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APPENDIX TO THE JOURNALS

OF THE

SENATE AND ASSEMBLY

OF THE

THIRTY-SIXTH SESSION

OF THE

LEGISLATURE OF THE STATE OF CALIFORNIA

VOLUME II.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1905.

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EIGHTEENTH AND NINETEENTH ANNUAL REPORTS

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA.



SACRAMENTO.

W. W. SHANNON - - - Superintendent of State Printing.

1904.

EIGHTEENTH ANNUAL REPORT OF THE BOARD OF DENTAL EXAMINERS.

To his Excellency HENRY T. GAGE,
Governor of the State of California,

SIR: The Board of Dental Examiners of the State of California submits the following as the eighteenth annual report of its proceedings, together with an account of all moneys received and disbursed, in compliance with the requirements of that certain Act of the Legislature approved March 23, 1901, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same, and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1895."

During the early part of the year, Dr. F. J. Bethel resigned and Dr. C. A. Herrick was appointed by your Excellency to fill the vacancy. Thereafter Dr. J. M. Dunn was elected Treasurer of the Board to succeed Dr. F. J. Bethel.

Since issuing the last report the Board has held two regular meetings, one commencing on June 15, 1902, and continuing each day thereafter up to and including June 23, 1902, and the other meeting on November 17, 1902. The Executive Committee of the Board has held eleven meetings.

Prior to the meeting of June 15th, members of the Board made several visits to all the dental colleges in California, and carefully inspected their books and facilities for the teaching of dental surgery. As a result of these investigations, before the meeting of the Board in the City of San Francisco last June, for the purpose of holding its annual examination of applicants for licenses to practice dentistry, there arose a doubt as to the standing of the San Francisco Dental College. The predecessors of this Board had adopted a resolution recommending the Dental Department of the San Francisco College of Medicine and Surgery to the National Association of Dental Faculties. The San Francisco Dental College claimed to be the successor of the said San Francisco College of Medicine and Surgery by reason of having changed the name of the college through an amendment to its articles of incor-

poration, and claimed that the action of the former Board was an indorsement and recognition of their college.

On the 14th of June, 1902, upon the advice of the attorney of the Board, the President of the Board caused to be served upon all the known members of the Faculty, and all others known to be interested in the San Francisco Dental College, an order to show cause why the said resolution, in so far as it might be deemed to be an indorsement of the San Francisco Dental College and in so far as it might be deemed to be binding upon this Board, should not be reconsidered, rescinded, and expunged.

On Monday, the 16th of June, 1902, the San Francisco Dental College appeared by its attorney, and after a day spent in hearing testimony, the Board unanimously adopted the following resolution:

Resolved, That the resolution adopted at a meeting of the former State Board of Dental Examiners on the 31st day of January, 1901, recommending the Dental Department of the San Francisco College of Medicine and Surgery to the National Association of Dental Faculties, in so far as such action might be construed to be an indorsement of the said Dental Department of the San Francisco College of Medicine and Surgery, or of the San Francisco Dental College, and in so far as such action might in any way be binding upon the Board of Dental Examiners, be reconsidered, abrogated, rescinded, and expunged from the minutes.

The committees of the Board having reported favorably on the Dental Department of the University of California, the Dental Department of the College of Physicians and Surgeons, and the Dental Department of the University of Southern California, resolutions indorsing the above colleges were unanimously adopted.

A resolution to the effect that the Board do not indorse the Dental Department of the San Francisco College of Medicine and Surgery was unanimously adopted, as was the following resolution in reference to the San Francisco Dental College:

WHEREAS, After a thorough investigation by the majority of the members of the Board, it has been found that the San Francisco Dental College is not conducted in the manner that a reputable dental college should be; be it

Resolved, That we do not indorse the same.

After the examinations, Charles F. Whitley, a rejected applicant who claimed to have graduated from the San Francisco Dental College, filed an action in the Superior Court of the City and County of San Francisco, praying that a writ of mandate issue to this Board directing it to examine him as to his qualifications to practice dentistry. After demurrer and answer filed by this Board, the plaintiff filed a demurrer to the answer and a motion to strike out parts thereof, and this matter is now pending in said court.

The case of Thomas A. Black against the Board of Dental Examiners of the State of California, concerning which reference was made in the last report of this Board, is still pending in court, the plaintiff not having taken any further steps toward ultimate determination thereof.

Since our last report, proceedings were instituted against E. D. Bates of Kelseyville and — McDavitt of San Bernardino, and the officers of this Board aided, in so far as they were able, in the prosecution of the defendants. Bates pleaded guilty and was fined \$50. In the case of McDavitt the jury disagreed.

That the efforts of the Board to uphold the law and to raise the standard of dental education are approved by a large majority of the members of the profession is evidenced by the fact that the "State Central Committee on Dental Legislation" has recently been organized for the purpose of assisting the Board in the litigation brought on by the Board's efforts to enforce the law, and for the further purpose of aiding in the discovery and prosecution of illegal practitioners, and also of securing necessary dental legislation. This committee is composed of representative dentists from every section of the State, and is enthusiastic and energetic in its work.

Conditions are such as to render the Board largely dependent upon the active coöperation of the legal practitioners throughout the State. Professional pride should prompt them to be on the alert for violators of the law, and the Board will welcome all suggestions and assistance that may be offered.

At the June meeting, one hundred and thirty-two applicants presented themselves for examination. Of these, one hundred and twenty-one were found to be eligible to take the examinations, and of this number the following one hundred and fifteen were granted licenses:

Deming, R. H.	Duckett, H. C.	Chandler, H. S.	McMahon, L. J.
Hambleton, W. D.	Rader, G. O.	Eaton, D. S.	Boyens, P. J.
Arbogast, A. A.	Goode, W. W.	Bendix, C. W.	Rhoades, R. H.
Bronson, O. E.	Gray, W. S.	Smith, J. L.	Gilbert, G. W.
McQuilkin, E. R.	Brown, F. T.	Schott, W. E.	Scheu, R. E.
Richardson, C. C.	Peters, A. B.	Heller, C. C.	Gould, A. D.
Locke, F. R.	Brown, J. G.	Steinhilber, M. M.	Worthley, A. H.
Wooley, P. J.	West, R. C.	VanWormer, E. B.	McCowen, C. S.
Wren, J. S.	Peters, H. C.	Carrillo, Y. R.	Whomes, G.
Ward, A. W.	Johnston, G. K.	Sibley, W. E.	Elvidge, G. F.
Levy, W. H.	Mathis, R. C.	Nelson, R. W.	Burns, R. Jr.
Worthington, M. M.	Bailey, G. E.	Lowers, T. H.	Parks, E. C.
Hursch, R. L.	Ellis, A. J.	Hiller, E. D.	Thompson, W. H.
Stark, T. A.	Hanson, C. T.	Arnold, E. B.	Hunter, C. R.
Clark, W. M.	Hirtz, N. F.	Gray, J. W.	White, F.
Fountain, M. F.	Swigert, G. O.	Mason, W. B.	Hall, W. G.
Wilkins, P. J.	Allen, R. McM.	Mosher, G. E.	Smith, R. E.
Rantz, W. A.	Ramsey, W. W.	Kroeck, P. H.	Wadleigh, W. M.
Lemon, C. H.	Edwards, D. P.	Wilkins, N. L.	Stokes, T. P.
Coe, C. S.	Hinman, H. T.	Blossom, May	Davis, E. N. W.
Pitt, C. S.	Hines, L. B.	Meyer, P. J.	McKean, N. D.
Watkins, W. H.	Gross, C. F.	Van Wyck, C.	Davis, F. B.
Schwarz, C. G.	Hein, G. N.	Epstein, H.	Murphy, R. N.

Cooper, A. F.	Clement, C. E.	Kelley, G. F.	Van Meusebach, Z. L.
Cavanaugh, C. S.	McCracken, W. J.	Smith, G. H.	Doyle, F. C.
Hartman, P. C.	Benjamin, C. W.	Snow, F. T.	Stauter, C. E.
Graham, H. J.	Ivey, J. R.	Schroeder, H. C. H.	Richards, W. F.
Ede, L. G.	McClinton, R.	Christies, J. E.	Smith, J. F.
Newman, H. C.	Darneal, W. E.	Kitchen, C. A.	

Since our last report thirteen forfeited licenses have been restored as provided for by Section 10 of the dental law. Two duplicate licenses have been issued.

At the meeting of November 17, 1902, an election of officers was held. Dr. C. A. Herrick, of Jackson, was elected President, Dr. F. G. Baird, of San Francisco, was re-elected Secretary, and Dr. J. M. Dunn, of Oakland, was re-elected Treasurer.

Examinations of applicants for licenses to practice dentistry will be both written and clinical. The Board will furnish chairs, engines, vulcanizers, and plaster, but applicants must furnish necessary materials, instruments, and patients.

The following is an account of all money received and disbursed by the Board from December 1, 1901, to December 1, 1902:

RECEIPTS.

Thirteen restorations of licenses, at \$25.....	\$325 00	
Two duplicate licenses, at \$15.....	30 00	
One hundred and thirty examination fees, at \$15	1,950 00	
Balance on hand last report.....	96 54	
		\$2,401 54

DISBURSEMENTS.

Eleven fees returned, at \$15.....	\$165 00	
Store-room, telephone, postage, tubes, etc.....	50 70	
Secretary and clerical expense.....	230 00	
Licenses and printing.....	61 50	
Supplies for examinations.....	18 03	
Attorney's fees.....	150 00	
Shorthand reporter.....	15 00	
Janitors.....	20 00	
Mileage and compensation of members.....	1,542 20	
Total disbursements.....	\$2,252 43	
Cash on hand.....	149 11	
		\$2,401 54

All of which is respectfully submitted by the Board of Dental Examiners of California.

December 1, 1902.

C. A. HERRICK, D.D.S.,
President.

F. G. BAIRD, D.D.S.,
Secretary.

NINETEENTH ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA

TO THE

GOVERNOR OF CALIFORNIA.

December 1, 1903.

NINETEENTH ANNUAL REPORT OF THE BOARD OF DENTAL EXAMINERS.

To his Excellency GEORGE C. PARDEE,
Governor of the State of California,

SIR: The Board of Dental Examiners of California has the honor of submitting the following as the nineteenth annual report of its proceedings, together with an account of all moneys received and disbursed, in compliance with the requirements of that certain Act of the Legislature approved March 23, 1901, and amended and approved March 20, 1903, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same, and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1885."

Since issuing the last report the Board has held three regular meetings; one in San Francisco, commencing on May 16, 1903, and continuing to May 23, 1903, inclusive; one in Los Angeles, from June 8, 1903, to June 13, 1903, inclusive; and the other in San Francisco, on October 26 and 27, 1903.

The Executive Committee of the Board has held twelve meetings for the purpose of attending to such business as could not be left until the regular meetings of the Board.

At the meeting of the Board commencing on May 16th, eighty-two applicants appeared for examination. Seven were found to be ineligible, and of the remainder fifty-two were granted licenses.

There were forty-seven applicants for examination at the Los Angeles meeting, all of whom were eligible; and thirty-five of whom were granted licenses.

At the San Francisco meeting on October 26th and 27th all of the officers of the Board were re-elected, namely: Dr. C. A. Herrick, President; Dr. J. M. Dunn, Treasurer, and Dr. F. G. Baird, Secretary. At this meeting, in addition to the routine work of the Board, plans were formulated for conducting prosecutions in the various sections of the State.

Prior to the first examination, committees from the Board visited all of the dental colleges in California and inspected their books and facilities for the teaching of dental surgery. After hearing reports from the

above committees the Board decided to allow its decisions of last year, concerning the standing of the colleges, to remain unchanged.

On January 24, 1903, Dr. F. G. Baird was reappointed for a second term.

Since the last report three forfeited licenses have been restored in accordance with Section 10 of the dental law.

The last Legislature passed a number of amendments to our law, which were approved by your Excellency. These amendments have greatly strengthened the law and we believe will eventually protect the public from the gross impositions of charlatans, and give the dental profession the standing to which its achievements, its literature, and its importance entitle it. The present law has already had the effect of causing quite a number of illegal practitioners to either leave the State, seek another avocation, or make an effort to properly qualify themselves for the practice of dentistry. These results have been accomplished by sending communications and copies of the law to violators. Prior to the passage of the existing law many illegal practitioners were driven here from other States. They now go elsewhere.

The policy of prosecuting the violators of the dental law has been inaugurated. Mr. E. Myron Wolf is the attorney of the Board, and Mr. C. C. Hamilton has been employed, at a salary of \$40 per month, to assist Mr. Wolf in gathering evidence, etc.

In San Francisco the following named have been arrested on the charge of misdemeanor in practicing dentistry without a license: F. A. Plymire, Henry C. Huck, O. B. Hewitt, Valdemar Cavalsky, Y. Oya, M. H. Schord, L. M. Laib, and Charles H. Whitley.

In Oakland the following named have been arrested: E. Conn, L. R. Patrey, J. J. Walk, J. Nordlund, and W. Nordlund.

The attorneys for these illegal practitioners announced their intention of testing the constitutionality of the law, and the courts have given them time in which to institute proceedings in the Supreme Court for this purpose. Meanwhile the misdemeanor charges are pending in the Police Courts.

It is the purpose of the Board to institute proceedings in other portions of the State as soon as a decision is given by the Supreme Court.

The Attorney-General of California, who is the legal adviser and attorney for the Board in cases in which the Board is defendant, submits the following report:

SAN FRANCISCO, November 20, 1903.

DR. F. G. BAIRD,

Secretary State Board of Dental Examiners, 502 Sutter Street, San Francisco, Cal.

DEAR SIR: In your communication of November 14, 1903, you say: "Will you please to prepare a brief report of the legal work of the Board of Dental Examiners attended to by you during the past year? We wish to put it our annual report. * * *"

In reply, permit me to say that, in addition to numerous oral consultations had with members of your Board relative to official business, the books of the office show that the following matters, coming from you, have received my attention:

Opinions.—No. 796, May 15, 1903, with regard to the printing of blanks, etc., for the use of the Board.

No. 804, June 3, 1903, as to (1) the restoration of forfeited licenses; (2) the return of application fees to ineligible applicants; (3) the constitutionality of annual license fees.

No. 848, August 1, 1903, relative to the restoration of forfeited licenses without the payment of a fee.

Litigation.—Louis M. Laib, petitioner, vs. Board of Dental Examiners, respondent. Action in mandamus, in the Superior Court of the City and County of San Francisco, to compel respondent to allow petitioner to take examination, etc. Under the direction of this office, your Board paid into court the examination fee advanced by petitioner, whereupon the court gave judgment for respondent.

Clifford A. Covalt vs. H. R. Harbison et al., as the Board of Dental Examiners, etc. Action in mandamus, in the Superior Court of the City and County of San Francisco, to compel issuance to petitioner of license to practice dentistry. The cause became at issue upon the filing by this office of the answer of your Board to the petition, and it is now awaiting a hearing.

The conduct of the litigation referred to has, of course, entailed upon the office the draughting of the usual number of papers and pleadings, the preparation of briefs, and appearances in court on numerous occasions, in addition to other details necessarily incident to such matters.

Very truly yours,

(Signed:) U. S. WEBB,

Attorney-General.

FINANCIAL STATEMENT.

The following is an account of the funds received and disbursed by the Board from December 1, 1902, to December 1, 1903:

GENERAL FUND.

Receipts.

Balance on hand last report	\$149 11	
129 examination fees, at \$25	3,225 00	
5 restoration fees, at \$25	125 00	
		\$3,499 11

Disbursements.

Reporting	\$20 00	
6 fees returned, at \$25	150 00	
Stamps	22 09	
Store-room	11 00	
Registering licenses (P. O.)	9 68	
Telephone and telegrams	14 70	
Sundries (including examination expenses)	72 00	
Janitors	30 00	
Serving papers	10 00	
Experting books	25 00	
Printing	40 50	
Secretary and clerical assistance for 16 months, at \$25	400 00	
Mileage and compensation of members	2,491 45	
Cash in hands of Treasurer	192 69	
		\$3,499 11

REGISTRATION FUND.

Receipts.

1085 registration fees, at \$2.....	\$2,170 00	
Donation	1 00	
For collecting checks.....	30	
		<u>\$2,171 30</u>

Disbursements.

Collecting and clerical assistance	\$200 00	
Department of State Printing	130 50	
Stamps	74 32	
Fees returned to five dentists (not registered).....	10 00	
Sundries	4 93	
Typewriting	12 50	
Exchange on country checks	13 20	
Legal services and securing evidence	180 00	
Cash in hands of Treasurer.....	1,545 85	
		<u>\$2,171 30</u>

Appended to this report is a copy of the Dental Law of California, General Information, the "Code of Dental Ethics" recommended by the American Dental Association, the list of legal dental practitioners in California, and the list of deceased licentiates.

All of which is respectfully submitted by the Board of Dental Examiners of California.

December 1, 1903.

C. A. HERRICK, D.D.S.,
President.
F. G. BAIRD, D.D.S.,
Secretary.

DENTAL LAW OF CALIFORNIA.

*An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same and known as "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California," approved March 12, 1885.**

[Approved March 23, 1901; amended and approved March 20, 1903.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be unlawful for any person to engage in the practice of dentistry in the State of California unless said person shall have obtained a license from a Board of Dental Examiners, duly authorized and appointed under the provisions of this Act to issue licenses; *provided*, that this Act shall not affect the right under the laws of the State of California, of dentists to practice dentistry who have lawful right to practice dentistry at the time of the passage of this Act.

SEC. 2. A Board of Dental Examiners to consist of seven (7) reputable and ethical practicing dentists is hereby created, to be known as the Board of Dental Examiners of California, whose duty it shall be to carry out the purposes and enforce the provisions of this Act. The members of this board shall be appointed by the Governor of California, all of whom shall have been actively and legally engaged in the practice of dentistry in the State of California, for at least [five] (5) years next preceding the date of their appointment, and none of whom shall be members of the faculty of any dental college or dental department of any medical college in the State of California, or shall have any financial interest in any such college. The said seven (7) shall compose the Board of Dental Examiners of California. The term for which the members of said board shall hold office shall be four (4) years, except that two of the members of the board first to be appointed under this Act shall hold their term of office for the term of one year, two for the term of two years, two for the term of three years, and one for the term of four years, and until their successors are duly appointed and qualified. In case a vacancy occurs in the membership of said board, such vacancy shall be filled by appointment by the Governor, within thirty (30) days after such vacancy occurs.

* Sections 10, 12, 14, 15, 19, and 25 amended; Sections 16, 17, and 18 repealed, and new section, numbered 21½, added in 1903.

SEC. 3. It shall be the power and duty of said board to organize by the election of one of its members president, another secretary, and another treasurer; to meet at least twice each year, at such time and place as the board may designate, for the purpose of transacting the business of the board, and at such other times as the board may elect, or on the call of the president of the board, or of not less than four (4) members thereof; a written notice of the time, place, and object of such called meeting to be mailed by the secretary of said board to all the members thereof not parties to the call, at least fifteen (15) days before the day of meeting; to examine all applicants for licenses to practice dentistry according to the provisions of this Act; to collect and apply all fees as directed by this Act; to keep a book showing the names of all persons to whom licenses have been granted by said board to practice dentistry, and such other books as may be necessary to plainly show all the acts and proceedings of said board; to have and to use a seal bearing the name "Board of Dental Examiners of California."

SEC. 4. Out of the funds coming into the possession of the board, each member of said board may receive as compensation ten dollars (\$10.00) for each day actually spent in attending to the duties of his office, and mileage at the rate of five cents (\$.05) per mile for all distances actually traveled in going to and coming from the meetings of the board. Said expenses shall be paid from the fees and fines received by the board under the provisions of this Act, and no part of the salary or other expenses of the board shall ever be paid out of the State Treasury.

SEC. 5. Each member of the board shall, upon his qualification and the organization of the board, file with the secretary his postoffice address, and thereafter any notice of any change therein. Any notice sent to the address so on file, shall be deemed to comply with the requirements of this Act as to notice to them.

SEC. 6. All books of said board shall be of public record and at all times during business hours open to public inspection. A certified copy of any part or all thereof shall be primary evidence in any court of this State. The original books shall be kept in the office of the secretary of said board, wherever he may reside, and he shall furnish to any person making application therefor a copy of any part thereof, upon the applicant paying a fee of twenty-five cents (\$.25) per hundred words so copied, the said fee to belong to the secretary. All copies shall be certified by the secretary.

SEC. 7. The Governor shall have the power to remove from office at any time, any member of the board for continued neglect of duty required by this Act, or for incompetency, unprofessional or dishonorable conduct.

SEC. 8. Said board shall examine all applicants for examination who

shall furnish satisfactory evidence of having complied with the provisions of this Act, relating to qualification for examination, and all persons satisfactorily passing such examinations shall be granted by said board a license to practice dentistry in the State of California. The examination of applicants shall be elementary and practical in character, but sufficiently thorough to test the fitness of the candidate to practice dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and prosthetic dentistry, hygiene and dental jurisprudence. The answers to which shall be written in the English language. Demonstrations of the applicant's skill in operative and prosthetic dentistry must also be given. All persons successfully passing such examinations shall be registered as licensed dentists on the board register, as provided in section three, and shall also receive a certificate of such registration; said certificate to be signed by the president and secretary of said board. In no case shall any applicant be examined or given a certificate who is not twenty-one years of age.

SEC. 9. Any member of the board may inquire of any applicant for examination concerning his character, qualifications or experience, and may take testimony of any one in regard thereto, under oath, which he is hereby empowered to administer.

SEC. 10. Every person now licensed to practice dentistry in this State, who has failed to register his license with the clerk of the county wherein his place of business is located, as provided by law, must register the same within sixty days after this Act takes effect, and every person who shall hereafter be licensed to practice dentistry in this State, shall within six months thereafter register in the office of the clerk of the county where his place of business is located, in a book kept by the clerk for such purpose, and called a register of dentists, his name, age, office address, the date and number of his license to practice dentistry, and the date of such registration, which registration he shall be entitled to make only upon showing to the County Clerk his license or a copy thereof certified by the secretary of the board over its seal, and making an affidavit stating his name, age, birthplace, the number of his license and the date of its issue; that he is the identical person named in the license; that before receiving the same he complied with all the preliminary requirements of this statute and the rules of the Board of Dental Examiners as to the terms and the amount of study and examination; that no money, other than the fees prescribed by this statute and said rules, was paid directly or indirectly for such license, and that no fraud, misrepresentation or mistake in a material regard was employed or occurred in order that such license should be conferred. The County Clerk shall preserve such affidavit in a bound

volume and shall issue to every licentiate duly registering and making such affidavit, a certificate of registration in his county, which shall include a transcript of the registration. Such transcript and license may be offered as primary evidence in all courts of the facts therein stated. A copy of such certificate of registration shall be sent by the County Clerk to the secretary of the board within five (5) days after it is made. The County Clerk's fees for taking such registration and affidavit and issuing such certificate of registration shall be one (1) dollar. A practicing dentist having registered a lawful authority to practice dentistry in one county of the State, and removing such practice or part thereof to another county, shall show or send by registered mail to the clerk of such other county his certificate of registration. If such certificate clearly shows that the original registration was of an authority issued by the Board of Dental Examiners, or if the certificate of registration itself is endorsed by the secretary of the Board of Dental Examiners as entitled to registration, the clerk shall thereupon register the applicant in the register of dentists of the latter county on receipt of a fee of fifty (50) cents, and shall stamp or endorse on such certificate of registration the date and his name preceded by the words "registered also in —— county," and return the certificate of registration to the applicant. Any lawfully registered person who shall thereafter change his name according to law shall register the new name with a marginal note of the former name with the clerk of the county or counties where he is practicing. The clerk shall note upon the margin of his former registration in ink the fact of such change, and a cross reference to the new registration. The clerk shall forthwith notify the secretary of the board of such change. Any County Clerk who knowingly shall make or suffer to be made upon the register of dentists kept in his office any entry other than that provided for in this Act, shall be liable to a penalty of fifty dollars, to be recovered by and paid to the said State Board of Dental Examiners in a suit in any court having jurisdiction. Any failure, neglect or refusal on the part of any person holding such license to register the same with the clerk of said county as above directed for a period of six months after the issuance thereof shall *ipso facto* work a forfeiture of his license, and it shall not be restored except upon the payment to said board of twenty-five (25) dollars. Any suspension, revocation or reinstatement of a license shall with the date thereof be forthwith noted by the County Clerk on the margin of the registration thereof upon receipt of notice from the secretary of the board. [*Amendment of 1903.*]

SEC. 11. In cases where a person is entitled to an examination for a license, but when the Board of Examiners is not in session, one member of said board may examine the applicant and furnish him a temporary license to practice dentistry until the next regular meeting of the board,

when he shall report the fact, at which time the temporary license shall expire. Such temporary license shall not be granted by a member of the board after the board has rejected the applicant. The member of the board conducting such examination may, in advance, charge and receive for his services a fee of five dollars (\$5.00) to be applied to his own use as compensation. No further fee shall be charged for granting such temporary license, and each person to whom it is granted must have the same registered by the County Clerk in the county or counties in which such person may desire to practice dentistry, as provided for in section ten of this Act.

SEC. 12. No person shall be eligible for examination by the State Board of Dental Examiners who shall not furnish satisfactory evidence of having graduated from a reputable dental college, which must have been endorsed by the Board of Dental Examiners of California; or who shall not have graduated from a high school or similar institution of learning, in this or some other State of the United States, requiring a three years' course of study, and who can not furnish to the Board of Dental Examiners an affidavit, containing his or her name, the name of his or her preceptor, and the names of at least two reputable witnesses, certified to in the State of California before a notary public, showing that he or she has completed an apprenticeship of four years of twelve months each, with a licensed practitioner of dentistry, in the State of California, or can not furnish to said Board of Examiners a certificate from the State Board of Dental Examiners, or similar body, of some other State in the United States, showing that he or she has been a licensed practitioner of dentistry in that State for at least five (5) years. [*Amendment of 1903.*]

SEC. 13. From and after the passage of this Act any and all persons desiring to enter upon the practice of dentistry in the State of California, without graduating from a reputable college in the United States, or producing satisfactory evidence of having been a licensed practitioner of dentistry in some other State for at least five years, must file with the Board of Dental Examiners an affidavit, certified to before a notary public of the State of California, of his intention to begin an apprenticeship with a licensed practitioner of dentistry in this State, and the said affidavit must certify that the affiant has regularly graduated from a high school or similar institution of learning in the United States, as provided in section twelve of this Act, and contain in full, the names of both affiant and his proposed preceptor and the names of two reputable witnesses, together with the date of beginning of his proposed term of apprenticeship; and the Board of Dental Examiners shall issue to affiant a receipt for same.

SEC. 14. Every person applying to the Board of Dental Examiners

for a license to practice dentistry shall pay to the board a fee of twenty-five (25) dollars, which shall in no case be refunded. Every licensed dentist shall, on or before the first day of May of each year, except the one in which he is licensed, pay to the secretary of the Board of Dental Examiners a fee of two (2) dollars, which shall be used exclusively for the prosecution of violators of this Act and for expenses of collecting said fee. The year for which a fee shall be paid shall begin the July first following the May when it becomes due and end the succeeding June thirtieth. The board may reduce or remit altogether said fee for any year, but such reduction or remission must be made alike to all liable to pay the same. In case any person defaults in paying said fee, his license may be revoked by the Board of Dental Examiners on thirty days' notice in writing from the secretary, unless within said time said fee is paid, together with such penalty not exceeding ten (10) dollars, as the board may impose. Upon payment of said fee and penalty the board shall reinstate the delinquent's license. On or before the first day of July of each year the secretary of the board shall send to the County Clerk of each county in the State a certified list of all practicing dentists therein who have paid said fee, and the clerk shall enter or paste the same in the register of dentists. Necessary expenses, per diem compensation and mileage of the members of the board incurred while in attendance on meetings not for prosecuting violators of this Act shall be paid out of the other fees and fines provided for in this Act. All moneys received under this Act shall be deposited in some reliable bank in the name of the board, and shall be withdrawn only on the joint check of the president and the secretary of the board. [*Amendment of 1903.*]

SEC. 15. Any and all persons shall be understood to be practicing dentistry within the meaning of this Act who shall for a fee, salary, or reward, paid directly or indirectly, either to himself or to some other person, perform operations of any kind upon, or treat diseases or lesions of the human teeth or jaws, or correct malimposed positions thereof, or display a sign, or in any way advertise himself as a dentist; but nothing in this Act contained shall prohibit bona fide students of dentistry from operating in the clinical departments or the laboratory of a reputable dental college, or an unlicensed person from performing merely mechanical work upon inert matter in a dental office or laboratory; or the student of a licentiate from assisting his preceptor in dental operations while in the presence of and under the personal supervision of his instructor; or a duly licensed physician from treating diseases of the mouth, or performing operations in oral surgery. But nothing in the provisions of this Act shall be construed to permit the performance of dental operations by any unlicensed persons under cover of the name of a regular practitioner of dentistry. [*Amendment of 1903.*]

[*Sections 16, 17, and 18 repealed in 1903.*]

SEC. 19. Any person, company or association shall be guilty of a misdemeanor, and upon conviction thereof shall be punishable with a fine of not less than fifty (50) dollars or more than five hundred (500) dollars, or by imprisonment for not less than five (5) days nor more than six (6) months in the county jail, or by both fine and imprisonment, who

1. Shall sell or barter, or offer to sell or barter, any diploma or document, conferring or purporting to confer any dental degree, or any certificate or transcript, made or purporting to be made, pursuant to the laws regulating the license and registration of dentists; or

2. Shall purchase or procure by barter, any such diploma, certificate or transcript, with intent that the same shall be used as evidence of the holder's qualification to practice dentistry, or in fraud of the laws regulating such practice; or

3. Shall with fraudulent intent, alter in a material regard any such diploma, certificate or transcript; or

4. Shall use or attempt to use any such diploma, certificate, or transcript, which has been purchased, fraudulently issued, counterfeited or materially altered, either as a license or color of license to practice dentistry, or in order to procure registration as a dentist; or

5. Shall practice dentistry under a false or assumed name; or

6. Shall assume the degree of "doctor of dental surgery" or "doctor of dental medicine," or shall append the letters "D.D.S." or "D.M.D." to his or her name, not having duly conferred upon him or her, by diploma from a recognized dental college or school legally empowered to confer the same, the right to assume said title; or shall assume any title, or append any letters to his or her name, with the intent to represent falsely that he or she has received a dental degree or license; or

7. Shall in an affidavit, required of an applicant for examination, license, or registration, under this Act, willfully make a false statement in a material regard; or

8. Shall engage in the practice of dentistry under any title or name without causing to be displayed in a conspicuous manner and in a conspicuous place in his or her office the name of each and every person employed in the practice of dentistry therein, together with the word mechanic or apprentice after the name of each unlicensed person employed; or

9. Shall within ten days after demand, made by the secretary of the board, fail to furnish to said board the name and address of all persons practicing or assisting in the practice of dentistry in the office of said person, company or association, at any time within sixty days prior to said notice, together with a sworn statement showing under and by what license or authority said person, company or association, and said employé are and have been practicing dentistry, but said affidavit shall

not be used as evidence against such person, company or association in any proceeding under this section; or

10. Is practicing dentistry in the State without a license, or whose license has been revoked or suspended. [*Amendment of 1903.*]

SEC. 20. It is hereby further provided, that the conferring of degrees and the bestowing of diplomas, by reputable dental colleges of this State, who have been endorsed by the Board of Dental Examiners of California, and are members of the National Association of Dental Faculties, are not included in the foregoing penalties, nor shall their rights and prerogative ever be abridged in any manner whatsoever.

SEC. 21. All fines, penalties, or forfeitures, not including the examination fee, imposed or collected for the violation of any of the foregoing provisions of this Act, unless otherwise specified, shall be paid as follows: One half into the common school fund in the county in which the prosecution is had, and one half to the treasurer of this board, to be turned into the regular funds of this board, and it shall be the duty of the County Treasurer of each county, upon the receipt by him of any such fines, penalties or forfeitures, to forthwith pay over the same one half to the treasurer of this board. Said board, or any member or officer thereof, may prefer a complaint for violation of the law regulating the practice of dentistry, before any court of competent jurisdiction, and may by its officers, counsel, and agents, aid in presenting the law or facts before said court, in any proceeding taken thereon; and it shall be the duty of the District Attorney of each county of this State to prosecute all violations of the aforesaid provisions of this Act in their respective counties in which such violations occur.

SEC. 21½. Any dentist may have his license revoked or suspended by the Board of Dental Examiners for any of the following causes:

1. His conviction of a felony or misdemeanor involving moral turpitude, in which case the record of conviction or a certified copy thereof, certified by the clerk of the court, or by the judge in whose court the conviction is had, shall be conclusive evidence.

2. For unprofessional conduct or for gross ignorance, or inefficiency in his profession. Unprofessional conduct shall mean employing what are known as cappers, or steerers to obtain business; the obtaining of any fee by fraud or misrepresentation; willfully betraying professional secrets; employing directly or indirectly any student or any suspended or unlicensed dentist to perform operations of any kind, or to treat lesions of the human teeth or jaws, or correct malimposed formations thereof, except as heretofore provided in section fifteen; the advertisement of dental business or treatment or devices in which untruthful, improbable or impossible statements are made, or habitual intemperance or gross immorality.

The proceedings to revoke or suspend any license under the first sub-

division of section twenty-one and one half, must be taken by the board on the receipt of a certified copy of the record of conviction. The proceedings under the second subdivision of section twenty-one and one half may be taken by the board from the matters within its knowledge, or may be taken upon the information of another. All accusations must be in writing, verified by some party familiar with the facts therein charged, and three copies thereof must be filed with the secretary of the board. Upon receiving the accusation the board shall, if it deem it sufficient, make an order setting the same for hearing, and requiring the accused to appear and answer it at said hearing, at a specified time and place, and the secretary shall cause a copy of the order and of the accusation to be served upon the accused at least ten (10) days before the day appointed in the order for said hearing. The accused must appear at the time appointed in the order and answer the charges and make his defense to the same, unless for sufficient cause the board assign another day for that purpose. If he do not appear the board may proceed and determine the accusation in his absence. If the accused plead guilty or refuse to answer the charges, or upon the hearing thereof the board shall find them or any of them true, it may proceed to a judgment revoking his license or suspending it. The board and the accused may have the benefit of counsel, and the board shall have power to administer oaths, take the depositions of witnesses in the manner provided by law in civil cases, and to compel them to attend before it in person the same as in civil cases, by subpoena issued over the signature of the secretary and the seal of the board and in the name of the people of the State of California. Upon the revocation of any license, the fact shall be noted upon the records of the Board of Dental Examiners and the license shall be marked as canceled, upon the date of its revocation. [*New section added 1903.*]

SEC. 22. The members of the Board of Dental Examiners shall make an annual report of its proceedings to the Governor of California by the first of December of each year, together with an account of all moneys received and disbursed by them, pursuant to this Act.

SEC. 23. Four members of said Board of Dental Examiners shall constitute a quorum for the transaction of business at any meeting of the board.

SEC. 24. Nothing in this Act shall be so construed as to interfere with the rights and privileges of physicians and surgeons in the discharge of their duties.

SEC. 25. This Act shall take effect immediately, and all laws in conflict with this Act are hereby repealed. [*Amendment of 1903.*]

CODE OF ETHICS.

[TRANSACTIONS OF THE NATIONAL DENTAL ASSOCIATION AT THE FIFTH ANNUAL SESSION HELD AT MILWAUKEE, WISCONSIN, COMMENCING AUGUST 6, 1901.]

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are in most cases unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients; and even the simplest case committed to his care should receive that attention which is due to operations performed in living, sensitive tissue.

SEC. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success when, in the nature of the case, there is uncertainty.

SEC. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged, special encouragement to their juniors.

SEC. 2. It is unprofessional to resort to public advertisements, cards, hand bills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints; to circulate or recommend nostrums; or to perform any other similar acts. But nothing in this section shall be so con-

strued as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or, in the same manner, to announce their removal, absence from, or return to business, or to issue to their patients appointment cards having a fee bill for professional services thereon.

SEC. 3. When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him; and if the interest of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SEC. 4. When general rules have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations as an inducement to patronage.

ARTICLE III.

CONSULTATIONS.

Consultations should be promoted in difficult or protracted cases, as they give rise to confidence, energy, and broader views in practice.

In consultations that courtesy and just dealing which is the right of all should be especially observed.

ARTICLE IV.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and adjacent parts. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the broader knowledge of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty.

ARTICLE V.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and, at the same time, the best judges of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and many other benefits conferred by the competent and honorable dentist, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way without proper remuneration.

GENERAL INFORMATION.

One of the questions submitted to the Attorney-General and referred to in the preceding report was: "Are those portions of Section 14, requiring licensed dentists to pay annual fees and providing for the revocation of licenses in default of payment, constitutional?"

In answering the above question, the Attorney-General gave an exhaustive opinion, closing as follows: "I therefore conclude that the requirement that dentists pay an annual fee is a proper exercise of legislative authority."

As many dentists have misconstrued the meaning of Section 8, Act of 1885, and Section 10, Act of 1901, the Attorney-General's opinion on the above sections is given in full:

SAN FRANCISCO, CAL., August 3, 1903.

HON. F. G. BAIRD,

*Secretary Board of Dental Examiners,
No. 502 Sutter Street, San Francisco.*

DEAR SIR: YOUR favor of July 20th received. You ask the following question: "Is there any way in which a license, which has been forfeited under the provisions of Section 8, Act of 1885, or Section 10, Act of 1901, can be restored without payment of \$25 to the Board of Dental Examiners?"

In replying, let us examine the sections to which you refer. Section 8 of the Act of 1885 provides:

"Any person who shall receive a certificate from said Board to practice dentistry, shall cause his or her certificate to be registered with the County Clerk of the county in which such person may reside, and the County Clerk shall charge for registering such certificate a fee of one dollar. Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the County Clerk as above directed, for a period of six months, shall work a forfeiture of the certificate, and no certificate, when once forfeited, shall be restored, except upon the payment to the said Board of Examiners of the sum of twenty-five dollars, as a penalty for such neglect, failure, or refusal."

Section 10 of the Act of 1901 is of the same purport as the above.

The construction of these sections is not complicated. Section 8 of the Act of 1885 refers to practitioners who procure a license under the provisions of the Act. Section 10 of the Act of 1901 refers to practitioners who procure a license under the Act of 1901. In both cases the persons who take out licenses are supposed to have been perfectly apprised of the provisions of the law under which they applied for licenses. The requirement that "any person who shall receive a certificate from said Board shall cause the certificate to be registered with the County Clerk," may be construed to be one of the conditions imposed upon the granting of a license. It is contained in the identical Acts regulating the procurement of a license, and this is sufficient notice to any person taking out a license.

A licensed business may be subjected to such reasonable regulations as are necessary for the protection of the public in general, or of persons dealing with the licensee; and a licensee who takes out a license with full knowledge of the conditions imposed is bound thereby. (*In re Bickerstaff*, 70 Cal. 35.)

I am of the opinion that there is no way in which a license which has been forfeited

under the provisions of Section 8 of the Act of 1885, or of Section 10 of the Act of 1901, can be restored without payment of \$25 to the Board of Dental Examiners.

Yours very truly,

(Signed:) U. S. WEBB,

Attorney-General.

It may be of interest to the profession at large to know some of the reasons which prompted many members of our profession to secure the passage of the Act of 1901 and the amendments of 1903; hence we submit the following:

In view of the well-known fact that many persons have been allowed to graduate from reputable dental colleges without being as well qualified as they should be, quite a number of the leading States have recently enacted laws requiring graduates, as well as non-graduates, to pass an examination. As a result many graduates who could not secure licenses in their own States came to California to take advantage of our law, which granted them licenses without examination. During the last year preceding the operation of the Act of 1901, five hundred persons were granted licenses to practice dentistry in California, many of whom we are constrained to believe were driven here from other States. Since the passage of the Act of 1901 conditions have greatly changed, as all must now pass an examination; furthermore, the former law did not provide sufficient funds with which to enforce its provisions.

Members of our profession should not only read, but should study the dental law. This will enable them to comply more closely with its provisions and help them to give the Board more information regarding its violation.

As an illustration of the assistance that dentists can give the Board, the following case is cited: About two or three months ago a licensed dentist gave the Board the names of nine illegal practitioners. Communications were sent to them, with the result that five of them have already ceased practicing.

Professional pride should prompt every ethical member of the dental profession to assist the Board in its efforts to enforce the law.

Registration fees must be paid *on or before May 1st* of each year. They become *delinquent after May 1st*, and subject the holder of the license to the penalty prescribed by law.

A complete system has been formulated for keeping a record of all of the proceedings of the Board.

Those asking for information should send a stamp for reply.

All money paid to the Board should be sent to the Secretary.

Any one failing to receive an official, numbered receipt for money paid will confer a favor by communicating such fact to the Secretary.

The law does not exempt a non-resident or retired dentist from the payment of the registration fee; however, if he does not wish to keep his license valid in California he may omit paying the fee.

Attention is particularly called to the following portion of Section 15: "but nothing in this Act contained shall prohibit * * * the student of a licentiate from *assisting his preceptor* in dental operations while in the *presence* of and under the *personal supervision* of his instructor." A student performing operations in a separate chair while his preceptor is conducting his own practice, or a student performing dental operations during his preceptor's absence, is violating the letter and the spirit of the law, and may be prosecuted for violating subdivision 10 of Section 19. His preceptor lays himself liable under subdivision 2 of Section 21½.

Diplomas from dental colleges or licenses from other States give their holders no right to practice dentistry in California without first passing an examination.

The next examination of applicants will commence in San Francisco on May 23, 1904. Another examination will commence in Los Angeles on June 13, 1904. Each applicant must come prepared to perform any operation in prosthetic or operative dentistry that may be assigned to him. All work must be done in the presence of the Board. Applicants must furnish all necessary materials and patients. A complete set of rules and instructions governing the examinations will be given the applicants at the time of the examinations.

The following are the dental organizations in California:

San Diego Dental Society.

Los Angeles Association of Dental Alumni.

Alumni Association of the Dental Department of the University of Southern California.

Southern California Dental Association.

Santa Barbara Dental Society.

Fresno Dental Society.

Santa Cruz Dental Society.

Santa Clara Valley Dental Society.

Oakland Dental Club.

San Francisco Dental Association.

Sacramento Dental Society.

Butte Dental Society.

Humboldt County Dental Association.

Dental Alumni Association of the College of Physicians and Surgeons.

Alumni Association of the Dental Department of the University of California.

California State Dental Association.

Under our present law it is very necessary that the Board should have the correct addresses of all dentists licensed to practice in California, whether they reside in the State or not. The migratory habits of many dentists has made the task of securing addresses a very difficult one. Communications for this purpose have been sent to all of the County Clerks in California and to from one to five dentists in each county. Polk's Dental Register, lists from dental depots, city directories, and telephone books have been searched; and names without

addresses have been published in the Pacific Dental Gazette, and still there are quite a number of names with no addresses. We wish to appeal to every member of our profession to assist the Board in this work.

In the list in this report the number and street are omitted to save space and expense in printing.

Since December 1, 1903 (the date of the foregoing report), Charles H. Whitley has surrendered himself into custody and a writ of habeas corpus has been issued by the Supreme Court. E. Myron Wolf has been retained by the Board, at a fee of \$500, to carry the case through the Supreme Court.

REGISTER OF LICENSED DENTAL PRACTITIONERS.

Name.	Place of Practice.	Name.	Place of Practice.
Abbay, William H.	Oakland.	Avery, W. N.	San José.
Abrahm, Henry	San Francisco.	Axton, F. R.	San Francisco.
Abrams, George		Ayres, C. S.	Oakland.
Acheson, N. B.	San Diego.	Ayres, M. J.	San Francisco.
Aiken, George S.	Paia, Maui, H. I.	Backman, G. S.	San Francisco.
Aiken, P. B.	Jackson.	Bacon, A. A.	
Albright, F. H.	Red Bluff.	Bacon, William R.	San Francisco.
Alger, E. J.	Albuquerque, N. M.	Badgley, A.	
Allen, Mrs. R. McM.	San Francisco.	Baer, Adolph	San Francisco.
Allen, H. G.	San Francisco.	Baer, Julius	San Francisco.
Allen, R. H.	Oakland.	Bagby, H. C.	Santa Maria.
Allen, W. E.	Hong Kong.	Bailey, L. C.	Mazatlan, Mex.
Allin, Ernest	Los Angeles.	Bailey, I. R.	Martinez.
Alberti, D. A.	San Francisco.	Bailhachi, G. E.	San Francisco.
Alderson, J. W.	San Francisco.	Baird, E. E.	San Francisco.
Alexander, M. O.	San Francisco.	Baird, Mary L.	San Francisco.
Alonsen, H., Jr.		Baird, Fred G.	San Francisco.
Ames, G. F.	Los Angeles.	Baker, W. A.	Los Angeles.
Anderson, F. W.	Woodland.	Baker, A. W.	San Francisco.
Anderson, R. C.	San Francisco.	Barker, A. M.	San José.
Anderson, D. P.	Santa Rosa.	Bar Due, W. N.	San Francisco.
Apablaza, C. J.		Barnett, E. S.	
Arbogast, A. A.	Nevada City.	Baldwin, C. V.	Los Angeles.
Archer, Charles S.	Portland, Ore.	Baldwin, F. M.	San Francisco.
Archer, Ira B.	North San Juan.	Barber, John	
Argall, F. L.	San José.	Barber, H. B.	
Armstrong, J. J.	Vallejo.	Bailey, G. E.	Whittier.
Armstrong, W. H.	San Francisco.	Barber, W. C.	
Arnold, E. B.	Los Angeles.	Barham, W. W.	Healdsburg.
Arnold, Otto		Barnett, Joseph	Los Gatos.
Arnold, F. N.	Los Angeles.	Barnes, A. M.	San Francisco.
Arroyo, Jorge	Guatemala, C. A.	Barnes, F. J.	San Diego.
Asay, J. L.	San José.	Barnes, B.	
Asay, Caspar E.	Visalia.	Barney, J. C.	Anderson.
Ashley, J. W.	San Francisco.	Barr, T. I. C.	San Francisco.
Ashworth, F. D.	San Francisco.	Bartram, E. E.	Los Angeles.
Ashworth, F. P.	San Francisco.	Barradas, F. C., Jr.	San Leandro.
Asahina, T.	San Francisco.	Barrett, C. J.	Eureka.
Aten, R. R.	Fresno.	Barrett, T. F.	San Francisco.
Aten, W. O.	San Francisco.	Barringer, L.	
Atwell, Francis		Bagley, W. S.	San Diego.
Atwater, H. G.	Los Angeles.	Basford, C. R.	San Francisco.
Atwood, D. G.		Bates, C. P.	Ukiah.
Atwood, William A.	San Francisco.	Bates, B. F.	Folsom.
Austin, W. E.	Modesto.	Bauer, Charles F.	San Francisco.
Austin, A. B.	Long Beach.	Bauske, R. E.	Oakland.
Austin, W. P.	Salinas.	Baxter, J. C.	Independence.
Auble, E. F.	Adin.	Beach, W. S.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Beacon, Charles W.	Crescent City.	Bogart, S. C.	Los Angeles.
Beals, C. H.	Angels.	Bonham, C. A.	Chico.
Beamer, R. F.	Sacramento.	Bonham, J. F.	Sebastopol.
Bean, G. L.	San Francisco.	Bonnel, F. C.	Hollister.
Beatie, A. L.		Bonstell, C. L.	San Francisco.
Bedford, L. N.	San Bernardino.	Boone, N. I.	Red Bluff.
Beers, C. J.	Los Angeles.	Borger, J. N.	San Francisco.
Bedwell, J. L.	San Miguel.	Bostwick, E. C.	San Francisco.
Belfils, E. K.	Fresno.	Bourne, R. R.	Los Angeles.
Bell, Charles H.	San Francisco.	Bowers, R. H.	Sacramento.
Bell, W. J.	Los Angeles.	Bowman, C. H.	San Francisco.
Benbrook, C. M.	Los Angeles.	Bowman, I. L.	Nevada City.
Belt, J. C.	San Diego.	Bowman, Amy G.	San Francisco.
Benjaman, E. H.	San Francisco.	Boxton, Charles	San Francisco.
Benjaman, C. N.		Boyd, Bert	Los Angeles.
Bendix, C. W.	Franklin.	Boyd, E. J.	
Bennett, A. F., Jr.	San José.	Boyd, S. A.	San Francisco.
Bennion, S. E.		Boyd, G. H.	Marysville.
Berger, L. O.	San José.	Boyens, P. J.	San Francisco.
Bergman, N. A.	Forbestown.	Boyes, E. B.	Oakland.
Bernheim, J. R.		Boyes, H. D.	San Francisco.
Bebb, W.	Los Angeles.	Boys, H. S.	Paso Robles.
Berry, Charles A.		Brainard, A. D.	Los Angeles.
Best, B. C.	San Francisco.	Bradbury, E. P.	Santa Barbara.
Best, J. P.	Long Beach.	Bray, George F. I.	
Bethel, F. J.	Tacoma, Wash.	Breadas, F. C.	
Betterton, E. L.	San Francisco.	Breene, F. T.	
Bettis, H. S.	Boise City, Idaho.	Bosford, C. R.	
Beverton, D. W.	Pacific Grove.	Brewster, John L.	
Biddle, E. W.	Healdsburg.	Brewster, F. A.	Watsonville.
Bills, A. V.		Brewster, B. B.	San Francisco.
Binney, F. A.		Bridges, J. S.	Chicago, Ill.
Bird, W. R.	Los Angeles.	Briggs, W. H.	Stockton.
Bishop, M. F.	Alameda.	Briggs, Charles Morehead	Los Angeles.
Black, J. A.	San José.	Brigham, K. A.	
Blackburn, D. E.	Pescadero.	Brigham, E. T.	
Blackwell, B. G.	Upland.	Broad, E. J.	San Francisco.
Blake, A. E.	San Francisco.	Broadbeck, W. H.	Los Angeles.
Blain, J. C.	San Francisco.	Broadnax, Bland	San Salvador, C. A.
Blair, C. L.		Broadwater, W. E.	Astoria, Ore.
Blaisdell, J. H.		Bronson, O. E.	Selma.
Bland, J. H.	San José.	Brooks, W. E.	San Francisco.
Bland, O.	San José.	Brooks, F. A.	San Francisco.
Blankman, William	San Francisco.	Brooks, F. S.	Martinez.
Bliss, F. A.	San Francisco.	Brown, E. E.	Fort Bragg.
Bliss, C. L.	Santa Cruz.	Brown, Henry	
Bliss, F. W.	Santa Cruz.	Brown, C. H.	San Francisco.
Block, Constantin		Brown, G. L.	Bakersfield.
Block, S. D.	San Francisco.	Brown, J. A.	San Francisco.
Blodgett, J. M.	Lodi.	Brown, F. T.	Oakland.
Blondin, L. D.	San Francisco.	Brown, William	
Blossom, May	Auburn.	Brown, M. A.	San Francisco.
Bloomer, E. O.	Los Angeles.	Brown, William G.	San Luis Obispo.
Boeseke, B. C.	Santa Barbara.	Brown, E. P.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Brown, A. ....	.....	Carmicheal, F. E.	Eureka.
Brown, H. Stephen	Los Angeles.	Carpenter, B. L.	Porterville.
Brown, Holmes G.	Los Angeles.	Carpenter, O., care Miss Graves. ....	.....
Brown, E. J.	Seattle, Wash.	.....	Pasadena (441 N. Merango St.).
Brown, A. V.	San Francisco.	Carr, George B.	Sacramento.
Brown, John	Sawtelle.	Carrillo, Y. R.	Los Angeles.
Brown, James G.	Oakland.	Carroll, H. H. ....	.....
Browning, W. F.	San Francisco.	Carroll, J. C.	Sacramento.
Brun, L. E.	San Francisco.	Casaday, G. H. Surg. U. S. A., Manila, P. I.	.....
Bryden, N. B.	Sacramento.	Case, C. E. ....	.....
Bryant, F. A.	San Francisco.	Case, E. G.	Ukiah.
Burke, S. E.	Los Angeles.	Casey, T. F.	Gilroy.
Buell, E. B.	Escondido.	Cassilly, J. P. ....	.....
Buck, Kate D.	Los Angeles.	Castle, C. C.	Merced.
Buckeridge, E. ....	.....	Cauch, D.	Oakland.
Buell, Harry C.	Los Angeles.	Cauch, F. L.	San José.
Bundy, L.	Medford, Ore.	Cave, D.	Los Angeles.
Bullard, J. A.	Chicago, Ill.	Cavanaugh, C. S.	San Francisco.
Burfield, W. M. H.	San Francisco.	Chalfant, C. W.	Willits.
Burgess, R. F. ....	.....	Chalfant, John	San Francisco.
Burnham, W.	San Francisco.	Chambers, W. K. ....	.....
Burns, Robert, Jr.	San Francisco.	Chance, A. W. ....	.....
Burkett, J. A. ....	.....	Chandler, H. S.	San José.
Burr, R. H.	Stockton.	Chapman, Mrs. N. E.	Nevada City.
Burns, J. B.	Oakland.	Chapman, S. A.	Virginia City, Nev.
Burns, O. B.	San Francisco.	Chapman, I. H.	San Francisco.
Burns, R. E.	San José.	Chappel, H. G.	Oakland.
Burns, P. M.	Eureka, Cal.	Chappell, McCoy .....	.....
Burt, F. E.	Los Angeles.	Chappell, J. F.	Vallejo.
Burton, Frank	Stockton.	Charles, M. S. ....	.....
Bush, F. J. H.	San Francisco.	Chase, G. M.	San Francisco.
Bush, Louis	San Francisco.	Chase, Maurice .....	.....
Bush, W. P.	Berkeley.	Cheadle, E. M. ....	.....
Butterfield, C. L.	Santa Ana.	Childs, J. E.	Haywards.
Bergstrom, G.	San Francisco.	Childs, Mrs. M. M.	Santa Barbara.
Bowen, J. J. ....	.....	Chilton, Jesse	Fullerton.
Boyd, Ida Menges	Los Angeles.	Chisholm, A. A.	Kelseyville.
Cahill, S. D.	San Francisco.	Chismore, H. J.	San Francisco.
Calder, H. F. ....	.....	Christensen, G. A.	San Francisco.
Caldwell, C. L.	Ferndale.	Christie, J. E.	San Francisco.
Caldwell, W. L.	Stockton.	Christopher, T. ....	.....
Callender, M. N.	San Francisco.	Ciley, J. L.	Little Stony.
Calmes, H. P.	Courtland.	Clark, W. M. ....	.....
Camicia, L. S.	Lookout.	Clark, F. E.	Honolulu, H. I.
Camp, F. H.	San Francisco.	Clarke, M. E. ....	.....
Campbell, R. E.	Watsonville.	Clarke, W. H.	Porterville.
Caffarota, A. J.	San Francisco.	Clarke, W. H.	San Francisco.
Caler, P. B.	Los Angeles.	Clark, F. N. ....	.....
Cane, Alfred	San Francisco.	Clark, F. A. ....	.....
Caranza, V. A. ....	.....	Clark, William N.	Naco, Ariz.
Carew, J. A.	San Francisco.	Clay, E. A.	San Francisco.
Carlton, H. P.	San Francisco.	Clayton, W. E.	Los Angeles.
Carlson, Adam	San Francisco.	Clazie, F.	Oakland.
Carlyon, P. H.	Olympia, Wash.	Close, R. M.	Oakland.
Carmicheal, T. M.	San José.	Cline, F. J.	Covina.
		Clement, C. E.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Cochrane, E. O.	San Francisco.	Cowan, E. L.	Los Angeles.
Cockburn, E. A.	Eureka.	Cox, G. E.	Los Angeles.
Cockerton, D. H.	Oakland.	Cragie, Henry	San Francisco.
Cockrill, R. B.	Fresno.	Craig, Marion W.	Oakland.
Coffin, A. M.		Craig, W. H.	Oakland.
Cogswell, J. L.	San Francisco.	Craigh, H. T.	San Francisco.
Cogswell, Thomas	San Diego.	Cranz, L. T.	San Francisco.
Coke, P. S.	San Francisco.	Crawford, J. S.	Los Angeles.
Colburn, O. M.	San Francisco.	Creagh, J. W.	San Francisco.
Cole, Hiram	Santa Rosa.	Croall, A. B.	San Francisco.
Colegrove, J. A.	Oakland.	Croall, M. V.	San Francisco.
Coleman, B. F.	Gilroy.	Criswell, R. B.	San Francisco.
Colestock, L. A.		Criswell, Helen P.	San Francisco.
Collins, F. E.		Cronkhite, J. A.	Los Angeles.
Collins, G. W.		Croft, S.	Los Angeles.
Collins, A. W.	San Francisco.	Cross, W. W.	
Collins, M. J.	Oakland.	Crossett, Truman	
Combs, H. M.	Visalia.	Crossett, E. T.	
Combs, J. E.	Visalia.	Crow, G. M.	Los Angeles.
Compton, G. T.	San Francisco.	Crow, Samuel H.	Sierraville.
Comte, G. A.	Los Angeles.	Crum, T. A.	
Congdon, M. J.	Berkeley.	Cummings, C. H.	San Francisco.
Coney, D. M.	San Francisco.	Cummings, P. S.	Berkeley.
Conner, G. S.	St. Helena.	Cummings, Jude E.	San Francisco.
Conner, E. T.	Dinuba.	Cummings, E.	Berkeley.
Connelly, C. L.	Santa Rosa.	Cummings, M. E.	Berkeley.
Conradt, H. J.	San Francisco.	Cunningham, S. J.	San Francisco.
Conwell, C. C.	Berkeley.	Cunningham, R. G.	Los Angeles.
Cook, Israel		Cunningham, F. R.	Los Angeles.
Cook, A. R.	Salt Lake City, Utah.	Cureton, Edward	San José.
Cook, W. E.	Eureka.	Curragh, J. M.	San Francisco.
Cook, J. F.	Los Angeles.	Curran, J. F.	Los Angeles.
Cool, G. W.		Cutter, R.	
Cool, Russell H.	San Francisco.	Custer, C. A.	Seattle, Wash.
Cool, W. P.	San Francisco.		
Coomes, A. M.	Sonoma.	Dahleu, P. J.	Oakland.
Coomes, F. E.	Oak Park.	Danforth, H. T.	Oregon.
Cooperm, J. C.	Fresno.	Daniels, G. E.	San Francisco.
Cooper, J. N.	San Francisco.	Danziger, G. A.	San Francisco.
Cooper, J. H.	Hanford.	Darneal, W. E.	San Francisco.
Cooper, M. L.	Modesto.	Dart, E. K.	San Francisco.
Cooper, A. F.	Arcata.	Davidson, J. E.	Oakland.
Cooper, E. M.	Ferndale.	Davidson, Robert	
Copsey, A. N.	Ukiah.	Davis, H. S.	San Francisco.
Copsey, H. B.	Eureka.	Davis, C. A.	
Corbett, W. F.	Middletown.	Davis, F. B.	Oakland.
Corbierre, C. C.	Redding.	Davis, E. N. W.	Tonopah, Nev.
Cornwall, A. T.	Oakland.	Davis, H. E.	San Francisco.
Corwin, Cecil	Haywards.	Davis, H. C.	San Francisco.
Cory, B. B.	Fresno.	Davis, C. E.	St. Helena.
Cothran, M. H.	San José.	Davis, Emile William	
Coulson, N. T.	San Francisco.	Davis, W. E.	San Francisco.
Covert, A. T.	Long Beach.	Davy, John W.	San José.
Covington, W. T.	Los Angeles.	Daly, T. H.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Deacon, A. P.	Susanville.	Duckett, C. S.	San Francisco.
Dean, G. S.	San Francisco.	Dunbar, L. L.	San Francisco.
Dean, C. O.		Dunbar, P. H.	San Francisco.
Dean, O. S.	Oakland.	Dundass, E. G.	Los Angeles.
Dean, J. S.	Redlands.	Dungan, G. A.	Eureka.
Decker, Charles W.	San Francisco.	Dunn, R. K.	San Francisco.
Decker, J. H.	Point Richmond.	Dunn, Martin	San Francisco.
DeCrow, Warren	San José.	Dunn, J. H.	Pomona.
Deffenbacher, D. S.		Dunn, J. M.	Oakland.
Deichmiller, Conrad	San Francisco.	Durham, J. H.	Irvington.
Delucchi, J. A.	Volcano.	Dyer, E. C.	San Francisco.
Dempsey, H. S.	Vallejo.	Earl, George W.	Gilroy.
Deming, R. K.	Visalia.	Eason, J. A.	San Francisco.
Dempster, James		Eastman, W. W.	Sonora.
Dennis, S. W.	San Francisco.	Eaton, DuBois	Centerville.
Dennis, Cecil C.	San Francisco.	Eddy, E. D.	Lincoln.
DePuy, Leo.	Pittsburg, Pa.	Ede, L. G.	San Francisco.
Derby, A. J.	Honolulu, H. I.	Edmison, B. S.	
Derby, Albert T.	San Francisco.	Edmonds, J. H.	
Deuel, Ernest C.	Sacramento.	Edmonds, Marion J.	
DeVore, W. G.	Payson, Ariz.	Edwards, A. L.	San Francisco.
Devlin, Charles A.	Vallejo.	Edwards, D. P.	Crescent City.
Dewey, J. S.	Alturas.	Edwards, J. W.	San Francisco.
Dewlaney, C. W.	San Francisco.	Edwards, B. F.	Oakland.
Dick, A. N.	Woodland.	Edwards, C. O.	Oakland.
Dick, A. Y.	Woodland.	Eisen, E. G.	San Francisco.
Diamond, P. T.		Eisenbrand, G. F.	
Dickover, J. J.	Santa Barbara.	Eller, H. C.	Etna.
Dillman, I. F.	Pomona.	Elliott, D. C.	Mayfield.
Dimmick, Joseph	Oakland.	Ellwanger, G. J.	St. Charles, Mo.
Dimock, H. C.	Lompoc.	Ellis, P. L.	
Dobbins, J. W.	Redding.	Ellis, W. A.	San Francisco.
Dodell, Harvey	San Francisco.	Elvidge, G. F.	San Francisco.
Dodge, H. D.	Palo Alto.	Ellis, A. J.	Pasadena.
Dodson, E. M.		Emerson, E. W.	San Francisco.
Dollin, A. F.	San Francisco.	Emery, C. A.	San Francisco.
Domeniconi, James	San Francisco.	Engs, John S.	Oakland.
Donnelly, George S.	San Francisco.	Emeis, H. P.	Logan, Utah.
Doolittle, C. V.	Pomona.	Ensign (<i>nee</i> Boardman), Jeanette H.	
Dorrance, F. C.	Los Angeles.		San Francisco.
Douglas, C.		Epperson, J. W.	Los Angeles.
Dovey, W. R.	Petaluma.	Epperson, J. H.	Ogden, Utah.
Dow, Edgar L.	Oakland.	Epperson, H. V.	
Dowling, Jerome		Epstein, Henry	San Francisco.
Downing, H. S.	Los Angeles.	Erhard, P. C.	Jackson.
Doyle, B. W.	Los Angeles.	Eshbach, D. M.	
Doyle, E. M.	Fresno.	Espenosa, M.	
Doyle, J. H.		Esterle, A. M.	Oakland.
Drullard, F. W.	Santa Cruz.	Estes, W. B.	San Francisco.
Drucker, G. J.	San Francisco.	Evans, W. H.	Napa.
Drucker, A. C.	San Francisco.	Evans, J. H.	Highland.
Drum, W. H.		Everts, Charles P.	Rio Vista.
DuBois, C. H.	San Francisco.	Ewing, F. L.	
Ducker, J. H.	San Mateo.	Fare, John	San Francisco.
Duckett, H. C.	San Francisco.		

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Fairweather, N. S.	Ukiah.	Gambitz, M. R.	San Francisco.
Farman, C. E.	Oakland.	Ganmons, W. E.	Alameda.
Farman, C. H.	Napa.	Gambitz, L. R.	San Francisco.
Farmer, E. W.	San Francisco.	Garcia, M. J.	
Ferguson, T. H.	San Francisco.	Gardiner, Thomas	Lakeport.
Ferguson, G. C.		Gardner, Edmund	Redding.
Fischer, L. W.	San José.	Gautier, L. A.	San Francisco.
Fischer, F.	San Francisco.	Garnett, W. M.	Los Angeles.
Fisher, F. H.		Garrison, D. M.	San Luis Obispo.
Fitch, O. P.	Placerville.	Garrison, D. R.	San Francisco.
Fitch, W. W.	Lompoc.	Garrott, A. C.	Los Angeles.
Fitzgibbon, J. G.	San Francisco.	Gaston, W. A.	San José.
Fleissner, H. H.	San Francisco.	Gaskill, P. D.	San Francisco.
Fleming, C. K.	San José.	Gaston, A. A.	San José.
Fletcher, Thomas	San Francisco.	Gates, H. E.	San Francisco.
Flood, A. M.	San Francisco.	Gates, Mrs. I. M.	Eureka.
Follansbee, H. E.		Gaylord, H. A.	Pasadena.
Foote, C. I.	San Diego.	Gazarian, H.	Fresno.
Ford, Louis E.	Los Angeles.	Gilbert, A. H.	San Diego.
Ford, A. J.	San Francisco.	Gilbert, G. W.	Fresno.
Forrest, J. M.	San Francisco.	Gedge, H. E.	San Francisco.
Forrester, H. E.		Geiger, H. H.	
Fountain, M. F.	Blue Lake.	George, E.	
Foster, H. C.	Corning.	Gholson, J. A.	
Fowler, A. A.	San José.	Gibson, F. W.	Oroville.
Fowler, J. R.	San Luis Obispo.	Gibson, F. W.	San Francisco.
Fowler, W. S.	San Francisco.	Gidding, W. A.	
Fox, C. H.	Bakersfield.	Gildea, B. M.	San Diego.
Fox, H. B.		Gilbert, O. C.	
Fox, J. M.	San Francisco.	Gilbert, A. J.	Stockton.
Frain, C. A.	Cleveland, O.	Gilbert, C. C.	San Francisco.
Frazer, T. J.	San Francisco.	Gilbertson, J. C.	Oakland.
Fraser, W. E.	San Francisco.	Gilman, C. D.	Oakland.
Frazer, I. A.	San José.	Gilman, S. M.	Oakland.
Freitas, E. L.	Los Angeles.	Gibson, F. R.	
Freeburger, F. O.	Portland, Ore.	Gibson, A. L.	Ukiah.
Frazier, S. H.	Berkeley.	Gilson, R. E.	Oakland.
Free, G. W.	Fresno.	Gilstrap, J. M.	Oakland.
Frederick, H. A.	San Francisco.	Ginno, J. W.	San Francisco.
French, H. W.	Oakland.	Ginno, L. F.	Berkeley.
French, L. W.	Los Angeles.	Girardey, W. O.	Sacramento.
French, A. W., care of Mr. R. Wilson		Giusti, J. J.	
	Los Gatos.	Glasscock, F. A.	Knob.
Fugler, C. A.	San Francisco.	Glasgow, H. J.	Fresno.
Fuller, C. H.		Glasgow, N. B.	San Bernardino.
Fuller, F. W.	Sisson.	Gleason, H. C.	Los Angeles.
Fulstone, J. W.		Gleaves, A. D.	San Francisco.
		Gliden, M. D.	Stockton.
Gabbs, M. F.	San Francisco.	Goddard, C. L.	San Francisco.
Gallot, J.	Sacramento.	Goe, S. E.	San Francisco.
Gabbs, E. S.	Sutter Creek.	Good, W. W.	Carson, Nev.
Galbraith, M. D.		Giffin, R. B.	Sacramento.
Galbreath, A. J.	Truckee.	Gonzales, F. J.	San Francisco.
Galeoto, S.	San Francisco.	Good, C. L.	San Diego.
Gallup, Thomas E.	San José.	Gore, Arthur	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Gordon, O. L.	Santa Cruz.	Hall, C. E.	
Gorton, C. D.	San Francisco.	Hall, T. W.	Oakland.
Gothard, J. T.	Alturas.	Hall, R. T.	Fresno.
Gottenberg, H. W.	Sonoma.	Hall, W. C.	Petaluma.
Gough, J. F.	Miller.	Hall, W. H.	Otay.
Gould, H. W.	San Diego.	Halsey, W. H.	Oakland.
Gove, G. W.	San Francisco.	Halsey, N. S.	San Rafael.
Gould, A. D.	Owego, N. Y.	Halstead, J. L.	Tulare.
Graham, G. F.	San Francisco.	Halstead, E. P.	San Francisco.
Graham, A. B.		Hambleton, W. D.	Oceanpark.
Graham, L. E.	Sacramento.	Hamilton, Cyrus.	Eureka.
Grant, A. H.		Hamilton, J. W.	San Francisco.
Grant, J. T.	Woodland.	Hammell, Annie.	
Grant, F. E.	Wheatland.	Hammer, H. F.	New York, N. Y.
Graw, J. W.		Hanson, C. T.	San Francisco.
Gray, G. W.		Hanson, H. P.	San José.
Gray, W. O.	San Francisco.	Hansen, W. A.	San Francisco.
Gray, D. H.		Harbison, H. R.	San Diego.
Gray, F. A.	Orange.	Hardecastle, George.	San Francisco.
Gray, John.		Harding, W. C.	
Gray, C. F.		Hardy, C. S.	San Francisco.
Greene, W.		Hardy, J. R.	San Francisco.
Green, W. F.	Modesto.	Hargrove, G. H.	
Green, M. L.	Oakland.	Hargrove, W.	
Graham, H. J.	Oroville.	Harms, M. F. E.	San Francisco.
Gray, W. S.	Yuba City.	Harnden, F. W.	San Francisco.
Greenbaun, L.	San Francisco.	Harper, J. A.	
Greenlaw, H. T.		Hart, C. E.	San Francisco.
Greenlaw, M. A.	San Francisco.	Hartman, P. C.	Campbell.
Gribbin, J. J.	Philadelphia.	Hart, O. P.	Needles.
Griffin, F. M.		Harth, A. P.	Grant's Pass, Ore.
Griffith, A. C.	Santa Rosa.	Harrison, C. L.	San Francisco.
Griffiths, Allen.	Oakland.	Harris, G. N.	Everett, Wash.
Griesser, A. H.	Oakland.	Harris, Isabelle D.	San Francisco.
Griner, O. T.		Harris, G. M.	North San Juan.
Gross, C. F.	Oakland.	Harris, G. R.	San Francisco.
Grossman, M. E.	Honolulu, H. I.	Harris, S. M.	Grass Valley.
Grotfend, George.	Redding.	Harris, M. P.	Grass Valley.
Grove, W. C.	Modesto.	Harwood, E. M.	
Grove, U. L.		Harshall, A. T.	
Guthrie, T. A.	Woodland.	Haslehurst, A. O.	San Francisco.
Gunsberger, B. M.	San Francisco.	Hastings, Robert.	
Guyor, C. N.	Denver, Colo.	Haslinger, O. A.	San Francisco.
Gwinn, W. M.	San Francisco.	Hatch, J. H.	San Francisco.
Gwin, W. R.	Los Angeles.	Haughawout, H. C.	Los Angeles.
Gruss, F. J.	Genesee.	Hauselt, C. P.	San Francisco.
		Hauver, J. C.	Auburn.
Harms, R. G. C.	Oakland.	Hawley, A. H.	Sacramento.
Hackett, F. M.	San Francisco.	Hawley, D. E.	
Hackett, C. C.	Napa.	Hamlin, B. R.	Alameda.
Hackett, S. A.	Oakland.	Hathaway, W. H.	Los Angeles.
Haines, B. W.	San Francisco.	Hare, D. A.	San Francisco.
Haines, N. J.		Hays, H. McD.	Colton.
Hackett, A. E.	San Francisco.	Hays, A. P.	Los Angeles.
Hale, Lem. T.		Hays, I. W., Jr.	Grass Valley.
Hale, R. L.	Martinez.	Hammond, T. F.	Fresno.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Hatcher, J. H.	Ontario.	Hilliker, E. B.	Los Angeles.
Hass, M. M.	Los Angeles.	Hinniker, A. J.	San Francisco.
Heacock, F. T.	San Francisco.	Hirth, C. E.	
Heacock, W. R.	San Francisco.	Higgins, R. M.	San Francisco.
Head, A. W.	San Francisco.	High, C. B.	
Head, T. D.	Redding.	Hoeker, J. M.	San Francisco.
Head, W. W.	Chico.	Hodgen, Joseph D.	San Francisco.
Heaney, W. P.	San Francisco.	Holfeng, Fred	
Hearn, F. G.	Yreka.	Hodges, C. A.	Oakland.
Hedrick, L.	San Francisco.	Holland, F. E.	Woodland.
Heider, W. T.	East Oakland.	Hocking, I. C.	
Hein, G. N.	San Francisco.	Hoffer, Virgil	Santa Rosa.
Heino, J.	San Francisco.	Hodshead, W. H.	Mendocino.
Heitman, F. W.	San Francisco.	Holden, S. R.	
Henderson, H. N.	Berkeley.	Holladay, W. P.	Los Angeles.
Heller, C. C.	Los Angeles.	Hollingsworth, M. W.	Santa Barbara.
Hempstead, J. E.		Hollingsworth, R. M.	Monterey.
Henderson, W. D.	Berkeley.	Hollingsworth, J. M.	Los Angeles.
Hendricks, Peter	Los Angeles.	Holloway, E. S.	Colusa.
Hendricks, John D.	Hollister.	Holman, F. D.	Los Angeles.
Hendricks, H. T.	Hanford.	Holladay, A. C.	Los Angeles.
Henderson, W. R.	Stockton.	Honodel, W. R.	Los Angeles.
Henderson, R. W.	Stockton.	Holmes, L. B.	San Francisco.
Henderson, N.	Alameda.	Holmes, C. A.	Mendocino.
Hennessy, J. C.		Hooker, A. O.	San José.
Heinzman, W. H.	San Francisco.	Hooker, A. H.	San Diego.
Herkner, C. E.	Grass Valley.	Hooper, Harry	San Francisco.
Herrinton, W. M.	San Francisco.	Houck, F. H.	Anaheim.
Herron, H. H.	Los Angeles.	Howard, E. G.	Los Angeles.
Herrick, C. A.	Jackson.	Howard, J. L.	Marysville.
Herbert, E. F.		Howe, E. B.	Riverside.
Herbert, C. P.		Hubbard, George A.	San Francisco.
Herrman, L. F.	Berkeley.	Hubbell, A. B.	San Francisco.
Hesketh, W. R.	Los Angeles.	Huddy, George H.	Honolulu, H. I.
Hervey, A. R.	Santa Ana.	Huebner, O. C.	Healdsburg.
Heitman, H. L.		Hughes, W. R.	Alameda.
Hewes, R. E.		Hullinger, A. J.	San Francisco.
Hewatt, A. B.		Hultberg, F. L.	San Francisco.
Hewitt, N. G.	Healdsburg.	Humphrey, J. G.	Alameda.
Hibbard, C. W.	San Francisco.	Hummelbaugh, A. C.	Salt Lake City, Utah.
Hickey, J.		Hunger, F. J.	Sacramento.
Higgins, C. R.	Fort Bragg.	Hunsaker, A. L.	
Higgins, T. S.	San Francisco.	Hunsaker, G. W.	Tulare.
Hill, A. S.	San Francisco.	Hopkins, E. L.	Fresno.
Hill, W. B.		Howard, O. J.	Fresno.
Hill, A. B.	Berkeley.	Hurd, E. M.	Maine.
Hill, A. L.	San Francisco.	Hurd, E. L.	
Hill, T. L.	San Francisco.	Hursch, R. L.	San Francisco.
Hiller, E. D.	Los Angeles.	Hurt, J. M.	Pomona.
Hinckley, I. L.	Fillmore.	Husted, Guy B.	Modesto.
Hines, J. P.	San Francisco.	Husted, F. R.	San José.
Hines, L. B.	Lodi.	Hutchins, J. M.	
Hinman, A., Jr.		Hutchinson, J. E.	Sacramento.
Hinman, H. T.	San José.	Hutchason, C. B.	
Hipkins, H.	San Francisco.	Hutton, J. A. D.	Berkeley.
Hirtz, N. F.	Los Angeles.	Hus, F. L. M.	Oakland.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Hudgens, A. L.	Tonopah, Nev.	Keesing, J. B.	San Francisco.
Huddle, W. F.		Keene, H. H.	Oakland.
Hutchason, W. E.		Kelley, N. D.	Fresno.
Huff, W. F.		Kelley, G. F.	Susanville.
Hyde, C. G.	Merced.	Kellogg, A. C.	San Francisco.
Hyde, A. T.	Merced.	Kemp, Van Ee, F.	San Francisco.
		Kemp, B. F.	San Francisco.
Inglehart, T. N.	San Francisco.	Kempe, M. U.	Oakland.
Ingersoll, A. E.	Eureka.	Kennedy, A. S.	
Ironside, F. A.		Kennedy, W. F.	Los Angeles.
Ivey, J. R.	San Francisco.	Kincaid, S. W.	Corning.
		Kinley, F. J.	Oakland.
Jackson, W. N.	San Francisco.	Kinney, I. B.	Minneapolis, Minn.
Jackson, J. A.	Lincoln.	Kirk, H. M.	Los Angeles.
Jacobs, F. O.	Oakland.	Kenworthy, L.	
Jacobs, Saul R.	San Francisco.	Kerwin, L. J.	San Francisco.
Jaegeling, J. P.	San Francisco.	Kertchem, D. J.	Stockton.
Janes, E. P.	Alameda.	Kestler, F. S.	Sacramento.
Janes, R. K.	Pasadena.	Key, J. W.	San Francisco.
Janke, W. E.	San Francisco.	Key, T. B.	Fresno.
Jarvis, C. F.	Oakland.	Key, J. W.	San Francisco.
Jenkins, F. M.	San Bernardino.	Kimerer, L. L.	Wheatland.
Jennin, E. L.		King, John J.	Los Gatos.
Jewell, W. S.	Oakland.	King, Birdine	San Francisco.
Jewell, A. A.		King, J. F.	San Francisco.
Jewett, Stanley	Marysville.	King, L. A.	Los Angeles.
Jeffrey, J. A.	San Francisco.	King, W. Z.	San Francisco.
Johnston, J. H.	San Francisco.	King, H. C.	Los Angeles.
Johnston, Robert	Eureka.	King, J. S.	Banning.
Johnson, J. W.	San Francisco.	Kirkwood, I. S.	Salt Lake City, Utah.
Johnson, J. H.	Waukon, Iowa.	Kirkpatrick, H. C.	Santa Cruz.
Johnson, F. D.	Chico.	Kitchen, C. A.	Los Angeles.
Jones, C. V.		Kleiser, G. W.	San Francisco.
Jones, P. C.	Fort Bragg.	Kleiser, J. A.	San Francisco.
Jones, E. M.	San Francisco.	Klein, N.	San José.
Jones, L. D.	San Diego.	Kleeman, F. C.	Oakland.
Jones, E. L.		Knepper, G.	Los Angeles.
Jones, L. G.	San Diego.	Knowles, S. E.	San Francisco.
Jones, Ellis	San Francisco.	Knowles, W. A.	San Francisco.
Jones, P. C.	San Francisco.	Knowles, C. W.	San Francisco.
Jones, T. R.	San Francisco.	Knowlton, J. S.	San Francisco.
Jones, H. McK.	Pomona.	Knox, H. B.	Oakland.
Jones, J. B.	College Heights.	Know, A. J.	San Francisco.
Johnson, Della M.	Mountain View.	Koehler, Frank	
Jordan, Minnie E.	Los Angeles.	Kriechbaum, G. H.	Los Angeles.
Joost, Anna D.	San Francisco.	Kroeck, E. C.	Los Angeles.
Josselyn, —		Kroeck, P. H.	San Francisco.
Jurgens, C. H.	San Francisco.	Krueger, O. F.	Healdsburg.
		Kuns, C. A.	Los Angeles.
Kaschedin, N.	New York, N. Y.	Kutch, A. J.	Los Angeles.
Kauffung, L. H.	San Francisco.	Kuster, C. F.	San Francisco.
Keagg, J. M.	San Francisco.		
Keane, J. W.	Medford, Ore.	La Barea, W. H.	Weaverville.
Ketcham, E. T.	Santa Maria.	Lacoste, H. S.	San Francisco.
Keefe, E. D.	San Francisco.	Lackey, W. F.	Oakland.
Keel, C. W.		La Force, Joseph E.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Lamberson, G. E.	.....	Locke, F. H.	Oakland.
Lancaster, C. E.	Oakland.	Lockwood, A. T.	Visalia.
Lane, F. L.	San Francisco.	Logan, W. C.	Astoria, Ore.
Lane, C. E.	Oregon.	Lord, Mrs. C. B.	.....
Lane, C. S.	Santa Barbara.	Lord, F. F.	San Francisco.
Lamb, Louis R.	Vallejo.	Lord, C. C.	Eureka.
Lang, J. E.	Oxnard.	Loring, E. L.	West Berkeley.
Langdon, F. C.	Los Angeles.	Louissou, W. S.	San Francisco.
Lansdowne, F.	Berkeley.	Lovegrove, W. R.	San Francisco.
Larison, C. A.	Yreka.	Lovejoy, G. E.	Petaluma.
Lawford, C.	San Jacinto.	Lovejoy, F. E.	Vallejo.
Latham, H. E.	.....	Lowder, W. S.	Los Angeles.
Laughlin, J. O.	San Francisco.	Lowder, W. D.	Los Angeles.
Latimer, D. H.	Hanford.	Lowers, T. H.	Los Angeles.
Laughlin, C. A.	.....	Lubbock, W. C.	.....
Lawrence, George O.	San Francisco.	Lucas, D. J.	.....
Lawrence, W. H.	San Francisco.	Lucas, D. L.	Esparto.
Lawton, W. J. P.	San Francisco.	Luce, S. J.	Selma.
Lassen, J. P.	Livermore.	Luce, George J.	San Francisco.
Ledyard, F. K.	San José.	Lucchetti, A. F.	San Francisco.
Lee, D. B.	Santa Barbara.	Luccock, J. P.	Alturas.
Lee, C. M.	San Francisco.	Ludlow, Wm. B., Jr.	Stockton.
Leek, G. W.	San Francisco.	Luedke, C. H.	Oxnard.
Leek, I. G.	San Francisco.	Lundy, E. A.	Hong Kong, China.
Leek, J. J.	San Francisco.	Lundborg, J. A. W.	San Francisco.
Leighton, C. H.	San José.	Lundborg, K. M.	Scotia.
Lemmon, C. F.	San Buenaventura.	Lyman, E. H.	San Bernardino.
Lemon, C. H.	Salinas.	Lynn, T. M.	Los Angeles.
Lemon, G. B.	Salinas.	Lyons, W. C.	Denver, Colo.
Leonard, C. N.	San Diego.	Lynch, T. A.	Downey.
Leonard, J. G.	Sierraville.	.....	.....
Leonardi, C. J.	.....	Macdonald, A. E.	San Francisco.
Leppo, D. H.	Santa Rosa.	Macdonald, Miss N. G.	San Francisco.
Levinger, L. V.	San Francisco.	Macdonald, Flora	San Francisco.
Leslie, R. Y.	Pasadena.	MacMullin, D. A.	.....
Leslie, E. W.	Pasadena.	MacNevin, G. M.	San Francisco.
Levey, W. H.	San Francisco.	Maldonado, E.	San Francisco.
Leviston, F. E.	.....	Malech, T. G.	.....
Levkowicz, M. W.	San Francisco.	Malone, A. F.	Rio Vista.
Lewis, W. F.	San Francisco.	Malone, G. E.	Dunsmuir.
Lewis, J. W. F.	San Francisco.	Manchester, M. R.	.....
Libbey, J. L.	Watsonville.	Mancilla, M.	.....
Lightcap, S. E.	.....	Marchres, C. C.	San José.
Likens, G. W.	Crockett.	Mariotte, P. A.	Oakland.
Likens, J. W.	San Francisco.	Marsh, W. J.	Downieville.
Lindsey, Charles M.	Oakland.	Markwitz, L.	San Francisco.
Lindsay, J. A.	Sacramento.	Martin, F. P.	Alameda.
Linscott, W. R.	Santa Cruz.	Martin, George	Berlin, Germany.
Litchfield, Oscar J.	Healdsburg.	Martin, Todd	Fresno.
Little, F. F.	Pomona.	Martin, S. D.	.....
Little, C. B.	Palo Alto.	Martin, F. J.	.....
Littler, S. J.	Petaluma.	Martin, William	San Francisco.
Litton, C. A.	San Francisco.	Marshall, Mabel E.	Vacaville.
Livermore, G. W.	Santa Barbara.	Marx, Monroe L.	San Francisco.
Lochman, O. G.	Los Angeles.	Massie, H. C.	.....
Locke, G. W.	San Francisco.	Mathews, C. F.	.....

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Matson, A. P.	San Francisco.	McNiel, M.	Virginia City, Nev.
Mathis, R. C.	Los Angeles.	McNutt, R. B.	San Francisco.
Matthews, E. S.	San Diego.	McMahon, L. J.	San Francisco.
Matthews, C. F.		McQueen, J. S.	Bishop.
Matthews, J.	Petaluma.	McQuitty, W. A.	San Francisco.
Matsuda, M.	Sacramento.	McQuilkin, E. R.	Gilroy.
Mauk, A. H.	San Francisco.	McWilliams, W. L.	
Maunder, P.		Meek, R. W.	Oakland.
Mayhew, W. H.	San Francisco.	Meek, C. A.	Redwood City.
Mayhew, A. B.	Palo Alto.	Mendes, C.	
Maynard, C. C.	San José.	Menendes, J. A.	Sonora.
Maynard, S. C.	San José.	Menendez, H.	Sonora.
MacArthur, J. F.	Los Angeles.	Menges, M. A.	Santa Ana.
McCabe, E.	Watsonville.	Menken, P. H., Jr.	Sacramento.
McCann, F. A.	Stockton.	Menton, H. O. F.	Santa Clara.
McCargar, Richard	Red Bluff.	Meredith, G. H.	Salinas.
McCarthy, J. P.	San Luis Obispo.	Merriman, A. F., Sr.	Oakland.
McCarthy, C. J.	San Francisco.	Merriman, A. F., Jr.	Oakland.
McClish, J. M.	Healdsburg.	Merriman, W. C.	Oakland.
McCarty, C. H.	Chicago, Ill.	Merrell, F. B.	
McCarty, W. H.	E. Chicago, Ind.	Merrill, A. P.	
McClure, J. F.		Mervy, E. T.	San Francisco.
McCoy, John C.	Los Angeles.	Mertes, J. P.	Los Angeles.
McAvoy, R. C.	Santa Ana.	Meseroll, J. M.	Stockton.
McBain, Charles A.	Napa.	Metcalf, F. H.	Sacramento.
McComb, V. J.		Meyer, W. O.	San Francisco.
McCowen, C. S.	Palo Alto.	Meyer, Albert	San Francisco.
McCowan, G.	Ukiah.	Meyer, H. S.	San Francisco.
McCurry, J. M.	San Luis Obispo.	Meyer, P. J.	San Francisco.
McCracken, W. J.	East Auburn.	Meyer, W. A.	San Francisco.
McClinton, Ray	San Francisco.	Miles, A. D. E.	
McDermid, John		Miles, H. S.	Los Angeles.
McFarland, G. H.		Millard, C. A.	Los Angeles.
McFadden, A.	San Francisco.	Millar, J. B. F.	San Francisco.
McGaughey, C. W.	Oroville.	Millar, R. F.	San Francisco.
McGettigan, C. A.	San José.	Miller, G. E.	San Francisco.
McGough, James	San Francisco.	Miller, O. L.	San Francisco.
McGovern, J. C.	San Francisco.	Miller, G. A.	Los Angeles.
McGowan, J. E.	Pomona.	Miller, Herman	San Francisco.
McGowan, J. L.	Monterey.	Miller, J. A.	San Francisco.
McGraw, D. F.	San José.	Milliken, C. T.	Sacramento.
McIntire, A. A.		Milliken, G. T.	Redwood City.
McIntyre, T. W.		Milliken, H. L.	San Bernardino.
McKay, W. W.		Milliken, J. D.	San Francisco.
McKean, N. D.	Alameda.	Millberry, G. S.	San Francisco.
McKenzie, A. W.	San Francisco.	Millberry, A. H.	San Francisco.
McKellops, H. L.		Miner, H. Everett	Stockton.
McLane, A. F.	Santa Rosa.	Mills, C. H.	
McLaren, J. A.		Michell, M. N.	Alturas.
McLaughlin, W. F.	San Francisco.	Mitchell, A. B.	San Francisco.
McLeod, A. D.	Los Angeles.	Moad, Mrs. S. R.	Napa.
McLernon, T. J.	East Oakland.	Mogan, C. J.	San Francisco.
McMath, J. F. O.	Oakland.	Mobley, W. G.	Oakland.
McMillan, J. E.		Molitor, M. D.	Spokane, Wash.
McMillan, H. A.		Monroe, George	
McMurray, M.	San Francisco.	Moody, Kate	Los Angeles.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Moody, J. D.	Los Angeles.	Novitzky, J. F.	San Francisco.
Moore, H. W.	Santa Barbara.	Nuckolls, H. M.	San Francisco.
Moore, J. E.	Oakland.	O'Brien, E. W.	Grass Valley.
Moore, J. S., Jr.		O'Brien, J.	Marysville.
Moore, Edna F. J. (Mrs. E. J. Broad) ..	San Francisco.	O'Connell, F. E.	San Francisco.
Moore, T. E.	San Francisco.	O'Connell, T.	San Francisco.
Moorhead, T. B.		O'Connell, Robert E.	San Francisco.
Morey, C. L.	Oakland.	O'Connor, D. L.	Fortuna.
Morffew, Thomas	San Francisco.	O'Connor, J. T.	Healdsburg.
Morgan, A. N.	Nevada City	Ogden, F. R.	Oakland.
Mories, A. H.	Alameda.	Ogle, W. O.	
Morris, Amiel	San Francisco.	Ohhara, T. H.	
Morris, W. H.	Redlands.	Ohea, C. H.	
Morton, R. E.	Dinuba.	Orella, V. P.	San Francisco.
Morris, R. W.	Los Angeles.	Okubo, Ituge	San Francisco.
Morris, C. A.	San Francisco.	O'Rourke, William	Oakland.
Morris, T. H.	San Francisco.	Ostrom, D. A., Jr.	San Francisco.
Morrison, J. W.	Downey.	Osbourne, M. E.	Los Angeles.
Morrison, E. H.	Pomona.	Oviatt, S. M.	
Moore, J. C. Y.	Chicago, Ill.	Packard, C. W.	Riverside.
Morse, W. D.	Pasadena.	Pague, F. C.	San Francisco.
Morton, H. R., Sr.	San Francisco.	Painter, J. B.	San Francisco.
Morton, H. R., Jr.	San Francisco.	Patton, M. A.	Santa Ana.
Morton, R. E.		Palmer, Edgar	Los Angeles.
Mosher, W. J.	San Francisco.	Palmer, A. H.	Pasadena.
Mosher, G. E.	Covina.	Palmer, F. M.	Los Angeles.
Moulton, H. G.	Guatemala, C. A.	Pancoast, F.	San Francisco.
Mueller, A.	Chicago, Ill.	Parker, C. H.	
Munson, B. W.		Parker, D. G.	
Mundell, W. A.	San Rafael.	Parker, Francis M.	Los Angeles.
Mulrenim, E. M.	San Francisco.	Parker, H. A.	
Murphy, R. N.	San Francisco.	Parker, J. P.	Santa Cruz.
Musselman, S.	Cucamonga.	Parker, J.	Pasadena.
Musselman, D.	Madison.	Parker, J. Tyle	Pasadena.
Murray, Milton	San Francisco.	Painter, J. B.	San Francisco.
Myers, O. P. H.	San Francisco.	Parks, E. C.	San Francisco.
Nash, Dorr	San José.	Parker, W. S.	Pasadena.
Neblett, J. W.	Riverside.	Parker, E. R.	
Nelson, W. H.	San Luis Obispo.	Parker, J. A.	San Francisco.
Newbauer, F.	San Francisco.	Park, E. E.	San Francisco.
Nelson, R. W.	San Francisco.	Parks, L. H.	Marysville.
Neel, W. E.	Los Angeles.	Parks, E. C.	San Francisco.
Neumann, L.	San Francisco.	Parr, E. F.	Visalia.
Nevins, G. F.	San Francisco.	Parr, W. H.	
Newell, E. W.	Santa Cruz.	Parson, P. M.	Oakland.
Newkirk, Garrett	Los Angeles.	Parsons, J. G.	San Diego.
Newgarden, Charles	New York, N. Y.	Patterson, A. D.	Visalia.
Newman, H. C.	Oakland.	Payne, C. S.	San Francisco.
Newton, Ernest	Fort Jones.	Payne, Eugene	
Nicolai, Charles J.	San Francisco.	Peake, Walter	Biarritz, France.
Noble, C. O.	San Francisco.	Pearce, C. H.	San Francisco.
Noble, C. S.	Arroyo Grande.	Pearce, T. B.	
Noble, H. D.	San Francisco.	Pearce, C. L.	
Norman, G. H.	Gridley.	Pearce, F. B.	San José.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Pease, J. L.	Oakland.	Pratt, A. C.	Los Angeles.
Peel, Jonathan M.	San Francisco.	Pratt, F. E.	
Peper, William	San Diego.	Pratt, E. W.	San Francisco.
Pepper, C. F.	Los Angeles.	Preshaw, R. G.	Oakdale.
Perkins, C. O.	Petaluma.	Preston, A. P.	Santa Rosa.
Perkins, E. W.	San Francisco.	Prey, Otto F.	
Perkins, P. J.	San Francisco.	Price, J. T.	Los Angeles.
Perkins, H. F.	San Francisco.	Price, J. W.	
Perrin, W. E.	San José.	Price, W. E.	San Francisco.
Perrault, J. T.	San Francisco.	Pring, E.	San Francisco.
Perry, Charles A.	San Francisco.	Procter, D. A.	San Francisco.
Perry, E. E.	San Francisco.	Proll, R. S.	San Francisco.
Peters, A. B.	San Francisco.	Prosser, J. L.	Oakland.
Peters, H. C.	Irvington.	Pruitt, Minnie Fisher	Oakland.
Pfister, Joseph	San Francisco.	Purnell, G. E.	
Phillips, F. H.	Petaluma.		
Phillips, H. J.	San Francisco.	Quick, E. P.	
Phillips, G. H.	Hanford.	Quinne, J. J.	
Phillips, R. F.	San Diego.	Quirk, T. H.	
Phipps, I. D.	Medford, Ore.		
Pickett, Burk	San Diego.	Rabe, John	Oakland.
Pieper, E. O.	San José.	Rader, G. C.	San Francisco.
Piper, S. L.	San Francisco.	Rainey, T. H.	San Jacinto.
Pirkey, M.	Willows.	Ralls, R. F.	
Pirkey, F. Z.	Colusa.	Ramsey, W. W.	Madera.
Pitres, E.	San Francisco.	Rankin, J. H.	Santa Rosa.
Pitt, C. S.	San Francisco.	Rantz, W. A.	Folsom.
Place, Lloyd Mills	Palo Alto.	Rannells, A. W.	
Platt, F. L.	San Francisco.	Ratcliff, A. D.	
Pless, F. G.	San Francisco.	Raugh, J. M.	Santa Ana.
Pless, H. T.		Ray, C. B.	Arcata.
Pletcher, C. B.	San Francisco.	Raymond, G. W.	Honolulu, H. I.
Plomteaux, H. J.	Oakland.	Reynolds, D. L.	Pasadena.
Plunkett, J. A.	Oakland.	Rea, C. T.	
Pollock, J. H.		Rea, Stanley	
Pomeroy, G. E.	Oakland.	Rea, F. E.	Ukiah.
Poplin, R. L.	Santa Paula.	Rea, John	Lincoln.
Porter, C. B.	Truckee.	Read, Emma E.	San Diego.
Porter, C. B., Jr.	San Francisco.	Reading, W. W.	San Francisco.
Porter, J. P., Jr.		Reamer, H.	
Porter, J. M.		Redmond, J. M.	Arcata.
Porter, S. P.	Napa.	Redmond, J. J.	San Francisco.
Porter, L. C.	Watsonville.	Reed, C. W.	Santa Rosa.
Porter, E. M.	Napa.	Reed, J. H.	
Porterfield, R. H.	San Francisco.	Reed, U. D.	Los Angeles.
Posner, Milton	San Francisco.	Reed, A. R.	Pomona.
Pospisiel, J.	Washington.	Reese, John S.	Oakland.
Post, C. E.	San Francisco.	Regnart, P. S.	San José.
Powell, Henry, Jr.	Haywards.	Reich, C. L.	San Francisco.
Powell, A. J.	Haywards.	Regensberger, A. T.	San Francisco.
Powell, J. D.	Sacramento.	Reid, T. B.	Sacramento.
Powell, J. N.	San Francisco.	Reid, H. E.	Sacramento.
Power, R. H.	Calistoga.	Reed, J. W.	
Prall, J. N.		Remington, C. L.	
Prather, W. J.	Fresno.	Rendall, R. S.	
Prather, W. R.	Merced.	Renwick, W. H.	Sacramento.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Requa, H. D.	Los Angeles.	Rulison, D. W.	Reno, Nev.
Reynolds, P. R.	Santa Ana.	Rulison, H. M.	San Francisco.
Reynolds, H. C.	Crescent City.	Rulofson, A. C.	San Francisco.
Rhoades, R. H.		Ruttan, G. M.	
Rhoades, S. R.	San José.		
Rice, C. E.	Los Angeles.	Sabichi, J. R.	Los Angeles.
Rice, E. V.	Azusa.	Sabin, C. R.	St. Helena.
Richards, C. W.	San Francisco.	Salmon, William	San Francisco.
Richards, H. H.	San Francisco.	Samuels, L. G.	San Francisco.
Richards, W. A.	San José.	Sand, Joseph A.	San Francisco.
Richards, W. F.	Sacramento.	Sands, D. S.	Los Angeles.
Richards, W. P.	Orange.	Sanderson, A. L.	San Mateo.
Richards, H. G.	San Francisco.	Sanford, L. N.	San Francisco.
Richards, J. I.	San Francisco.	Sanger, I.	Manila, P. I.
Richardson, E. E.	San Francisco.	Saul, O. M.	
Richardson, E. M.	San Francisco.	Savage, F. L.	Hollister.
Richardson, C. C.	Chico.	Savage, C. W.	Santa Rosa.
Richards, W. H.		Savage, S. L.	Livermore.
Ricks, Charles C.		Savage, Henry	
Rietzke, G. C.	San Francisco.	Sawhill, F.	
Rinebold, J. J.		Sawyer, A. M.	San Francisco.
Ripor, S. L.		Sawyer, F. E.	San Rafael.
Rinckel, E. J.		Saxby, J. B.	Santa Barbara.
Roberts, D. E.	Murphys.	Saxe, F. J.	Oakland.
Roberts, S. H.	San Francisco.	Schaefer, S. G.	Portland, Ore.
Roberts, J. M.	Los Angeles.	Schacht, C. W.	Jackson.
Roberts, H. J.		Scheier, R. B.	San Francisco.
Roberts, N. J.		Scheu, R. E.	San Francisco.
Robertson, John	San Francisco.	Schiffman, A. F.	Los Angeles.
Robinson, F. A.		Schiller, Maurice	San Diego.
Robinson, F. O.	San Francisco.	Schillig, G. E.	Marysville.
Robinson, W. H.		Schlott, E. F.	San Francisco.
Robinson, R. D.	Los Angeles.	Schmidt, G. L.	Oakland.
Roche, H. N.	San Francisco.	Schneider, Joe	Mexico.
Roche, G. W. W.	San Francisco.	Schott, W. E.	Deming, N. M.
Rodden, G. F.	San Francisco.	Schroeder, E. R.	Alameda.
Ronna, J.	San Bernardino.	Schroeder, R. A.	
Rodgers, H. B.	Watsonville.	Schroeder, H. C. H.	San Francisco.
Rodolph, G. W.	Oakland.	Scudder, R. C.	Los Angeles.
Rodolph, C. T.	Oakland.	Schumaker, F.	San José.
Rogers, E. J.	Bridgeville.	Schumer, A. C.	Oakland.
Rogers, Guy	San Francisco.	Schulters, C. F.	Oakland.
Rohrer, E. J., care Mattie Rohrer		Schultze, E. H.	
	Highland.	Schwamer, W. F.	Oakland.
Roller, O. P.	Los Angeles.	Schwartz, C. G.	
Romaine, C.		Schwartzschild, F.	
Rood, R. A.	San Diego.	Scott, F. F.	Washington.
Root, C. B.	San Francisco.	Scott, W. K.	
Root, W. A.	St. Helena.	Scott, J. M.	Sacramento.
Roper, R. J.	Prescott, Ariz.	Scott, Fannie E.	Oakland.
Roper, Ralph J.	Santa Ana.	Saitau, S.	Los Angeles.
Rose, F. N.	San Francisco.	Seager, H. L.	San Francisco.
Roth, L. J.	Los Angeles.	Seely, M. J.	San Francisco.
Rowand, J. T.		Sehorn, W. A.	Rocklin.
Ross, Donald H.	Reno, Nev.	Schwarz, Chas. G.	East Oakland.
Rulison, F. J.	Susanville.	Seibel, P. H.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Seiferd, F. J.	San Francisco.	Smith, W. B.	
Semler, Ludwig.....		Smith, C. L.	Tulare.
Servier, L. R.		Smith, T. S.	
Seydel, F. W.	Willows.	Smith, W. O.	Brooklyn, N. Y.
Shankey, G. W.	San Francisco.	Smith, J. Leroy.....	Woodland.
Sharp, W. F.	San Francisco.	Smith, R. E.	Marysville.
Sharp, J. G.	San Francisco.	Smith, G. H.	Sausalito.
Shertel, W. W.	Lake City.	Smith, Uriel	
Shaw, F. I.	Seattle, Wash.	Smith, J. F.	Los Angeles.
Shaw, J. F.		Smith, C. D.	Angels Camp.
Shaw, H. H.		Smith, W. Albert.....	Los Angeles.
Shaw, I. G.	Sacramento.	Smith, W. C.	Pasadena.
Shepard, E. P.	San Francisco.	Smith, J. F.	Forest Hill.
Sheppard, H. M.	San Francisco.	Smith, F. Z.	Fresno.
Shepard, W.	Alameda.	Smith, C. C.	Riverside.
Shepard, S. B.	Selma.	Smith, R. E.	Sacramento.
Sheppard, C. F.	Anderson.	Smith, R. W.	San Francisco.
Sherman, C. A.	Los Angeles.	Smith, T. M.	San Francisco.
Sheriff, E. W.	San Diego.	Smith, M. E.	San Francisco.
Shields, F. M.	Sacramento.	Smith, U.	Sacramento.
Shoaff, W. R.		Smyth, F. U.	Oakland.
Shoemaker, R. H.	Pasadena.	Smyth, W. J.	Oakland.
Shuey, G. E.	East Oakland.	Snavely, A. C.	Whittier.
Shellhorn, A. L.		Snavely, M. E.	Los Angeles.
Short, E. N.	San Francisco.	Snell, A. T.	Los Angeles.
Sibley, W. E.	Los Angeles.	Snook, J. C.	Cornieville.
Sichel, Max	San Francisco.	Snow, F. T.	San José.
Sichel, Henry	San Francisco.	Soher, H. C.	San Francisco.
Sichel, Henry, Jr.	San Francisco.	Southworth, S. S.	San Rafael.
Sichel, L.	San Francisco.	Southworth, S. S.	San Francisco.
Sieberst, W. R.	San Francisco.	Sparks, A. F.	Alameda.
Simms, J. B.	Arcata.	Sparhawk, E. E.	Oakland.
Simmons, W. A.	Represa.	Sparrevohn, H. R.	Los Angeles.
Simmons, W. H.	Oakland.	Spates, A. R.	Redlands.
Simpson, J. H.	Napa.	Spear, T. R.	San Francisco.
Simons, B. R.	Philadelphia, Pa.	Spence, S. J.	
Simpson, G. W.	Santa Barbara.	Spiess, G.	San Francisco.
Simpson, A. L.	San Francisco.	Spinks, M. E.	Los Angeles.
Simpson, Jennie M.		Spinks, W. H.	Los Angeles.
Singleton, W. E.	San Francisco.	Sprake, W. T.	San José.
Sisson, E. K.	San Mateo.	Spratt, C. W.	
Skillen, R. C.	Pasadena.	Squier, R. M.	Napa.
Skinner, C. C.	San Francisco.	Solley, A. A.	San Francisco.
Sloan, J. D.	Santa Paula.	Staire, H. M.	Ventura.
Sloat, C. F.	San Francisco.	Staire, J. M.	Ventura.
Small, J. L.	Palo Alto.	Stalder, J. M.	Oakland.
Small, H. E.	Los Angeles.	Stineman, J. H.	Wheatland.
Smith, A. B.		Stallman, G. E.	San Francisco.
Smith, F. J.	San José.	Stanford, G. G.	San Francisco.
Sibley, R. R.	Sacramento.	Stanley, W. H.	San Francisco.
Smith, H. S.	Stockton.	Stanton, J. C.	Rio Vista.
Smith, J. McC.	Oakland.	Stapff, F. W.	San Francisco.
Smith, A. D.		Stark, T. G.	San Francisco.
Smith, N. R.	Santa Monica.	Stauten, C. E.	Oakland.
Smith, C. H.	Cloverdale.	Stealey, T. S.	San Francisco.
Smith, H. O.	Nevada City.	St. Clair, J. A.	Newman.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Steele, Dan L.	San Francisco.	Taft, T. D.	San Francisco.
Steinhilber, Minnie M.	Los Angeles.	Taggart, John E.	Burlington, Va.
Stephens, H. H.		Tait, E. R.	Oakland.
Stephens, C. J.	San Francisco.	Tait,	San Francisco.
Stephenson, Harley H.	Sacramento.	Takagi, B. S. N.	Los Angeles.
Stern, H. S.	San Francisco.	Talbot, H. I.	Lompoc.
Stevens, C.	Los Angeles.	Tate, S. P., Jr.	Oakland.
Stevens, F. N.		Tate, A. W., Jr.	Watsonville.
Stevens, F. E.	Los Angeles.	Taylor, F. S.	Los Angeles.
Stephens, H. A.	San José.	Taylor, A. I.	
Stevens, A. J.	Los Angeles.	Taylor, A. W.	San Francisco.
Stevenson, H. H.	Woodland.	Taylor, C. C.	San Francisco.
Stewart, R.	Chico.	Taylor, J. M.	
Stich, Benj. M.	San Francisco.	Taylor, R. L.	San Francisco.
Stambaugh, C. D.	Riverside.	Taylor, W. N.	
Stickney, F. W.	San Francisco.	Taylor, W. J.	Sacramento.
Stiles, H.	San Francisco.	Taylor, W. E.	Oakland.
Stine, F. M.		Teague, L. A.	San Francisco.
Stinson, C. G.	Santa Barbara.	Teague, F.	San Francisco.
Stirling, M. G.	San Francisco.	Tebbetts, F. F.	Sacramento.
Stoakes, F. C.	Oakland.	Tennyson, C. B.	Lodi.
Stocking, C. H.	Los Angeles.	Tennyson, H. A.	San Francisco.
Stokes, F. R.	San Francisco.	Theller, S. S.	
Stokes, T. P.	San Francisco.	Theller, E. A.	
Stoll, B. F.	San Francisco.	Therkof, G. H.	San Francisco.
Stone, J. T.	Petaluma.	Therkof, George A.	San Francisco.
Stone, W. W.	Placerville.	Thatcher, J. W.	San Francisco.
Strickland, S. L.	San Francisco.	Thomas, A. J.	Sacramento.
Stryker, W. C.	Hanford.	Thomas, H. B.	
Stuart, S. L.	Ventura.	Thomas, C. L.	Escondido.
Stuttmeister, W. O.	Redwood City.	Thomas, Montgomery	Fresno.
Suggett, A. H.	Marysville.	Thompson, R. P.	
Sullivan, H. F.	Oakland.	Thompson, W. H.	
Sullivan, A. S.	San Francisco.	Thrailkell, W. O.	
Sullivan, T. H.		Thomas, W. G.	Grass Valley.
Sullivan, J. P.		Thurston, J. H.	Los Angeles.
Sullivan, M. J.	San Francisco.	Thomas, James Robert	Ukiah.
Sullivan, J. L.	Marysville.	Tibbetts, A. L.	Petaluma.
Summers, R. A.	Oakland.	Tibbetts, A. G.	Los Angeles.
Summer, C. M.		Timerman, E. C.	Oakland.
Swain, E. M.	San Francisco.	Timmons, A. J.	Yreka.
Swain, H. P.	San Francisco.	Titcomb, C. B.	
Swanberg, N. A.	Seattle, Wash.	Tizzard, S. B.	Los Angeles.
Swartwont, L. D.	Los Angeles.	Tobriner, Oscar	San Francisco.
Sweetster, L. O.	San Francisco.	Todd, Baxter	
Swigert, H. I.	Mariposa.	Todd, P. I.	Los Angeles.
Swigert, G. O.		Todd, C.	Sacramento.
Switzer, Anna		Tollhurst, G. W.	Los Angeles.
Sykes, A. E.	San Francisco.	Tollhurst, S. H.	Los Angeles.
Sylvester, A. J.	San Francisco.	Tomkins, G. H.	Oakland.
Sylvester, C. W.	Los Angeles.	Tomlinson, Charles McR.	San Francisco.
Sylvester, H., Jr.	San Francisco.	Tope, John H.	
Symons, S. J.	Oakland.	Toprahanian, A. G.	Colton.
Symington, W. H. L.	Los Angeles.	Toprahanian, H. G.	
		Townsend, J. R.	Pasadena.
Taber, M. E.	San Bernardino.	Townsend, E. L.	Los Angeles.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Toye, W. O.	San Francisco.	Wagner, A. C. F.	San Francisco.
Travers, H. P.	Oakland.	Wait, R. L.	Sacramento.
Treen, Robert de G.	Pasadena.	Walden, W. A.	Stockton.
Treen, T. O.		Walk, C. L.	
Tremper, R. H.	Ontario.	Walker, G. H.	
Treyer, E. J.	San Francisco.	Walker, C. H.	Oakland.
Tristram, G. T.		Walker, J. T.	Masonville.
Trueman, H. G.	San Francisco.	Wall, A. C.	Honolulu, H. I.
Truesdall, E. C.	Los Angeles.	Wallace, W. G.	Stockton.
Trumpour, J. P.	San Francisco.	Wallace, A. H.	San Francisco.
Tryson, W. M.	San Francisco.	Walsh, W. E.	San Diego.
Tucker, A. C.	Los Angeles.	Walsh, J. W.	Oakland.
Tucker, I. L.	Oroville.	Walsh, R. L.	San Francisco.
Tudor, P. J.		Walton, P. J.	Fruitvale.
Tufts, J. B.	San Francisco.	Walton, S. L.	San José.
Tulles, Morgain*		Wanberg, G. E.	Whittier.
Turner, H. C.		Ward, J. N.	Auburn.
Turner, P. T.	Stockton.	Ward, A. W.	San Francisco.
Turner, R. E.	Modesto.	Ward, H. B.	San Francisco.
Turner, W. A.	Santa Maria.	Wardlaw, H. J.	San Francisco.
Turner, R. H. L.	Los Angeles.	Ware, William H.	Manila, P. I.
Twist, J. F.	San Francisco.	Warnekros, W. L.	Santa Barbara.
Twiggs, W. A.	San Francisco.	Warner, A.	San Francisco.
Tyson, Charles	Placerville.	Warner, John	
		Washer, W. A.	
Ulsteen, E. A.	Dixon.	Wasley, D. W.	Chico.
Upchurch, N. B.	Vacaville.	Wasson, J. S.	San José.
Upham, F. F.	Dixon.	Wassman, Max	San José.
Upton, E. A.	Oakland.	Waterbury, J. E.	Paso Robles.
Urmy, H. N.	Los Angeles.	Waterman, E. R.	San Francisco.
		Watkins, F. D.	St. Helena.
Van Amringe, D. R.	Sonoma.	Watkins, W. H.	San Francisco.
Van Akin, J. R.		Watts, J. W.	San Diego.
Van Crom, A.	Alameda.	Wayne, A. T.	Redlands.
Vanderlip, J. T.	San Francisco.	Weaver, C. R.	Gilroy.
Vanderlip, G. G.	San Rafael.	Weaverling, G. F.	Los Angeles.
Vandever, G. Y.	San Francisco.	Webster, F. E.	Martinez.
Van Muesbach, Zesch. L.	San Francisco.	Webster, L. D.	San José.
Van Meter, W. H.	San Pedro.	Weldon, C. A.	Vacaville.
Van Orden, L., Sr.	San Francisco.	Weldon, E. J.	Sacramento.
Van Orden, G. N.	San Francisco.	Weldon, J. A.	Sacramento.
Van Vleck, J. D.	Los Angeles.	West, R. C.	Orland.
Van Wormer, E. B.		Weston, C. S.	Oakland.
Van Wyck, C.	San Francisco.	Weston, W. H.	Los Angeles.
Veale, A. F.	San Francisco.	Westphal, E. W.	San Francisco.
Verrinder, A. E.	Victoria, B. C.	Westphal, O. F.	San Francisco.
Victor, E. R.	Bakersfield.	Weyer, G. A.	Modesto.
Vogelman, D. J.	Vallejo.	Wheeler, T. R.	San Francisco.
Vogel, Thomas A.	Los Angeles.	Whelan, W. A.	San Francisco.
Voorhies, G. L.	Vallejo.	Whitcomb, S. E.	San Francisco.
Vorwald, T. F.	Oakland.	White, L. L.	
		White, G. A.	Santa Barbara.
Walker, LuElla	Oakland.	White, J. M.	Los Angeles.
Wachhorst, N. B.	San Francisco.	White, A. L.	San Francisco.
Wadleigh, W. M.		White, J. R.	Eureka.
Wadsworth, W. H.	Berkeley.	White, R. W.	
Wagner, R.	Los Angeles.		

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Whitman, E. W.	Oakland.	Wolfe, F. B.	Fresno.
White, C. M., Jr.	Chico.	Wilcoxon, C. R.	Santa Clara.
Whitnack, C. A.		Wolf, F. O.	
Whitney, E. O.	Seattle, Wash.	Wood, A. B.	
Whitlock, Alma	San Bernardino.	Wood, C. C.	Oakdale.
Whitten, R. E.	Santa Ana.	Wood, William	Sacramento.
Whitted, Charles	Santa Ana.	Woolsey, E. G.	Ione.
Whittaker, E. E.	San Francisco.	Woolsey, R. I.	Oakland.
Whomes, George	Arizona.	Woolsey, P. J.	Jamestown.
Whomes, R. W.	Los Angeles.	Woodward, W. S.	
Wilbur, P. S.	Bakersfield.	Worral, G. H.	Santa Clara.
Wilcox, W. I.	San Francisco.	Woodruff, W. B.	
Wild, M. C.		Worthington, J. I.	Bakersfield.
Wilder, D. R.	Los Angeles.	Worthington, M. M.	Bakersfield.
Wiley, J. N.	Santa Rosa.	Worthley, A. H.	Newcastle.
Wilcox, W. C.	Stockton.	Wright, R. B.	Oakland.
Wilkins, F. E.	Oakland.	Wright, B. E.	
Wilkins, P. J.	Colusa.	Wright, W. S.	San José.
Willard, S. S.		Wright, A. O.	Stockton.
Williams, C.	Marysville.	Wren, J. S.	
Williams, E. G.	Oakland.	Wyatt, M. O.	Winters.
Williams, Ernest Guy	Colfax.	Wymore, G. H.	Santa Rosa.
Williams, V. A.	Cloverdale.		
Williams, J. J.	Pacific Grove.	Yant, H.	San José.
Willsey, T. F.	Napa.	Yates, L. C.	Santa Barbara.
Wilson, C. H.		Yeman, J. P.	Yuma, Ariz.
Wilson, J. F.	Jackson.	Young, J. E.	San Francisco.
Wilson, H. D.	San Pedro.	Young, H. C.	San Francisco.
Wilson, W. O.		Young, J. A.	San Diego.
Wilson, O. T.	Oakland.	Younger, W. J.	Paris, France.
Wilson, M. W.		Young, J. S.	Butte City.
Wing, W.	Eureka.	Younger, E. A.	San Francisco.
Winter, J. W.	San Francisco.		
Wisner, P.	San Francisco.	Zeigler, C. L.	San Francisco.

DECEASED LICENTIATES.

Adams, I. L.	Dentler, E. F.	La Due, W. K.	Rogers, F. S.
Arbeely, H. J.	Dick, W. A.	Larkin, Geo. W.	Russell, E. W.
Austin, H.	Doulton, G. H.	Lee, E. W.	Saul, G. M.
Beers, Barrett	Drucker, W. E.	Lee, L. A.	Sheets, H. Clay
Bernard, George	Dutch, W.	Light, W. W.	Shrewsbury, N.
Bernard, H. A.	Dyer, J. J.	Lightbody, H. I.	Simms, C.
Bertrand, E. H.	Farnsworth, F.	Lilliard, W. F.	Sisson, E. K.
Blood, J. M.	Fickett, S. H.	Little, J. R.	Smith, J. B. M.
Blondin, Arthur	Finigan, L.	McCargar, P.	Spaw, C. R.
Blake, R. J.	Fitzpatrick, F.	Mitchell, H. H.	Stephenson, C. H.
Blake, C. E.	Forbes, W. W.	Moad, B. R.	Strain, E. S. L.
Bometter, F.	Gibbin, J. A.	Moore, C.	Stealey, E. M.
Botsford, George	Goodell, L. C.	Moore, W. A.	Stauffer, H. W.
Boyd, C. W.	Gonzalez, I. F.	Moore, J. S.	Sublett, W. A.
Bowles, J. B.	Gray, R. F.	Moterne, C. F.	Swift, T. E.
Boynes, H. F.	Griswold, W. F.	Moulton, C. R.	Taggart, D. R.
Bolton, Thomas	Harlan, C. N.	Newson, G. W.	Thrall, H. H.
Browser, R. C.	Halsey, I. S.	Nye, W. E.	Vidaver, N. J.
Bryan, A. C.	Hart, A. C.	Parsons, M. W.	Van Bonhurst, C. G.
Burnett, E. T.	Hartman, R. C.	Pennington, A. R.	Van Winckle, H. M.
Buge, J. J.	Harm, W. D.	Pendleton, B. F.	Verrinder, R. T.
Burch, Maria	Hatcher, S. H.	Petton, L. D.	Wade, Thomas
Burleson, F. D.	Hitchcock, J. W.	Pierson, H. H.	Walker, A. J.
Cafferoto, A.	Horner, J. Van C.	Porter, J. S.	Ward, S. T.
Caldwell, F. M.	Holmes, Stephen	Ran, Henry	Westover, G. C.
Card, W. H.	Hodgen, I. N.	Remington, J. W.	Wells, L. W.
Case, G. A.	Hoffman, M.	Reibel, W. H.	Whipple, T. S.
Case, I. M.	Jacobs, B. R.	Reith, W. C.	White, F. H.
Cole, R. E.	Jenkins, O. S.	Read, W. S.	Wilbert, J. L.
Cranz, F. H.	Kingsbury, W. B.	Relley, John W.	Winter, W. G.
Croome, W.	Knapp, A. R.	Ross, C. G.	
Davenport, A. C.	Knox, H. E.	Rogers, E. P.	

BIENNIAL REPORT

OF THE

Commissioners to Manage Yosemite Valley

AND THE

MARIPOSA BIG TREE GROVE.

FOR THE YEARS 1903-1904.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.

1904.

COMMISSIONERS TO MANAGE YOSEMITE VALLEY AND THE
MARIPOSA BIG TREE GROVE.

HON. GEORGE C. PARDEE, - - - Governor of California,
Ex officio President.

CHARLES S. GIVENS, *Vice-President.*

WM. G. HENSHAW, WM. H. METSON, FRANK H. SHORT,

WM. G. KERCKHOFF, THOMAS A. HENDER,

J. C. WILSON.

J. J. LERMEN, - - - Secretary and Treasurer.
Office, Hayward Building, San Francisco.

GEORGE T. HARLOW, - - - Guardian.

REPORT.

To His Excellency GEORGE C. PARDEE,
Governor of the State of California.

SIR: The Commissioners to Manage Yosemite Valley and the Mariposa Big Tree Grove have the honor to present herewith the report of their management of the Valley and of the Grove for the years 1903 and 1904.

Since the last report a new lease of the Sentinel Hotel has been executed between the Commission and J. B. Cook, the holder of the preceding lease. The term of the lease is four years from November 1, 1904. The rent paid for the hotel during the preceding term was \$1,900 a year for the Sentinel Hotel and \$175 for the Glacier Point Hotel. It was believed that better satisfaction would result from both hotels being run under one management, for which reason joint bids for the leasing of the Glacier Point and Sentinel Hotels were called for. The bid of J. B. Cook was accepted, he paying \$2,000 a year for the Sentinel Hotel and \$200 for the Glacier Point Hotel, and he agreeing to expend the sum of \$1,340 in permanent improvements on the said hotels, and the sum of \$2,000 upon improvements to Camp Yosemite (also managed by him). Under this arrangement the accommodations at the Sentinel Hotel have been made as good as circumstances will permit.

IMPROVEMENTS.

The chief permanent improvement attempted during the past year has been the creation of a new water system. The present water supply is inadequate for the needs of the Valley, the number of buildings constantly increasing each year. For this reason the stream of water crossing the trail to Glacier Point, by way of Union Point, has been made use of and the water will be piped from this spring to the hotel. This additional supply will answer the needs of the Valley for probably many years to come; that is to say, the supply is expected to be entirely adequate for double the present demand. As high a pressure as is wanted can be obtained. Indeed, one of the problems that confronted the Commission was the reduction of the pressure to a head that could easily be managed.

FIRE PROTECTION.

With the installation of the new water system, protection from fire will be largely increased. Practically speaking, the pressure is without limit, so that in the event of a new hotel being constructed, fire protection will be assured, as well as a plentiful supply of good and wholesome water.

IMPROVEMENT OF THE ROADS.

This matter has been the one problem that has ever been before the members of the Commission, constantly receiving some attention, because the Commissioners have been criticised by an unthinking and inconsiderate public for inconveniences resulting from poor roads.

It can not be gainsaid that the roads of Yosemite Valley are about as bad as they can be. It can not be denied that a trip to Yosemite Valley is greatly injured and its pleasures lessened by the inconveniences resulting from the roads in the Valley, and it must be admitted that were the roads of the Valley in fairly good condition the average visitor would remain much longer in the Valley than he is wont to do. But the great cost of repairing the roads, in view of the meager appropriations that have been made by our State Legislature, has ever been a stumbling-block in the way of the efforts of the Commission to better the road conditions. With the use of oil upon the roads of this State and the great success that generally follows such use, the Commission had hopes that a solution of the difficulty was at hand. Accordingly, the assistance of the State Highway Commissioner, Hon. N. Ellery, was invoked, and he has visited the Valley and selected pieces of roadway in various parts of the Valley and prepared them according to the latest approved methods for the sprinkling of oil, in order that a fair test might be made of this method. The transportation companies were induced to lend their assistance, to the end that the cost of the experiment might be reduced to a minimum, and a hundred barrels of oil were used upon the stretches of road previously prepared for the reception of the oil, under the direction of Mr. Ellery, as above stated. The result of the experiment has been a most bitter disappointment. The roadway would not pack; the surface being composed of decomposed granite, the oil sifted through it, pretty nearly much in the same manner as water does. The oil sinking into this granitic sand simply left a covering of loose sand saturated with oil, which bespattered the clothes of travelers and made the conditions even worse than they were before. The report of Mr. Ellery, made after an examination of the roads subsequent to the use of oil, is annexed hereto.

Apparently, the only solution of the difficulty is to abandon the idea of using the present surface of the road and build up a road of some other substance, packing the same by the use of either oil or water. The cost of such work will be extremely large in the first instance, but



YOSEMITE FALLS.

as good roads are of such imperative necessity for a pleasurable visit to, and comfortable enjoyment of, Yosemite Valley, the resulting satisfaction fully warrants the outlay.

NEW HOTEL.

Again does the Commission call attention to the one improvement most urgently needed in Yosemite Valley, and that is a new hotel. In our last biennial report we stated the reasons why, in our opinion, a new hotel is not only a much needed improvement, but also a good financial investment for the State of California.

In our last biennial report we said: "Under existing laws it is practically impossible to arrange with private capital for the construction of necessary hotels or other improvements in Yosemite, and obviously the broader and better policy is that the State should appropriate the money and receive the revenues and continue in full control of the Valley for the benefit of the public; but if adequate appropriations can not be had and decent accommodations provided for the public desiring to visit and enjoy the Valley, then such amendments should be provided by law as will permit the use of private capital in the Valley."

But the Commission hopes that the State of California will not go back to the Federal Government with the statement that it can not appropriate the money to build a hotel in keeping with its surroundings and sufficiently large to accommodate properly the travel to the Valley. It is hoped that the State, looking at it from a business standpoint, will set aside a sufficient sum of money to build a hotel of its own that will be a credit to the Valley as well as to the State. Such a hotel, we believe, can be constructed for \$300,000. No smaller sum should be appropriated, as it would be better not to build at all than to add to the present flimsy, unsubstantial, and unsightly structures that now pass for hotels in the Valley.

ASSISTANCE RENDERED BY FEDERAL OFFICIALS.

During the past year, representatives of different departments of the Federal Government have visited Yosemite Valley, and have given the Commission the benefit of their special knowledge of the matters coming under their care.

A most important service was rendered the Valley by Mr. A. D. Hopkins, in charge of Forest Insect Investigations conducted by the Bureau of Entomology of the United States Department of Agriculture. It was most fortunate for the Valley that this gentleman visited it at the time he did, otherwise serious damage to the pines of the Valley would certainly have resulted from the pine weevil. The investigations of Mr. Hopkins disclosed the existence of this insect, then in process of development, which would in about two weeks' time have emerged

from its breeding places and attacked the standing, healthy pines. Had it been permitted to go that far, there would have been no stopping it until the pines of the Valley had been destroyed. The report of Mr. Hopkins is hereto annexed. It contains much interesting information and furnishes much food for thought.

Through the kindly assistance of Mr. A. G. McAdie, in charge of the Weather Bureau at San Francisco, arrangements have been made for the recording of the rainfall and temperature and other weather conditions each day in Yosemite Valley, and for the telegraphing of these data, at the expense of the Federal Government, to Mr. McAdie, who in turn will distribute these reports throughout the country. This service will prove of considerable interest to prospective travelers to Yosemite Valley, as it will keep the outside public in touch with the weather conditions there. Inquiries as to the weather conditions in the Valley are constantly being made by the public, but owing to lack of facilities, there has been heretofore no way of properly giving this information to the public.

Another officer of the Federal Government whose services the Commission desires gratefully to acknowledge is Mr. Samuel G. Bennett, of the United States Geological Survey. Through the coöperation of Mr. Bennett, an attaché of his department was sent to the Valley for the purpose of installing gauges to measure the flow of water in the Merced River and streams tributary thereto. This information will also be forwarded regularly to the office of the Geological Survey in San Francisco and published from time to time. An authentic and authoritative statement of the amount of water in the streams of the Valley will then at all times be available for the public. As the general public is desirous of visiting the Valley at a time when there is plenty of water in the streams, this information will be of considerable interest to all travelers contemplating a trip to the Valley.

Mr. E. A. Sterling, of the United States Bureau of Forestry, with two assistants, recently visited the Valley for the purpose of inspecting forest conditions in and around the Valley, and especially to look into the matter of protecting the forests from fire. Upon returning from the Valley Mr. Sterling reported that there was little to suggest in the way of fire protection; that the matter was already pretty well covered by the Commission.

DEATH OF W. W. FOOTE.

It is with feelings of the deepest sorrow that the Commission reports the death of Hon. W. W. Foote, for seven years one of its members. During the last few years of his life, Mr. Foote had not been in very good health and was not devoting much of his time to business; but he took an ever increasing interest in Yosemite Valley, finding recreation

and pleasure in studying how best to serve its interests. The Yosemite Valley Commission never had a more enthusiastic member.

A few months before his death Mr. Foote conceived the idea of getting out a guide-book of Yosemite Valley, which would bear the official sanction of the Commission, and the opening pages thereof had about been drafted when Death called him. He took an interest not only in Yosemite Valley, but in all things and persons associated with it. Galen Clark, about to attain the age of ninety years, was the especial object of his consideration, and he it was who started the subscription for a book entitled "Indians of the Yosemite," prepared by Mr. Clark, the preface to which was written by Mr. Foote. This introduction was written in February, 1904, and the ink was hardly dry ere, on the 13th of that month, death terminated his membership in this Commission. In the delirium preceding his death his talk was ever of Yosemite Valley—pathetic evidence of the impressions which this grand and beautiful spot had made upon him.

LARGER APPROPRIATIONS SHOULD BE MADE FOR GENERAL WORK.

We desire to protest most strongly against the insufficient appropriations that have been made in the past for the general care and maintenance of the Valley. For the past and the present fiscal years, \$15,000 a year has been allowed. The allowance for the previous two fiscal years was \$10,000 a year. These amounts are entirely insufficient to meet even the most pressing needs of the Valley. The result has been that such necessary improvements as the bettering of the roads, the protection of the river banks, and the clearing-out of underbrush have been neglected, to the great detriment and injury of the Valley and inconvenience of visitors. Such was the pressing need of the Commission for more funds during the past two years, that it became necessary to increase very largely the sums paid by the different concessionaires transacting business in the Valley. A head tax of 50 cents for each passenger brought in by the transportation companies was levied, this tax amounting to over \$1,750 from one company and over \$500 from the other company. Besides these sums the companies were assessed \$250 apiece. The rents paid by all other concessionaires were largely increased, with the result that the rent roll was raised from \$3,750 to \$7,500. This increase has been of some assistance to us, but is barely sufficient to pay the costs of opening the trails in the spring and keeping them in first-class condition throughout the season, and of keeping in repair the buildings, bridges, etc.

It is impossible to set aside from the small sums of money at the disposal of the Commission anything for the construction of new roads. To construct a good road in Yosemite Valley will cost perhaps \$5,000 a mile, and as there are about twenty-five miles of roadway in Yosemite

Valley, to put the entire system in first-class condition would cost over \$100,000.

We therefore submit, that if the Valley is to be properly taken care of by the State of California, \$100,000 should be set aside for general work during the next two years, and \$20,000 for the same period to cover the expenses of general work in the Mariposa Grove of Big Trees. With these amounts something can be done and a showing made. The improvement in the conditions of the Valley and of the Grove, if such a sum is set aside, would be so marked and the showing made so good that all will feel that the State has received full value for every dollar spent. We trust that such will be the pleasure of your Excellency and of the Legislature.

Annexed hereto is a financial statement, showing the receipts and disbursements for the past two fiscal years.

Respectfully submitted.

BOARD OF COMMISSIONERS TO MANAGE YOSEMITE
VALLEY AND MARIPOSA BIG TREE GROVE,

By J. J. LERMEN, Secretary.

REPORT OF STATE HIGHWAY COMMISSIONER.

SACRAMENTO, CAL., June 18, 1904.

*To the Honorable Yosemite Valley Commission,
San Francisco, California.*

GENTLEMEN: The request of your Commission to experiment with oil in the betterment of road conditions in the Yosemite Valley was carried out during my stay there from May 24 to June 4, 1904. The experience and conditions attending such work are here given in detail for your consideration, as are also other road and engineering items that came to my attention.

Prior to my arrival, Mr. Stevens, the Guardian, prepared three stretches of road for the application of oil. Two of these were on the main road between the Sentinel Hotel and the El Capitan bridge, on the south side of the Merced River. They were given a crown of 8 inches for a width of 14 feet, of a material composed mostly of granitic sand. The third piece of road was across the meadow land between the Sentinel Hotel and the Yosemite Camp. It was crowned 6 inches in 16 feet of width, and was composed of silt, gravel, and sand.

On May 26, 1904, there were received in the Valley four tanks of oil of 25 barrels capacity each, which on May 27th was applied as follows: 50 barrels were distributed on the road between Sentinel Hotel and Yosemite Camp for a distance of 840 feet and a width of 12 feet, thus making approximately an average of 300 barrels to the mile; and 50 barrels were distributed on a piece of the road between Sentinel Hotel and El Capitan bridge for a distance of 2,050 feet and a width of 8 feet, thus making approximately 190 barrels per mile.

The apparatus to conduct the work was crude. In the use of mountain wagons and teams by which the oil was transported, great difficulty was found in keeping the prepared road surface intact. The wagons had very narrow tires and when containing the oil weighed about 15,000 pounds. In using them to distribute the oil they cut the road surface into a veritable plowed ground, thus requiring considerable more oil than otherwise, with far less beneficial results. Then no oil could be held in reserve for such places as were not sufficiently covered to give a good, even surface. This again added a difficulty.

The road between Sentinel Hotel and Yosemite Camp, after application of the oil, was sanded and rolled as thoroughly as our appliances

would permit. It certainly received as fair a test as the circumstances would allow, and I believe that it will, with the exception of some weak spots in the oiled surface, give a good idea of the ability to make a road surface of oil in the Valley.

In regard to the other oiled piece, it was my intention to demonstrate the fact that oil in insufficient quantity and without further care will practically last but a year or two and then become worn out and gone, when, to again prevent dust, another application is necessary. Such renewals, without any permanent result, are surely most unsatisfactory and far too expensive to warrant such work. What is desired is a permanent road surface, and to obtain this on the character of soil at hand there must be used from 300 to 350 barrels of oil per mile on a 12-foot strip of road. Even this is not the best for the travel to which the Valley roads are subjected.

To my mind the improvement of these roads should be substantially permanent for heavy travel, and while experiments for this purpose are being made nothing but the best and most economical plan should be sought. Therefore, I earnestly believe that a far more satisfactory and lasting road can be built there by the application of the macadam principle for a foundation, with an oiled surface. With this view I suggest to your honorable body the plan of constructing a piece of road of the river gravel contained at points along the Merced River. This gravel without surface protection would be useless on your roads and would entail unnecessary expense, while if protected with an oil covering would give very good results. It is certainly the best for the Valley's travel to have good rock foundations for your road work; and it can be stated without reserve that the above-mentioned river gravel, properly handled and applied and then oiled, will effect a far better result and will prove much more economical of maintenance than the direct application of oil to the present condition of roadbed and surface.

There are, on the floor of the Valley, at least 15 miles of roads to be improved. To do this work in a thorough manner with oil would require about 5,500 barrels and the purchase of proper appliances for such work. But before any action is taken I desire to recommend a trial of the graveled and oiled road, so that you may discern the relative efficiency of the two methods. This suggestion is made after careful observation of the oiling already done.

While in the Valley I looked over the iron bridge which spans the Merced River at the Sentinel Hotel, and had it tightened. This structure is of very light weight and needs yearly inspection. In the matter of the new El Capitan bridge, I made measurements of the old structure, so that the new design which is now being made will avoid any of the weak points that caused failure in the old bridge.

I twice visited the new reservoir—once in company with Guardian

Stevens and again with Commissioners Short and Hender—and found the location and work well suited for its purpose. When finished this work will be substantial and far superior to any plan of building with rock and cement.

Another fact that came to my attention through Mr. C. A. Givens was the lack of any plat or survey of your sewers or water mains in and about the town of Yosemite. To have an intelligent idea of those systems, it is necessary that you have a contour map showing the lines of pipes, connections, relative elevation, branches, and other relative data, by which you may easily outline any new or contemplated work or connections with the present work. I verbally offered my services in this matter to Mr. Givens, and herewith further offer to do such work upon my next visit to the Valley, if so desired by your Commission.

Upon the request of the Commission, on June 5th I visited and closely examined the big tree, known as the "Grizzly Giant," in the Mariposa Grove of Big Trees. It was found to lean $18\frac{1}{2}$ feet from a vertical line and to have some partially decayed surface roots on the side farthest from the lean. To ascertain whether or not it has of late increased its deflection from the vertical line is difficult and uncertain, but I established transit points by which any further movement may be accurately detected. Mr. Leach, the guardian of the trees, accompanied and assisted me in this work, and I gave him points by which he can determine any movement of the tree. The destruction of this giant sequoia can be stayed by attaching two cables sufficiently divergent to each other to form a substantial triangle; the cables to be fastened to pine trees near by, but concealed from the view of visitors. Resort to this plan is suggested, providing any additional deflection is determined.

Very respectfully,

N. ELLERY,
Highway Commissioner.

REPORT ON DESTRUCTION OF TREES BY INSECTS.

WASHINGTON, D. C., July 1, 1904.

To MR. W. H. METSON, *Yosemite Commissioner, San Francisco, Cal.:*

MY DEAR SIR: In compliance with your request of the 12th ult. and aided by the facilities which you so kindly offered, I visited the Yosemite Valley June 12-14, for the purpose of investigating the damage to forest trees mentioned by you, and to make such other investigations and observations as would enable me to judge of the conditions relating to other insect depredations.

I found that many of the young and medium-sized yellow pine in the upper part of the Valley had dead and dying tops, with the leaves yellow or red. Upon examination I found that these were being killed by a pine weevil which attacks the base and middle portion of the main stem of the tree. The broods were developing and emerging at the time of my observations, so that there will be no opportunity to destroy them this season, but I would recommend that all small trees *found dying in this manner* during the fall, winter, and early spring should be cut and burned, and that the operation should be completed before the first of June. There were also other insects operating in a similar manner in the reproduction pine, but if the dying trees are cut and burned as recommended all the insects will be destroyed. A few large pine trees were also observed which had died from the attack of destructive pine bark beetles of the genus *Dendroctonus*. These beetles enter the bark of the large trees during the period from June to September, and excavate winding galleries between the inner bark and outer wood, in such a manner as to girdle and cause the death of the trees, and when they occur in sufficient numbers they may destroy not only one but hundreds of trees. Indeed, the two species found are known to be very destructive in other sections of the Pacific Slope and Rocky Mountain region. However, numerous enemies were found which apparently were keeping them in check, and under normal conditions they would probably continue to do so, but conditions favoring the more rapid multiplication of the destructive enemies of the pines would naturally result in very serious damage.

I found in the lower portion of the Valley a number of large yellow pine which had been felled last September. These offered the most favorable conditions for the multiplication of the two species of de-

destructive pine bark beetles. Indeed, the bark was infested by vast numbers of their broods, which were developing and would emerge within a few weeks. I also noted a few large trees which were dead or dying from the attack of these insects, the attack having been made last summer. I explained to the Secretary, and to the Guardian who accompanied me, the serious conditions which prevailed in the felled pine trees, and instructed him as to the proper methods to pursue to destroy the broods, and also explained the matter to the Guardian and urged the importance of immediately removing and burning the bark from the trunks in order to destroy the broods of insects. I also reported the conditions to you when I saw you in San Francisco, and I have no doubt the matter has received prompt attention. I may say further that it will be important to keep a careful watch on the pine trees of the Valley, and if at any time small or large trees are found dying, they should be cut and the bark removed from the trunks, before the destructive insects emerge.

In the meantime, if you desire any further information regarding any trouble affecting other kinds of trees, known or supposed to be caused by insects, I will be very glad to give you any information I can regarding them. In all cases, however, specimens of insects or their work should be sent to me for examination. It is my plan to visit the Yosemite National Park and Valley next fall or summer to make further investigations.

Thanking you sincerely for the facilities you kindly offered which enabled me to make the investigations in the Valley,

I am very truly yours,

A. D. HOPKINS,

In charge of Forest Insect Investigations.

FINANCIAL STATEMENT.

RECEIPTS AND DISBURSEMENTS BY FUNDS FOR THE FIFTY-FOURTH FISCAL YEAR— JULY 1, 1902, TO JUNE 30, 1903.

Appropriation for Care of Yosemite Valley.

By appropriation		\$10,000 00
Balance from fifty-third fiscal year		8 45
		\$10,008 45
Labor	\$4,469 00	
Supplies	3,526 00	
Blacksmithing	107 37	
Freight	209 53	
Care of Sierra Club	17 50	
Office expenses	1,553 91	
Constructing bridge	50 00	
One horse	75 00	
Reverted to State Treasury	14	
		\$10,008 45

Appropriation for Traveling Expenses.

By appropriation		\$850 00
Balance from fifty-third fiscal year		51 78
		\$901 78
Traveling expenses of Commission	\$900 44	
Balance reverted to State Treasury	1 34	
		\$901 78

Appropriation for Care of Mariposa Big Tree Grove.

By appropriation		\$875 00
Balance from fifty-third fiscal year		70 97
		\$945 97
Office expenses	\$336 52	
Supplies	89 95	
Labor	283 00	
Sundries	6 29	
Building cabin	230 00	
Balance reverted to State Treasury	21	
		\$945 97

Yosemite Fund.

Balance on hand last report		\$3,750 37
By rent account		6,063 91
		\$9,814 28
Supplies	\$242 75	
Labor	4,765 03	
Freight	26 21	
Advertising	2 50	
Blacksmithing	48 00	
Surveying	100 00	
Printing	26 00	
Balance	4,603 79	
		\$9,814 28

Resume.

	Disbursements.	Receipts.
Appropriation for care of Yosemite Valley	\$10,008 31	\$10,008 45
Appropriation for care of Mariposa Big Tree Grove	945 76	945 97
Appropriation for traveling expenses	900 44	901 78
Yosemite Fund	5,210 49	9,814 28
	\$17,065 00	\$21,670 48
Reverted to State Treasury	1 69	
Balance to credit of Yosemite Fund	4,603 79	
	\$21,670 48	\$21,670 48

RECEIPTS AND DISBURSEMENTS BY FUNDS FOR THE FIFTY-FIFTH FISCAL YEAR—
JULY 1, 1903, to JUNE 30, 1904.

Appropriation for Care of Yosemite Valley.

By appropriation		\$15,000 00
Supplies	\$3,862 10	
Office expenses	1,554 55	
Labor	8,684 55	
Sundries	69 40	
Blacksmithing	97 90	
Freight	343 39	
Repairing roads	375 00	
Advertising	10 70	
Balance to credit of fifty-sixth fiscal year	2 41	
		<u>\$15,000 00</u>

Appropriation for Care of Mariposa Big Tree Grove.

By appropriation		\$1,000 00
Labor	\$542 25	
Repairing roads	350 00	
Supplies	105 31	
Balance to credit of fifty-sixth fiscal year	2 44	
		<u>\$1,000 00</u>

Appropriation for Traveling Expenses.

By appropriation		\$1,000 00
Traveling expenses	\$938 09	
Balance to credit of fifty-sixth fiscal year	61 91	
		<u>\$1,000 00</u>

Yosemite Fund.

Balance on hand from fifty-fourth fiscal year		\$4,603 79
By rent account		7,861 33
		<u>\$12,465 12</u>
Labor	\$1,576 90	
Supplies	187 15	
Office expenses	158 65	
Traveling expenses	540 69	
Advertising	15 00	
Freight	22 50	
Entertainment of President Roosevelt	794 70	
Care of Sierra Club	17 50	
Blacksmithing	7 37	
Balance to credit of fifty-sixth fiscal year	9,144 66	
		<u>\$12,465 12</u>

Resume.

	Disbursements.	Receipts.
Appropriation for care of Yosemite Valley	\$14,997 59	\$15,000 00
Appropriation for care of Mariposa Big Tree Grove	997 56	1,000 00
Appropriation for traveling expenses	938 09	1,000 00
Yosemite Fund	3,320 46	12,465 12
	<u>\$20,253 70</u>	<u>\$29,465 12</u>
Balance to credit of the appropriation for the care of the Yosemite Valley	2 41	
Balance to the credit of the appropriation for the care of the Mariposa Big Tree Grove	2 44	
Balance to the credit of the appropriation for traveling expenses	61 91	
Balance to the credit of the Yosemite Fund	9,144 66	
	<u>\$29,465 12</u>	<u>\$29,465 12</u>

BIENNIAL REPORT

OF THE

State Veterinary Medical Board

OF THE

STATE OF CALIFORNIA

January 5, 1903, to September 22, 1904



SACRAMENTO :

W. W. SHANNON, : : : : : SUPERINTENDENT STATE PRINTING.

1905.

REPORT OF THE STATE VETERINARY MEDICAL BOARD.

SAN FRANCISCO, CAL., September 23, 1904.

To His Excellency GEORGE C. PARDEE,

Governor of the State of California:

SIR: We, the members of the State Veterinary Medical Board, beg leave to submit our report for the period beginning January 5, 1903. to and including September 22, 1904.

In that time six meetings have been held, as follows: Los Angeles, July 18, 1903; Los Angeles, August 27. 28, 29, 1903; San Francisco. September 18, 1903; Los Angeles, March 4, 1904; San Francisco, September 14 and 22, 1904.

Number of applicants examined:

Applicants—graduates	47
Applicants—non-graduates	28
Total examined.....	<u>75</u>

Number of certificates issued:

To holders of diplomas.....	46
To non-holders of diplomas.....	18
Total certificates issued.....	<u>64</u>

FINANCIAL STATEMENT.

Receipts.

To balance on hand.....	\$24.60
Examining 47 graduates, @ \$5.....	235.00
Examining 28 non-graduates, @ \$10.....	280.00
Issuing 64 certificates, @ \$5.....	<u>320.00</u>
Total receipts	\$859.60

Expenditures.

Incidentals, postage, rent, etc.....	\$120.60
Printing	26.50
Per diem and traveling of members.....	<u>697.50</u>
Total expenditures.....	\$844.60
Balance on hand.....	\$15.00

All persons who are practicing veterinary medicine and surgery in the State of California, and who have not received a certificate from

this Board, in pursuance of the Act regulating the practice of veterinary medicine and surgery in the State of California, are violating the law, and are subject to arrest, and if convicted, liable to a fine or imprisonment or both.

It will be necessary for all persons who may hereafter desire to engage in the practice of veterinary medicine or surgery in this State to secure a certificate from this Board, upon a diploma issued by a legally chartered college of veterinary medicine and surgery, as required by the Act creating this Board.

It is generally supposed that it is the duty of the State Veterinary Medical Board, alone, to prosecute violators of this law. This, however, is not the case, but it is the duty of every citizen, especially veterinary surgeons, to see that the law is enforced, which shall consist of the filing of a complaint, with sufficient evidence to warrant conviction. This, with formal information and a list of witnesses, should be handed to the prosecuting attorney of the county in which the violation has taken place, who must then prosecute the case.

The attention of licensees is particularly called to Section 6 of the Act, requiring the proper filing and display in office of certificate. It requires no action on the part of this Board to work a forfeiture of the certificate; the fact of failure to have it filed within six months after date of issue or the proper display of it in office subjects it to forfeiture for neglect.

The Board is thoroughly impressed with the importance of legislation of this character, and is pleased to say that much benefit has been derived from the law during the past ten years, and a strict administration of the law will surely prove of benefit to the community and a credit to the profession.

All of which is respectfully submitted by the State Veterinary Medical Board.

DAVID F. FOX, D. V. S.,
President.

EDWARD J. CREELEY, D. V. S.,
Secretary.

LAW REGULATING THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF CALIFORNIA.

SECTION 1. It shall be unlawful for any person or persons to practice veterinary medicine and surgery in the State of California without having previously obtained a diploma from a college duly authorized to grant such to students in veterinary medicine and surgery, or to those who have passed satisfactory examinations before the State Veterinary Medical Board as hereinafter provided for: *provided*, that nothing in this Act shall prevent the medical or surgical treatment of stock by the owners or the employés of owners, or by neighbors who do not assume to be practitioners of veterinary medicine or surgery.

SEC. 2. This board of examiners shall be known as the State Veterinary Medical Board, and shall consist of five duly qualified practitioners in veterinary medicine and surgery, whose duty it shall be to carry out and enforce the provisions of this Act.

2. The members of the State Veterinary Medical Board shall be appointed by the Governor of the State.

3. The Board so appointed shall hold office for four (4) years, and the compensation of each member of said State Veterinary Medical Board shall be five dollars per diem, exclusive of all necessary expenses while actually engaged in the duties of their office at the meetings of said Board.

4. A meeting of the said State Veterinary Medical Board shall be held at least once in every six months after the appointment of said Board by the Governor of the State of California, such meetings to be held alternately in San Francisco and Los Angeles.

5. Three members of the State Veterinary Medical Board shall constitute a quorum.

6. Said compensation to be paid out of the fees and penalties received under the provisions of this Act, and no part of the salary or other expenses of the State Veterinary Medical Board shall be paid out of the State Treasury.

7. All moneys received by said State Veterinary Medical Board as such fees and penalties, in excess of the compensation and expenses of the State Veterinary Medical Board, shall be annually paid into the State Treasury, and become part of the General Fund of the State.

SEC. 3. Said State Veterinary Medical Board shall examine all diplomas as to their genuineness. Each applicant not holding a diploma shall submit to a theoretical and practical examination before the State Veterinary Medical Board, said examination to be written or oral, or both, and sufficiently strict to satisfy said board that the applicant is competent to practice veterinary medicine and surgery.

2. An examination fee of five dollars shall be paid to the State Veterinary Medical Board by the holder of a diploma, and ten dollars by an applicant not holding a diploma; said money shall be paid by the applicant before examination.

3. In case of failure of approval, said fee shall be forfeited to the State Veterinary Medical Board.

SEC. 4. All examinations of persons not graduates shall be made directly by the State Veterinary Medical Board, and the certificates given by said Board shall authorize the possessor to practice veterinary medicine and surgery in the State of California. All examinations of ungraduated practitioners must take effect before the eighteenth day of September, nineteen hundred and three; after that date no certificates shall be granted except to persons presenting diplomas from legally chartered colleges.

SEC. 5. Upon the approval of credentials, or upon the approval of the examination of an applicant, said State Veterinary Medical Board shall grant him or her a license to practice in this State, and shall receive therefor a fee of five dollars; said license shall be signed by a majority of the Board.

SEC. 6. Any person qualified as required by this Act, shall, upon the receipt of his license, have said license prominently displayed in his office, and a true copy thereof shall be filed in the office of the clerk of the county in which he resides. Any person removing to another county to practice shall file the license in like manner in the county to which he removes. The holder shall pay the County Clerk the usual fees for filing. Any person holding such license, who shall refuse or neglect to prominently display in his office, or file a copy of the same with the County Clerk, as above directed, within six months after receiving such license, shall forfeit his license, and no license, when once forfeited, shall be restored to the original holder, except on the payment to said State Veterinary Medical Board the sum of twenty-five dollars as a penalty for such failure, neglect, or refusal.

SEC. 7. Any person shall be regarded as practicing veterinary medicine and surgery, within the meaning of this Act, who shall have received a license as mentioned in Section 5. But nothing in this Act shall be construed to prohibit the members of the medical profession from prescribing for domestic animals in case of emergency, and collecting a fee therefor, nor to prohibit gratuitous services in an emer-

gency, nor to prevent any person from practicing veterinary medicine and surgery on any animal belonging to himself or herself. And this Act shall not apply to commissioned veterinary surgeons in the United States Army.

SEC. 8. Any person practicing veterinary medicine and surgery in this State contrary to the provisions of this Act, shall be guilty of a misdemeanor, the penalty of which shall be a fine of not less than one hundred dollars, nor more than five hundred dollars, or by imprisonment of not exceeding six months, or by both.

SEC. 9. This Act shall take effect sixty days from and after its passage.

OFFICIAL REGISTER AND DIRECTORY OF QUALIFIED VETERINARY SURGEONS IN THE STATE OF CALIFORNIA.

Name.	Degree.	Residence.	Qualifications.	Certificate Issued.
Alexander, T. J.	V. S.	Woodland	Ontario Veterinary College, 1889	1894
Anderson, William	D. V. S.	Los Angeles	New York Veterinary College, 1895	1903
Archibald, R. A.	D. V. S.	Oakland	Chicago Veterinary College, 1891	1893
Armstrong, G. E.	M. D. C.	Santa Ana	Chicago Veterinary College, 1893	1903
Barber, B. F.		Marysville	Chicago Veterinary College, 1902	1904
*Burns, Peter		San Francisco	Licensed by California State Veterinary Board of Examiners	1893
Bowhill, Thomas	M. R. C. V. S. L	London, England	Royal Veterinary College, London, England, 1886	1893
Buckley, John M.	D. V. S.	New York, N. Y.	American Veterinary College, New York, 1891	1893
Buzzard, A. E.	M. R. C. V. S. L	San Francisco	London Veterinary College, London, England, 1884	1893
Blackinton, L. C.	V. S.	Los Angeles	Ontario Veterinary College, 1889	1894
Button, W. H.	M. D. C.	Santa Rosa	Chicago Veterinary College, 1895	1895
Baldy, O. C.		Palo Alto	Licensed by California State Veterinary Board of Examiners	1894
Bergman, A.	V. S.	Napa	Ontario Veterinary College, 1869	1894
Backentose, E.	V. S.	Eureka	New York Veterinary College, 1878	1894
Blemer, Charles H.	D. V. S.	San Francisco	National Veterinary College, 1895	1899
Boyle, Robert B.		Oakland	Licensed by California State Veterinary Board of Examiners	1903
Boncher, W. A.	V. S.	Fullerton	Ontario Veterinary College, 1898	1903
Browning, P. H.	M. D. C. V. S.	San José	Chicago Veterinary College, 1903	1903
Brady, Matthew J.			New York Veterinary College, 1892	
Boomer, J. B.	D. V. S.	San Francisco	San Francisco Veterinary College, 1902	1903
Carpenter, T.	M. D. V.	San Francisco	McKillop Veterinary College, 1897	1903
Clausson, W.	M. O. C. V. S.	Alameda	Ontario Veterinary College, 1890	1893
Creely, Edward J.	V. S.	San Francisco	Stuttgart, Germany, 1875	1893
*Clark, Edward M.	D. V. S.	San Francisco	American Veterinary College, N. Y., 1890	1893
Crandel, G. J., Sr		Bishop	Ontario Veterinary College, 1892	1893
Cragen, H. B.		Los Angeles	Licensed by California State Veterinary Board of Examiners	1893
Carney, R. T.	Pomona		Licensed by California State Veterinary Board of Examiners	1893
Carney, R. T.	Whittier		Chicago Veterinary College, 1892	1893
Connolly, William A.	D. V. S.	Los Angeles	Ontario Veterinary College, 1901; McKillop, 1902	1893
Carroll, Thomas E.	M. D. C. V. S.	Chico	California Veterinary College, 1900	1902
Dawdy, Clarence	D. V. S.	Watsonville	California Veterinary College, 1904	1903
Dodson, G. K.	M. D. C.	Los Angeles	Chicago Veterinary College, 1895	1904
Davenport, F. L.	V. S.	Sonora	Ontario Veterinary College, 1895	1896
Dell, J. A.		Redlands	Licensed by California State Veterinary Board of Examiners	1893
DeBiron, Louis Henri	V. S.	Pasadena	Ontario Veterinary College, 1881	1903
*Davidson, R. D.	M. R. C. V. S.	San Bernardino	Agricultural College, Switzerland	1903
Danielsen, L. A.	D. V. S.	Merced	London Royal Veterinary College, 1882	1893
Donaldson, R. H.	D. V. S.	Palo Alto	New York Veterinary College, 1891	1903
Donnelly, George J.	D. V. S.	Oakland	Chicago Veterinary College, 1891	1903
			California Veterinary College, 1901	1903

Defoe, Albert F.	D. V. S.	San José	San Francisco Veterinary College, 1900	1903
Donovan, Andrew	D. V. S.	Vancouver Barracks	San Francisco Veterinary College, 1902	1903
Drake, F. J.	D. V. S.	Watsonville	San Francisco Veterinary College, 1903	1903
Daniels, J.	V. S.	Oxnard, Cal.	Ontario Veterinary College, 1898	1904
Eastman, Charles	D. V. S.	San Luis Obispo	Kansas City Veterinary College, 1904	1904
Egan, William F.	M. R. C. V. S.	San Francisco	Royal Veterinary College, Edinburgh, 1886	1893
Edmons, J. A.	M. D. C.	Los Angeles	Licensed by California State Veterinary Board of Examiners	1893
Eddy, John H.	M. R. C. V. S. L	Stockton	Chicago Veterinary College, 1893	1893
Elliott, W. B.	M. R. C. V. S. L	Hilo, H. I.	Royal Veterinary College, London, 1893	1894
Fitzgerald, James D.	M. R. C. V. S. L	San Francisco	Royal Veterinary College 1886	1893
Fox, David F.	D. V. S.	Sacramento	Chicago Veterinary College, 1891	1893
Fennimore, H. D.	D. V. S.	Los Angeles	American Veterinary College, 1891	1900
Fisher, Carl W.	{ V. S. }	San Mateo	Ontario Veterinary College, 1898	1901
	{ D. V. M. }		Cornell University, 1901	
Faulkner, George F.	M. D. C.	Salinas	Chicago Veterinary College, 1893	1894
Fleming, W. J.	V. S.	Ontario	Ontario Veterinary College, 1890	1894
Forrest, H. A.		San José	Licensed by California State Veterinary Board of Examiners	1893
Forrest, F.		San José	Licensed by California State Veterinary Board of Examiners	1893
Fabbi, H.		City of Mexico	Licensed by California State Veterinary Board of Examiners	1893
Funston, W. H.	V. S.	Oakland	Ontario Veterinary College, 1894	1903
*Gardner, J. H.		Santa Ana	Licensed by California State Veterinary Board of Examiners	1903
Gillen, J. R.	V. S.	San Diego	Ontario Veterinary College, 1887	1893
Graham, J.	V. S.	Fresno	Ontario Veterinary College, 1872	1903
*Goulding, F.	V. S.	Santa Barbara	Ontario Veterinary College, 1882	1893
Garland, J.	V. S.	Santa Barbara	Ontario Veterinary College, 1882	1899
Galvin, Thomas P.	D. V. S.	San Francisco	Ontario Veterinary College, 1885	1903
Griffiths, Frank		Hanford	San Francisco Veterinary College, 1902	1903
Gallup, C. E.		Arcata	Licensed by California State Veterinary Board of Examiners	1903
Graves, Charles E.	D. V. S.	Santa Cruz	Licensed by California State Veterinary Board of Examiners	1903
Glasson, S.	D. V. S.	San Francisco	San Francisco Veterinary College, 1902	1903
Gresswell, Charles	M. R. C. V. S.	San Francisco	San Francisco Veterinary College, New York, 1903	1903
Haring, E. M.	D. V. M.	Berkeley	American Veterinary College, 1903	1904
Halton, J. H.	D. V. S.	San Francisco	Royal Veterinary College, London, 1875	1904
Hingston, J. Compton	V. S.	Emeryville	Cornell University, 1904	1904
Hogarty, J. J.	D. V. S.	Oakland	San Francisco Veterinary College, 1903	1904
Hester, J. H.	V. S.	Pasadena	Ontario Veterinary College, 1900	1903
Howard, T. B.	M. D. C.	San Diego	Ontario Veterinary College, 1892	1893
Hoover, B. F.	V. S.	San José	Chicago Veterinary College, 1889	1899
Hearn, E. B.		Fresno	Ontario Veterinary College, 1895	1900
Hunter, H. M.		Visalia	Licensed by California State Veterinary Board of Examiners	1903
Hoffman, L. C.	D. V. S.	Napa	Licensed by California State Veterinary Board of Examiners	1903
Jacobson, J.	V. S.	San Francisco	California State Veterinary College, 1900	1903
Jones, W. H.	M. R. C. V. S. L.	Hilo (Hawaii)	Berlin Veterinary College, 1875	1893
			London Royal Veterinary College, 1881	1893

* Deceased.

OFFICIAL REGISTER AND DIRECTORY OF QUALIFIED VETERINARY SURGEONS IN THE STATE OF CALIFORNIA—Continued.

Name.	Degree.	Residence.	Qualifications.	Certificate Issued.
Jackson, H. R.		Oakland	Licensed by California State Veterinary Board of Examiners.	1892
Klench, J. P.	V. S.	Petaluma	Ontario Veterinary College, 1889	1897
Keefer, George H.	M. D., D. V. S.	San Francisco	American Veterinary College, 1882	1900
Kely, W. F.		Manila, P. I.	Licensed by California State Veterinary Board of Examiners.	1893
Kennon, L. C.		Napa	Licensed by California State Veterinary Board of Examiners.	1903
Kraker, Louis G.	D. V. S.	San Francisco	San Francisco Veterinary College, 1901	1903
Keane, Chas.	D. V. S.	Sacramento	California Veterinary College, 1897	1904
Lord, R. A.	M. R. C. V. S. I.	Santa Ana	London Royal Veterinary College, 1888	1893
*Lemke, H.	V. S.	Bakersfield	Stuttgart, Germany, 1884	1893
Lee, A. O.	V. S.	Pomona	Ontario Veterinary College, 1899	1899
Leavey, E. N.	D. V. S.	New York	American Veterinary College, 1899	1901
Locke, George H.	D. V. S.	Lockeford	California Veterinary College, 1900	1903
Lougley, O. A.	D. V. S.	Fresno	San Francisco Veterinary College, 1903	1903
Masoero, Cesar	D. V. S.	San Francisco	Royal Veterinary College, Turin, Italy, 1883	1893
McCollum, Alexander	V. S.	Sacramento	Ontario Veterinary College, 1875	1893
McFarlane, W. S.	V. S.	Hueneme	Ontario Veterinary College, 1901	1904
McLean, L. A.	V. S.	Sacramento	Ontario Veterinary College, 1887	1903
McCarthy, G. F.	D. V. S.	San Francisco	San Francisco Veterinary College, 1901	1903
McMurray, John	D. V. S.	Livermore	San Francisco Veterinary College, 1901	1903
Megowan, C. L.	V. S.	Sacramento	Ontario Veterinary College, 1895	1896
Morrison, W. E. D.	V. D. M.	Los Angeles	Ames, Iowa, 1886	1893
Maclay, Thomas	M. R. C. V. S.	Petaluma	London Royal Veterinary College, 1884	1893
Magor, J. F.	D. V. S.	Redlands	Montreal Veterinary College, 1885	1896
*McLean, J. N.	V. S.	Woodland	Ontario Veterinary College	1893
Medici de Biron		Pasadena	Ontario Veterinary College	1901
Murray, Michael J.	D. V. S.	San Rafael	Royal College, Stuttgart, 1894	1900
Mazza, Ralph	M. D. C.	Petaluma	California Veterinary College, 1900	1902
McLean, William C.	D. V. S.	San Mateo	Chicago Veterinary College, 1902	1903
McGovern, James F.	D. V. S.	San Francisco	San Francisco Veterinary College, 1901	1903
Moxey, F. H.		Fresno	San Francisco Veterinary College, 1902	1903
Matthews, G. E.		Fresno	Licensed by California State Veterinary Board of Examiners	1903
Neif, Frederick A.	D. V. S.	Red Bluff	Licensed by California State Veterinary Board of Examiners	1893
Neilson, B. A.	D. V. S.	San Francisco	American Veterinary College, 1892	1893
Orme, T. W.	V. S.	San Bernardino	Licensed by California State Veterinary Board of Examiners	1903
O'Rourke, Isaac W.	M. R. C. V. S. L.	Reno, Nevada	Ontario Veterinary College, 1894	1894
Oliver, W. J.	D. V. S.	Los Angeles	Royal Veterinary College, 1884	1893
Orvis, C. B.	D. V. S.	Milton	Chicago Veterinary College, 1886	1893
Otomo, Heijo		Los Angeles	Licensed by California State Veterinary Board of Examiners	1901
Oddie, S.		Ukiah	Licensed by California State Veterinary Board of Examiners	1903

Osborne, O. J.	D. V. S.	Whittier	Licensed by California State Veterinary Board of Examiners.	1903
Outhier, C. B.	M. R. C. V. S.	Salinas	San Francisco Veterinary College, 1902.	1903
Patterson, A.	D. V. S.	San Francisco	London Royal Veterinary College, 1890.	1893
Pierce, F. E.	V. S.	Los Angeles	Chicago Veterinary College, 18-9	1893
Powers, R. H.	V. S.	Walla Walla	Ontario Veterinary College, 1888.	1893
*Parent, P. P.	V. S.	Hollister	Licensed by California State Veterinary Board of Examiners.	1893
Parks, Ion W.	V. S.	Pasadena	Ontario Veterinary College, 1898.	1900
Pomeroy, Joseph T.	D. V. S.	Redwood	Licensed by California State Veterinary Board of Examiners.	1903
PHELPS, W. E.	D. V. S.	Redlands	Licensed by California State Veterinary Board of Examiners.	1903
Peterson, Theodore.	D. V. S.	Visalia	San Francisco Veterinary College, 1901	1901
Quinlan, J. C.	D. V. S.	San Francisco	National Veterinary College, 1904	1904
*Robin, A.	D. V. S.	San Francisco	Licensed by California State Veterinary Board of Examiners.	1893
Rowland, Ward B.	D. V. S.	Pasadena	American Veterinary College, 1882	1893
Rowatt, A. R.	D. V. S.	Honolulu	Montreal Veterinary College, 1888	1895
Ramsey, F. A.	D. V. S.	Pomona	Chicago Veterinary College, 1897	1897
Richards, W. W.	V. S.	San Diego	Ontario Veterinary College, 1897	1898
Ramage, A. L.	D. V. S.	Riverside	Ontario Veterinary College, 1901	1902
Rydborg, August J.	D. V. S.	San Francisco	San Francisco Veterinary College, 1901	1903
Ryan, Martin A.	D. V. S.	Oakland	San Francisco Veterinary College, 1902	1903
Ramage, A. J. R.	V. S.	Pomona	Ontario Veterinary College, 1889	1900
Rose, Wm.	V. S.	Los Angeles	Ontario Veterinary College, 1891	1904
Skafte, F. W.	D. V. S.	San Francisco	Montreal Veterinary College, 1888	1893
Spencer, H. F.	M. R. C. V. S.	Sacramento	London Royal Veterinary College, 1888	1893
Spencer, H. A.	D. V. S.	San José	Chicago Veterinary College, 1891	1893
Schodde, B.	M. D. C.	Hollister	Licensed by California State Veterinary Medical Board	1893
Stimpson, G. W.	V. S.	Fresno	Chicago Veterinary College, 1893	1893
Shaw, R. J.	D. V. S.	San Francisco	Ontario Veterinary College	1895
Sawyer, F. N.	M. D. C.	Bakersfield	Montreal Veterinary College, 1894	1893
Streets, J. J.	D. V. S.	Ventura	Chicago Veterinary College, 1884	1893
Sullivan, Jas.	V. S.	Suisun	Montreal Veterinary College, 1887	1899
Smith, A. O.	D. V. S.	Pomona	Ontario Veterinary College, 1887	1893
Sellick, W.	D. V. S.	San Diego	Licensed by California State Veterinary Board of Examiners.	1893
Summerfield, Jas. J.	D. V. S.	Santa Rosa	Licensed by California State Veterinary Board of Examiners.	1893
Somers, J.	D. V. S.	San Juan	California Veterinary College, 1897	1902
Sorenson, A. J.	V. S.	Modesto	San Francisco Veterinary College, 1901	1901
Stears, K. O.	V. S.	San Francisco	Ontario Veterinary College, 1898	1900
Saunders, H. G.	V. S.	Santa Barbara	Ontario Veterinary College, 1891	1903
Shipman, O. E.	V. S.	Wrights	Licensed by California State Veterinary Board of Examiners.	1903
Sears, E.	V. S.	Merced	Licensed by California State Veterinary Board of Examiners.	1903
Seabury, W. A.	D. V. S.	Hanford	Grand Rapids Veterinary College, 1903	1904
Twinning, Frederick E.	V. S.	Fresno	San Francisco Veterinary College, 1901	1903
Tourtillion, N. P.	V. S.	Los Angeles	Ontario Veterinary College, 1888	1893

* Deceased.

OFFICIAL REGISTER AND DIRECTORY OF QUALIFIED VETERINARY SURGEONS IN THE STATE OF CALIFORNIA—Continued.

Name.	Degree.	Residence.	Qualifications.	Certificate Issued.
Twombly, S. S.	V. S.	Los Angeles	Ontario Veterinary College, 1894	1895
Trullinger, J.	.....	Bakersfield	Licensed by California State Veterinary Board of Examiners.	1893
Thompson, W. M.	V. S.	Willows	Ontario Veterinary College, 1892	1893
Tilton, E. W.	D. V. S.	Santa Cruz	Chicago Veterinary College, 1889	1893
Tritton, R. L.	V. S.	Los Angeles	Ontario Veterinary College, 1899	1900
Turner, H. A.	V. S.	Fresno	Ontario Veterinary College, 1894	1895
Tyler, John L.	D. V. S.	Long Beach, Cal.	Chicago Veterinary College, 1891	1904
Ward, G. R.	.....	Santa Maria	Licensed by California State Veterinary Board of Examiners.	1903
Williamson, W. L.	M. D. V.	San Francisco	McKillop Veterinary College, 1895	1899
Whittlesey, R. T.	D. V. S.	Los Angeles	American Veterinary College, New York, 1882	1893
Westphal, C. H.	D. V. S.	San Francisco	American Veterinary College, 1894	1895
Withers, A. S.	M. D. C.	Los Angeles	Chicago Veterinary College, 1894	1895
*Withers, R. J.	M. D., V. S.	Los Angeles	Chicago Veterinary College, 1886	1895
White, S.	.....	Pasadena	Licensed by California State Veterinary Board of Examiners	1893
Wadams, W. A.	.....	Santa Clara	Licensed by California State Veterinary Board of Examiners	1893
Williams, A. S.	.....	Marysville	Licensed by California State Veterinary Board of Examiners	1893
Wise, A. B.	.....	San Bernardino	Licensed by California State Veterinary Board of Examiners	1893
Williams, W. L.	D. V. S.	San Francisco	Licensed by California State Veterinary Board of Examiners	1893
Ward, Archibald R.	D. V. M.	Berkeley	Montreal Veterinary College, 1893	1898
Waddle, John G.	D. V. S.	Stockton	Cornell University, 1901	1901
Williams, B.	.....	Fresno	San Francisco Veterinary College, 1901	1903
Waddle, George J.	.....	Modesto	Licensed by California State Veterinary Board of Examiners	1903
Welsh, Joseph A.	D. V. S.	San Francisco	Licensed by California State Veterinary Board of Examiners	1903
.....	.....	.....	California Veterinary College, 1897	1903

* Deceased.

REPORT

OF THE

Commissioner of Public Works

TO THE

GOVERNOR OF CALIFORNIA,

TOGETHER WITH THE

REPORT OF THE COMMISSION OF ENGINEERS

TO THE

COMMISSIONER OF PUBLIC WORKS

UPON THE

Rectification of the Sacramento and San Joaquin rivers and their principal tributaries, and the reclamation of the overflowed lands adjacent thereto.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.

1905.

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REPORT OF COMMISSIONER OF PUBLIC WORKS.

SACRAMENTO, December 20, 1904.

To HON. GEORGE C. PARDEE,

Governor of California:

SIR: Last spring's disastrous flooding of broad areas of the lowlands of the Sacramento and San Joaquin valleys, embracing several of the best reclamation districts of our State upon which vast sums of money had been expended for protection and drainage, again forcibly demonstrated the insecurity of reclamation interests under existing river conditions and disconnected efforts toward flow control.

This enormous property loss and devastation of fertile areas by flood led many representative men and public bodies throughout the State to organize for the purpose of harmonizing all sections and enlisting the support of all interests in devising some comprehensive plan of river improvement and drainage that should provide security against overflow and promote navigation.

A State River Convention was called in San Francisco on May 23, 1904. The convention was composed of delegates from representative and public bodies interested in the improvement of our rivers, the reclamation of our valleys from overflow, and the general development of our State.

An exhaustive consideration and discussion of the flood situation marked the proceedings of the assemblage. Among the prominent men who spoke were yourself and United States Senator George C. Perkins. The latter voiced the opinion that a well-devised and complete scheme of river improvement and drainage for California lowlands would, if properly presented at Washington, receive the earnest attention and liberal support of the Federal Government. The convention finally decided to appoint a committee to draft resolutions expressing the sentiment of the convention.

The resolutions, which were adopted unanimously, provided that the convention form itself into a permanent organization, to be known as "The River Improvement and Drainage Association of California," and that a commission of engineers be appointed to investigate river and flood conditions in the Sacramento and San Joaquin valleys, who should submit a plan for their improvement and control in time for suitable action to be taken by the next session of the State Legislature.

Three of the members of the proposed commission were to be eminent engineers residing outside of the State of California.

As finally constituted the commission was composed as follows: Major T. G. Dabney, Chief Engineer of the Yazoo Mississippi Delta Levee District; Major Henry B. Richardson, member of the United States Mississippi River Commission; Major H. M. Chittenden, U. S. A., in charge of the Yellowstone Park and the Missouri River; and M. A. Nurse, Chief Engineer to the Commissioner of Public Works for California.

This commission organized August 9, 1904, and immediately began a thorough study of the physical conditions of the rivers and valleys comprising the field of its labors. A vast amount of information and data was gathered, and the Commission then adjourned to meet in Sioux City the latter part of November, 1904, to compile data and prepare its plans and recommendations.

In brief, the plan, as submitted, provides for channel rectification and enlargement by joint action of natural and mechanical agencies, and the gradual concentration and confinement of the flood volume of the rivers and lesser streams of the Sacramento valley between lines of levees so located as to ultimately provide ample channel area for transporting all the flood volume. Until such channel rectification and enlargement shall have been secured through the joint agency of increasing current energy and mechanical excavation, relief will be afforded the levees by introduction of escapement weirs to temporary by-pass channels for conducting the surplus flood through the basins. The recommendations in detail form a part of this report. The plan thus submitted meets with our approval.

The State is to be congratulated upon having secured the services of the distinguished engineers who have devised the plan of river improvement and drainage herewith submitted. Their diligent study of our river problem and wide experience in devising and introducing measures for flood control of other rivers preëminently fitted them for the task they have so well discharged.

FINANCIAL STATEMENT.

ACT OF 1897. (Statutes of 1897.)

Balance in appropriation January 1, 1903.....	\$10,553 39
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Expenditures.

Salaries of Engineers and Assistants, January 1, 1903, to July 1, 1903.....	\$3,300 00
Expenses.....	2,920 02
Emergency contract, revetment work at Chicory ranch.....	4,118 85
Balance in appropriation December 19, 1904.....	214 52
	\$10,553 39

ACT OF 1903. (Statutes of 1903.)

Appropriation	\$200,000 00
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Expenditures.

Expenses of River Commission.....	\$12,503 27
Snagging Upper Sacramento river.....	6,041 00
River gauges	1,302 25
Weir at Butte slough.....	10,731 05
Expenses of Auditing Board.....	250 90
Training wall at Tisdale weir.....	9,245 12
Engineers' salary, July, 1903, to December 1, 1904	9,890 00
Office expenses.....	336 57
Survey at Lake Earl	212 35
Survey at Marysville	1,006 95
Boulevard survey below Sacramento.....	366 15
Expenses at Finnegan cut, San Joaquin river	939 08
Pulling snags, Mokelumne river.....	8,007 63
Survey, lower river.....	906 13
Survey, Gray's bend to Elkhorn	155 08
Balance in appropriation December 19, 1904	138,106 47
	\$200,000 00

Respectfully submitted.

FRANK D. RYAN,
Commissioner of Public Works.

REPORT
OF THE
COMMISSION OF ENGINEERS
TO THE
COMMISSIONER OF PUBLIC WORKS
OF THE
STATE OF CALIFORNIA,
UPON THE
Rectification of the Sacramento and San Joaquin Rivers and their principal tributaries, and
the reclamation of the overflowed lands adjacent thereto.

Submitted December 15, 1904.

REPORT

OF THE

COMMISSION OF ENGINEERS TO THE COMMISSIONER OF PUBLIC WORKS OF CALIFORNIA.

I.

INTRODUCTORY.

UNITED STATES ENGINEER OFFICE,

SIoux CITY, IOWA, December 15, 1904.

To HON. FRANK D. RYAN,

*Commissioner of Public Works, State of California,
Sacramento, Cal.:*

SIR: The Commission of Engineers, appointed by yourself, with the concurrence and approval of the Governor and Auditing Board, for the purpose of investigating the problems presented by the Sacramento and San Joaquin rivers and their tributaries, and recommending a plan for the correction of the faulty conditions there existing, has the honor to submit the following report:

(1) The Commission organized in San Francisco on August 9, 1904, by selecting T. G. Dabney as chairman, and H. M. Chittenden as secretary, the other members being H. B. Richardson and M. A. Nurse.

(2) The investigation was proceeded with under the general directions contained in the following letter from yourself:

SACRAMENTO, CAL., August 8, 1904.

The Commission of Engineers, 37 Flood Building, San Francisco, Cal.:

GENTLEMEN: As you have heretofore been informed, the necessity of formulating some general plan for the rectification of the Sacramento and San Joaquin rivers and their principal tributaries, and the reclamation of the overflowed lands adjacent thereto, has led to your appointment as a Commission of Engineers to investigate this problem and submit a report thereon.

It is expected that you shall examine the physical data concerning the present and past conditions of these streams that have been placed in your hands, and make such other investigations as may be found necessary, to enable you to submit a recommendation of a general plan for improving their regimen with a view to providing means for passing their flood waters harmlessly into Suisun bay, both for the improvement of navigation facilities in the streams and to render feasible the protection of the adjacent lands from disastrous flood overflow.

It is desired that your report, embodying such recommendations as you may make for the accomplishment of the above objects, shall be submitted to serve as a basis for

legislation by the California legislature during the approaching session of that body, which is to begin on January 2, 1905, and it is desired that the report shall be submitted not later than December 15, 1904.

Yours respectfully,

FRANK D. RYAN,
Commissioner of Public Works, State of California.

(3) It may be proper at the outset to remark, that after the investigation was pursued far enough to disclose the full magnitude and complexity of the many-sided problem presented for examination and solution, the Commission has labored under some sense of oppression from the insufficiency of the time available, and the lack of important data necessary for the thoroughness of study demanded in order to do full justice to the matters consigned to its hands. The Commission has, however, addressed itself with due diligence to the task before it, and is now prepared to lay before you the results of its labors and the conclusions arrived at.

(4) The Commission held daily sessions in the offices provided for it, at room 37, Flood Building, San Francisco, except when absent on tours of observation in the Sacramento and San Joaquin valleys. During these sessions a general invitation was extended to all persons who might be interested in the work of the Commission to appear before it during the hours of 10 A. M. to 1 P. M. of each day, to impart information and submit suggestions pertaining to the subjects of investigation. In response to this invitation a considerable number of the prominent citizens of the territory affected and others having interests there appeared before the Commission from time to time, and furnished much material information concerning the physical features of the problem, and discussed the methods suggested for the treatment of its various phases.

By special request of the Commission, several engineers, who had at different times been engaged in making surveys and collecting physical data, and in studying the conditions presented by the flood flow in these streams, and also the United States Engineer in charge of the navigation interests of the district, gave much valuable information to the Commission as a result of their labors in this field. The expressions given out by all these gentlemen have been reduced to writing and are a part of the record of this investigation.

(5) There was also placed in the hands of the Commission a large mass of printed and written data, embracing reports of engineers and former engineering commissions, and embodying a history of the preceding investigations of the subject-matters, accompanied by maps that cover all of the territory involved. The Commission is especially indebted to Col. W. H. Heuer, Corps of Engineers, U. S. A.; Mr. Wm. Ham. Hall, formerly Chief State Engineer of California, and to Messrs. Marsden Manson and C. E. Grunsky, for their voluminous and valuable contributions to the literature of the subject.

(6) The Commission has made a diligent study of all the literature above alluded to, as far as time has permitted, and in seeking all available means of information bearing upon the problem intrusted to its hands, made a number of tours of observation into the valleys of the Sacramento river and tributaries, and to a more limited extent into the San Joaquin valley. Brief allusion is made to these several tours of the Commission for the purpose of collecting information from a personal inspection of the ground, in the following memoranda:

(7) First, a general tour of observation was made, beginning August 15th and terminating August 22d, covering eight days of travel. On this inspection trip the Commission was accompanied by yourself, by the Executive Committee of the River Improvement and Drainage Association, by Col. W. H. Heuer, Corps of Engineers, the officer in charge of the Government improvement work on the river, by many prominent citizens living along the rivers, and part of the way by Hon. George C. Pardee, Governor of California, and Hon. Theodore A. Bell and Hon. J. C. Needham, Members of Congress.

The journey was made by various modes of conveyance—railroad, steamboat, launches, and wheeled vehicles. The trip extended up the Sacramento river to Chico landing; up Yuba river as far as the barrier across the Yuba being constructed by the State and Federal governments for the purpose of restraining the flow of mining débris into the rivers; down the Feather from Marysville and the Sacramento to its mouth; and up the San Joaquin to Stockton.

(8) Subsequently special journeys were made by the Commission alone to certain localities for the purpose of making particular studies of the physical features there present. A brief recital of these journeys is here given in the order of their dates:

September 13th to 15th, a two days' tour was made in a launch, covering the lower portion of San Joaquin river, and the Sacramento river with its collateral channels from the mouth to the head of Sutter slough, and Cache slough to Maine Prairie.

September 20th the Commission left San Francisco for the purpose of examining Putah and Cache creeks, and the Sacramento river from Knight's landing to the head of Grand island. This intention was carried out and the ground covered as far as the city of Sacramento, where a violent rain storm compelled a suspension of the tour, and on September 23d the Commission returned to San Francisco, deferring the examination of the river from Sacramento to Grand island to a later date.

September 29th the tour of inspection was resumed. An examination was made of the lower portion of the American, and the Sacramento down as far as the head of Grand island. A tour was also made along the lower portion of Putah creek, and along the western margin

of Yolo basin and thence to the vicinity of Maine Prairie, the journey being extended across the Montezuma hills west of Maine Prairie. The Commission returned to San Francisco on the night of October 1st. October 4th to 6th was occupied in a tour of inspection on which the ground was covered along Willow creek from the town of Willows to the Sacramento river, and thence down the river to Sycamore slough. The head and upper part of Butte slough were examined and the country thence to Marysville. Bear river was also examined from Wheatland to the vicinity of Feather river. The Commission returned to San Francisco on the night of October 6th.

September 16th to 18th was occupied on a special journey to Tulare lake and vicinity, accompanied by yourself and members of the Executive Committee of the River Improvement and Drainage Association and local residents of the region visited.

(9) The Commission felt the need of making further examinations of the territory coming within the scope of its investigations, but as the time at its disposal was too limited to admit of this, only the more important localities received this attention.

(10) On October 15th, the Commission, with your approval, suspended its labors in California, and adjourned its session in San Francisco to reconvene and continue its labors in Sioux City, Iowa, at a later date. This measure was made necessary to meet demands upon the attention of members of the Commission to their duties in their special fields of official activity elsewhere.

(11) The labors of the Commission were resumed in Sioux City, Iowa, on November 21st, in the office of Major H. M. Chittenden, of the Corps of Engineers, U. S. A.

(12) The Commission completed its labors in Sioux City and submitted its report on December 15th, and then adjourned *sine die*.

(13) Accompanying this report are the following documents:

(a) A map of the Sacramento and lower San Joaquin flood basins on a scale of 5 miles to the inch. This map shows in general terms the scheme recommended by the Commission, and it is purposely made small so that it can be printed with the report and be conveniently referred to.

(b) A map on a scale of 2 miles to the inch (the Manson-Grunsky map of 1894), on which the scheme is outlined in color and in greater detail.

(c) A profile of the Sacramento river from Chico creek to Suisun bay, showing many details of importance connected with the report.

(d) A transcript (in duplicate) of the testimony taken by the Commission.

II.

THE SACRAMENTO RIVER AND ITS TRIBUTARIES.

(1) As a preliminary to remedial measures to be recommended, it may be well to state in outline the task that has been set before the Commission, and the physical conditions that are now presented by the river channels and territory to be treated. It is deemed unnecessary to go into a detailed analysis of all the physical features presented in this problem, as that has been done thoroughly and efficiently by other engineers and engineering commissions who have preceded this Commission in similar investigations, the results of whose labors are fully set forth in their several reports and clearly displayed upon the accompanying maps.

(2) *Sacramento River*.—That portion of the Sacramento river lying above the confluence of Stony creek demands no attention at the hands of the Commission, since the river channel occupies the lowest part of its valley, has channel capacity sufficient to carry all its flood waters except in times of extraordinary volume of flow, and at such times the area of overflow is narrowly limited by the rising slopes of the adjacent ground. At the mouth of Stony creek the river has nearly enough channel capacity to pass its great floods, but the channel from that locality to the outfall in Suisun bay requires artificial correction.

(3) Briefly stated, the Sacramento river occupies the longitudinal axis of a valley which at the mouth of Stony creek has a width between the base of the foothills on the east and west of about 25 miles. This is increased to about 35 miles in the latitude of Calden's landing, and this latter width is approximately maintained to the mouth of the river. This valley is bounded on the east, north, and west by a very precipitous watershed, with a mean annual rainfall varying from 20 to 60 inches, the higher figure being most remote from the axis of the valley, with an occasional maximum of about 100 inches in the mountainous regions.

(4) From Stony creek southward the valley is generally of alluvial formation, with the characteristic elevation of the banks of the river and a depressed "trough" on each side about 6 feet below the elevation of the banks in the upper portion, increasing to some 20 feet below the river banks in the lower portion. The slope of the ground is generally rapid from the vicinity of the river toward the axis of the trough, which, on the west side, lies from 2 to 7 miles from the river bank.

(5) The west-side trough is divided into two "basins" by a transverse ridge extending from the hills on the west to the bank of the river in the vicinity of Knight's landing. The ridge is supposed to have resulted from deposits from Cache creek, which traverses the val-

ley in this region and is 10 to 12 feet higher than the trough above and below. The upper portion of the west-side trough is called Colusa basin, and the lower portion Yolo basin.

(6) The depression on the east side of the Sacramento river is divided into a series of basins by the interposition of Sutter buttes, and several tributary streams. The northernmost of these basins, terminating below at the head of Butte slough, is called Butte basin. Next comes Sutter basin, extending to the mouth of Feather river. American basin reaches from Feather river to the American river, and Sacramento basin embraces the territory lying south of American river to its merger with the lower San Joaquin valley.

(7) In the region where the lower parts of the Sacramento and San Joaquin valleys merge into one another the territory is occupied by a number of islands of considerable importance as agricultural lands. The areas of these islands vary from about 1,600 to 43,000 acres. Some of them are more directly under the influence of the Sacramento floods, while others are more intimately related to the San Joaquin. In general, the influence of the floods from the Sacramento river predominates in this territory.

(8) The Sacramento river, with its valley closely circumscribed by a mountainous watershed, is subject occasionally to heavy and prolonged precipitation and is burdened at such times with a sudden inflow of large volumes of water, mainly from its upper tributaries, but also with large contributions from the eastern and western mountain slopes.

(9) The river channel from the mouth of Stony creek to Butte slough, a length of 53 miles, differs characteristically from that division extending from Butte slough southward. The slope of this upper division is considerably steeper than that below Butte slough and its channel dimensions are also greater to a marked extent.

In the vicinity of Stony creek the flood capacity of this division much exceeds that at its lower end, diminishing progressively down stream, so that in the latter locality it is capable of passing less than two thirds of its flood volume.

Immediately below Butte slough the large volume of flood outflow through that channel has resulted in a sudden contraction of the river, which, combined with its flattened slope, has reduced its discharge to less than one third of the flood flow.

(10) The limitation of channel dimensions in this part of the Sacramento river is in accordance with a well-established law of the flow of rivers, by which nature adjusts the size of channels to the volume of water carried through them. Thus, from Stony creek southward, for a very long time in the history of the Sacramento river, the sudden

presentation of large flood volumes at that point has caused a considerable portion of the water to flow out of the channel over the banks and through depressions, into the valley on either side. The effect has been to build up the immediate banks of the river to higher elevations, by the deposition in the vicinity of the river of the heavier sedimentary matter carried by the water, and correspondingly to develop the troughs of relative depression on either side of the valley.

Another effect has been the progressive deterioration of the channel going down stream, with the cumulative increase in the volume of escaping water, culminating in the concentrated flow through Butte slough, with the marked effect noted above in a sudden contraction of the channel below that point.

(11) The division of the river extending from Butte slough to the mouth of Feather river, a length of $64\frac{1}{2}$ miles, is not only more contracted in cross-section than the upper division, but is excessively crooked and has a flatter slope of the high-water plane.

(12) In the vicinity of the mouth of Feather river large accessions of flood waters return to the Sacramento river from the overflowed basins above and from this tributary. In consequence the channel is greatly enlarged from there down, as compared with the portions above Feather river. In this locality, as well as in the vicinity of the mouth of American river, a large part of the surplus flood water passes out into Yolo basin and, flowing slowly to the lower end, returns to the Sacramento through Cache slough.

(13) The flood water thus escaping from the channel of the Sacramento occupies the basins which constitute the depressed portions of the east and west valley, and arrest the flow from the mountain slopes, whose waters are thus accumulated in these reservoirs. These great bodies of water remain on the land until a general subsidence of the floods, when they are slowly drained into the river, Colusa basin discharging through Sycamore slough above Knight's landing, Yolo basin through Cache slough at the foot of Grand island, and the eastern basins through Feather and American rivers, except the Sacramento basin, whose water finds its way into San Joaquin river through its lower tributaries.

(14) The channel of the Sacramento river from the mouth of Feather river to Suisun bay, a length of $81\frac{1}{2}$ miles, has become largely occupied by sedimentary deposits brought down the Feather and American rivers from the mining regions at the head of the Yuba, Bear, and American rivers. This condition has resulted from the introduction of the process of hydraulic mining, by which enormous quantities of débris, consisting of earth and stones, has been dislodged from the mountain sides by powerful jets of water, much of which has

been washed down into the river channels. The accumulation of this mining débris in the channel of the Sacramento river during the past forty or fifty years has greatly reduced its original capacity for passing its floods. This reduction was estimated in 1894 at more than one third.*

In this connection it should be recognized that these river channels were not capable of carrying all of the water of their great floods during the period that antedated the era of hydraulic mining, so that the latter is not wholly responsible for the evils of overflow, though the difficulty of dealing with the problem has been much emphasized by this agency.

(15) From the vicinity of the head of Grand island southward, the regimen of the Sacramento river is vitiated by the dispersion of its waters and consequent dissipation of its energy through various subsidiary channels, as the bifurcation of the main stream into Old river and Steamboat slough which delimit Grand island. In addition are Sutter slough on the west, passing out of the main channel above Grand island and returning the water through Cache slough; and Georgiana and Three-mile sloughs on the east, whose water passes into the San Joaquin river.

(16) *Feather and Yuba Rivers.*—The Feather above the mouth of the Yuba has not been vitiated except to a moderate extent by the invasion of mining deposits, and that part of its channel is in fairly good condition. From the mouth of the Yuba to its junction with the Sacramento, the Feather river is so encumbered by sedimentary deposits that have entered it through the Yuba and Bear tributaries, which drain the principal mining regions on the eastern side of the Sacramento valley, that its channel capacity has been reduced to less than one half of its former dimensions and its character as a navigable stream has been practically destroyed.† The Feather river also acts as a continual feeder for supplying the great quantities of mining débris by which the Sacramento channel is clogged.

(17) The Yuba river, tributary to the Feather, has its source in the Sierra Nevada to the eastward, and drains that region where hydraulic mining operations have been carried on most extensively and on a very large scale. As a result of these mining works, the channel of the Yuba where it emerges from the foothills is filled up many feet deep with the coarser matter washed down from the mines, consisting of shingle and large gravel. Farther down stream this material gradually diminishes in coarseness, until, when the vicinity of the Feather river

* See report of Manson and Grunsky, 1894, page 33. Also report of Examining Commission on Rivers and Harbors, 1890, page 33.

† See report of Manson and Grunsky, 1894, page 35.

is reached, the entire expanse between containing lines of levees north and south of the Yuba is filled mainly with a mixture of sand and clay, the latter locally called "slickens." The interspace between the Yuba river levees, which is from 2 to $2\frac{1}{2}$ miles wide, is wholly occupied by this mining débris, which covers the original surface of the ground outside of the channel to a depth near Feather river of about 13 feet. Over this expanse the Yuba river, when in flood, spreads in a broad sheet, and at low stages meanders through it in superficial and shifting channels.

(18) At a point about 4 miles east of the city of Marysville the sand deposits have been built up in the old bed of the Yuba to a height of 13 feet above the farming land on the opposite side of the levee.

The town of Marysville, located at the junction of the Feather and Yuba rivers, is making heroic efforts to maintain its protecting levees at a high enough standard to avoid being overwhelmed by an irruption of the Yuba river.

(19) *The American and Bear Rivers.*—These streams—the Bear tributary to the Feather and the American to the Sacramento river—also rise in the Sierra Nevada, and have also received large invasions of débris from the hydraulic mines in the regions about their sources; and while this filling process has proceeded to a less degree than in the case of the Yuba, their beds are practically filled up with this material.

III.

GENERAL STATEMENT OF THE PROBLEM.

(1) In the Sacramento valley and contiguous parts of the San Joaquin valley, there are some 1,250 square miles of very fertile land that is subject to overflow from every considerable flood in the Sacramento river and about 1,700 from extraordinary floods. The problem presented for solution is to devise means for preventing the inundation of these lands by conveying the flood water that must pass through this territory harmlessly into Suisun bay; and to correct the existing faults of the river channels with a view to voiding the floods and promoting the interests of navigation.

(2) *Rejected Propositions.*—Before proceeding to a discussion of the plans to be recommended by the Commission for the correction of the evils for which a remedy is sought, it may be well to clear the ground by eliminating certain propositions for the treatment of different features of the problem that have been strongly advocated heretofore by various authorities, and which, after due consideration, have been rejected by the Commission. These propositions are catalogued below, and are to be discussed in turn:

(a) The proposition which assumes the futility of undertaking to convey the flood water through the river channels, and provides an elaborate system of by-passes to control its flow outside of the rivers, as a permanent arrangement.

(b) The proposition to excavate a deep and capacious waterway through the Montezuma ridge for the purpose of conveying the flood water from Yolo basin into the northern part of Suisun bay west of the Montezuma hills.

(c) The proposition to excavate a high-grade canal west of Yolo basin and across the Montezuma ridge, for the purpose of intercepting the flow in Cache and Putah creeks and other smaller streams, and conveyance of this water into the northern part of Suisun bay west of the Montezuma hills.

(d) The proposition to divert Yuba, Bear, and American rivers into American basin.

(e) The proposition to divert the Sacramento river into the San Joaquin by a cut along Three-mile slough or across Sherman island.

(f) The proposition to divert part of the flood water from Sacramento river into the San Joaquin by means of relief channels across Sherman and Brannan islands.

Taking up these propositions in the order named above:

(3) *The By-pass System.*—The by-pass scheme has been advocated by two engineers of recognized ability, Messrs. Marsden Manson and C. E. Grunsky. In their full and elaborate report of 1894 this plan has been worked out in detail and with great care and painstaking, and the meritorious character of the work done by them in this connection highly commends itself. Nevertheless, the Commission finds itself unable to accept this plan as a permanent solution of the Sacramento river problem, for the following reasons:

(a) The by-pass plan involves the maintenance, in a general way, of three rivers instead of one. The existing faults of the river channel have resulted from the dispersion of a large part of its flood flow from the river into the adjacent depressions on either side. The manner in which this dispersion of water has occurred, under natural conditions, was by the overpour of a thin sheet along extended bank lines, the effect of which on channel dimensions was approximately uniform, with a gradually increasing contraction as the volume of flow contained in the river was reduced progressively down stream by the increasing volume of outflow over the banks. Under these natural conditions it is probable that the channel has reached a status of approximate fixedness with perhaps a tendency to further slow deterioration.

The perpetuation of this régime, modified by a concentration of outflow at a few points as contemplated in the by-pass system, must, in the

opinion of the Commission, fail as an adequate remedy for existing evils and result in a continuance of unsatisfactory conditions.

It is a matter of common observation that when, in a silt-bearing stream, a large volume of flood water is permitted to escape at one point, the resultant diminution of current energy in the channel at the point of outflow causes a marked shoaling of the river immediately below by deposit of sediment that the more enfeebled current is unable to transport.

(b) There is a strong probability that the passage of large volumes of water through wide and shallow channels may result in silting up these artificial waterways in their upper reaches and thus impair their utility.

(c) The estimated cost of this plan, upon a moderate basis as to quantities and prices, is \$8,637,000 for the by-passes and \$650,000 for channel correction. This does not include any estimate for constructing levees along the banks of the Sacramento river, which the plan recognizes as being necessary to confine to its channel such a volume of water as the by-passes do not provide for carrying. But it is assumed that the individual land-owners along the river are to voluntarily contribute that feature of the plan. Neither does the estimate include the cost of a number of pumping plants which are recognized as necessary to relieve basins that can not be drained by gravity. It is also assumed that the cost of these is to be borne by local interests, as well as that for leveeing Cache slough and its tributaries for the reclamation of Yolo basin, this feature having also been omitted from their estimate as being of local concern only.

It is believed by the Commission that these assumptions are untenable as a reliance for an important part of a comprehensive system of river improvement and land reclamation; and that the cost of these features of the work necessary to be provided for must largely increase the whole estimate of cost.

(d) The by-pass plan involves the sacrifice of some 46,000 acres of land the value of which when reclaimed should be an important factor to be considered, and it is believed can be reduced to about one fourth of that area.

(4) *The Montezuma Cut.*—The proposition to make a deep cut through Montezuma ridge for the purpose of draining Yolo basin has been condemned by all the engineers who have fully considered the case: (1) because of excessive costliness (Manson and Grunsky's estimate is over \$14,000,000)*, and (2) because its effectiveness for the purpose in view, if the cut should be made, is a matter of doubt.

(5) The Montezuma ridge is a depression in the Coast Range east of Maine Prairie and lying northward of Montezuma hills proper. It is

* See report of 1894, page 50.

some 6 miles wide and has a summit elevation of about 37 feet above low tide. The proposed cut is to connect the lower end of Yolo basin with Montezuma slough, which is the northern projection of Suisun bay westward of the ridge.

(6) It is deemed useless to go into any further discussion of this proposition, especially as a logical basis for its adoption could only be found in conjunction with the by-pass system which the Commission has not considered favorably.

(7) *Cache and Putah Intercepting Canal.*—The proposition to intercept the Coast Range drainage as far up as Cache creek and convey it through a high-grade canal across the Montezuma ridge, while sustained by so able an authority as Mr. Wm. Ham. Hall, the Commission has thought proper to reject after due consideration. This project is an attractive one, if it were feasible, as an effective way to dispose of the troublesome problem of dealing with the mountain drainage on the west side of Yolo basin.

(8) It has been estimated* that a channel 240 feet wide with a flow 20 feet deep should carry the water of Cache creek to Putah creek, a distance of 18 miles; that a channel 535 feet wide, with a depth of flow of 20 feet, should carry the Putah creek water alone to the summit of the Montezuma ridge, a distance of 25 miles; and that a channel 704 feet wide should carry the combined water of both creeks. No consideration is given to the mountain drainage other than as delivered by these two creeks.

(9) The cut through Montezuma ridge, 6 miles in length, is estimated at 13 feet deep. The idea of making a completed canal of the above dimensions by artificial means was dismissed as being too costly for consideration. But it was proposed that an initiatory canal should be made with a top width of 30 feet, a bottom width of 10 feet and a depth of 10 feet, 59 miles in length, at an estimated cost of \$183,900, with additional cost for works to divert and regulate the flow of the creeks into the canal. It was assumed that such a canal, having a gradient of 2 feet per mile, would enlarge and deepen itself to the required dimensions by the erosive action of the water flowing through it.*

(10) This proposition is regarded with disfavor by the Commission for the following reasons:

(a) It is admitted that the expected process of enlarging the excavation by current action must be of indefinite time duration, and for this indefinite period the disposition of this mountain drainage is unprovided for in any manner. Some idea of the time likely to be required for the performance of this work through the agency of the moving water is sug-

* See report of State Engineer, 1880, Part II, page 39 *et seq.*

gested by considering that the quantity of material to be thus moved is eighty or ninety millions of cubic yards, the initial cut being 59 miles long.

(b) In the expected conversion of so small an excavation into a waterway of such large dimensions by current action, no note is taken of the probable departure of the ultimate resultant channel from the alignment originally marked out for it.

(c) The conveyance of so large a mass of excavated material into Montezuma slough must have a deleterious effect upon that waterway.

(d) It is believed by the Commission that this small cut, of such considerable length and relatively low gradient, instead of being enlarged by current erosion, must speedily be filled with the heavy matter to be carried into it from Cache and Putah creeks, these streams having much steeper gradient, and transporting large quantities of heavy mountain débris in those portions of their courses.

(e) No note is taken of the probable existence of hard material along the line of the proposed excavation that might be an insuperable obstacle to the erosion expected to be made by the water flowing through the canal.

(11) *Diversion of Rivers into American Basin.*—The Commission has not gone exhaustively into a discussion of the débris problem, because its solution has been definitely taken up by the Federal and State authorities, and is now in the hands of the California Débris Commission, with work already in progress. It would therefore be inadvisable for this Commission to propose any plan for the treatment of the question under these circumstances. In general terms the scheme of the Débris Commission contemplates the ultimate restoration of the Yuba and Bear rivers to something like their original channels and preventing them from spreading over such extensive areas as they do at present. The Commission regards this policy as a wise one and believes it to be a practicable one. Its inspection of the Bear river valley showed clearly that, since the suspension of hydraulic mining the river has been working back into a deeper and more fixed channel and has already made considerable progress in that direction. If the present tendency should be encouraged by artificial work the river can without question be confined to a single channel of small width leading directly from the foothills to Feather river.

(12) The proposition to divert the Yuba, Bear, and American rivers into the American basin, as a means of disposing of the débris problem in its relation to those streams, has received superficial attention and has been strongly advocated by a few authorities, the purpose being to use this low territory as a settling basin for the reception of this material. The Commission has given such attention to this subject as

its opportunities and means of information have afforded, and the conclusion arrived at is that the plan is not a feasible one.

(13) None of its advocates seems to have considered the enormous cost of conducting the large volume of flood flow of these rivers into new channels over such considerable distances. None of them has worked out the question of gradient so as to be certain that the necessary slope, for the Yuba particularly, can be secured.

(14) There has been no consideration of the great loss which would result from the withdrawal of the low lands of the basin from reclamation, nor any estimate of how long this withdrawal is to continue.

(15) The Commission was also informed that these sand deposits are a very poor substitute, for agricultural use, for the rich soil which now covers the basin.

(16) The cost of right of way would undoubtedly be very great.

(17) No thought appears to have been bestowed upon the condition of these rivers after performing the function of silting up American basin, nor what further measures of control and regulation may then be required; but it is apparent that if this plan could be put into execution, the permanent solution of the problem would only be deferred.

(18) The problem of delivering the waters of these three rivers (at least 150,000 second feet at high floods) back into the Sacramento river has evidently received only superficial consideration; but if it is to be done by means of overflow weirs, which shall at the same time restrain the Sacramento river from backing up into the basin, the problem would certainly prove to be complicated, difficult, and very costly.

(19) In conclusion it is sufficient to point out that the Yuba and Bear rivers, with their present steep gradients, have been completely filled up by mining deposits; and that an effort to divert their flow through new artificial waterways must of necessity be upon planes of much flatter slope, with the speedy result of filling the upper reaches of these new waterways with similar materials and leaving but a scant remnant of the finer matter to find its way into the bottom of American basin; besides entailing unknown complications in maintaining their flow through the upper portions of their channels.

(20) It is believed that the necessity for relief of this character will constantly diminish unless hydraulic mining be resumed. Under present conditions the channels of the Yuba and Bear rivers ought gradually to improve and eventually regain something like their original channels, and the quantity of débris delivered into the Feather and Sacramento rivers ought gradually to diminish. If hydraulic mining is ever resumed on a large scale, extensive storage would, of course, have to be

provided for the heavier material; but this would have to be in the close neighborhood of the foothills, for it is not believed that it would be possible with any attainable slope to carry it to the lower portions of the American basin. The most that could be accomplished would be to carry down the finer material, and for this single purpose the ends would not justify the means. This finer material can be carried off by the rivers if they are confined within their banks and their energy be not diminished by a dispersion of their flow.

(21) *Cut-off into the San Joaquin.*—A measure often suggested for the relief of flood conditions in the Sacramento valley is to change the course of the lower Sacramento by cutting a channel through into the San Joaquin either on the lines of the lower course of Three-mile slough or across Sherman island about $1\frac{1}{2}$ miles west. The first line is generally preferred.

(22) The argument is that the Sacramento would reach tide level by the cut-off in 11.6 miles less distance than by the present route; whatever fall or head is now required to carry the waters of the river over this distance would be saved; the flood plane at the head of the cut would be materially lowered, and this lowering would extend up the river in diminishing degree for an indefinite distance.

(23) The argument is a sound one if the San Joaquin can be considered a tidal estuary without sensible hydraulic gradient and of sufficient capacity not to be materially affected by a heavy inflow of water; and also if that capacity would remain unchanged under the new conditions. Probably the expectations of advocates of this measure would be largely realized at first, and perhaps for several years after the cut-off is made.

(24) It is to be feared, however, that the above conditions would not continue, but that the vast quantities of silt brought down by the Sacramento would gradually fill up the estuary of the San Joaquin below the new junction, just as is already being done to a considerable extent by Three-mile slough and to a less extent by Georgiana slough. It seems inevitable that this must be so, in spite of the aid of tidal scour and of the current of the San Joaquin.

(25) If this should prove to be the case the result would ultimately be to change the condition of the lower San Joaquin from that of a tidal estuary with practically no hydraulic gradient to that of a tidal river in which current will predominate over tidal action and in which there will be a pronounced hydraulic gradient. It is not likely that this gradient would ever be quite as great as that in the lower Sacramento, owing to the permanent increase of volume by the addition of the San Joaquin.

(26) Whatever high-water slope might be finally developed, it

would raise the flood plane at the junction of the two streams. By the same amount, or nearly so, the range of the tide above the junction of the two streams would be diminished, tidal action would be decreased, and liability to shoaling would be correspondingly increased. The net result would probably be that the present San Joaquin estuary below the new junction would fill up to the limits necessary to carry the new river, while the portion of the estuary above the junction would deteriorate as a navigable waterway—all of which would be injurious to the San Joaquin.

(27) The question then is, on the basis of the general good, would the gain to the Sacramento compensate for the loss to the San Joaquin? It would seem that the immediate gain would be considerable, but it is believed that it would ultimately disappear. The distance from a point in Suisun bay a little below New York landing to the head of the proposed Three-mile slough cut, near Zeille's wharf, is two miles greater by the proposed channel than by the present one. Even if the ultimate slope by the new channel should be something less than by the present, the increased distance would probably offset the gain and the high-water plane at the head of the cut would in time be quite as high as at present, and possibly higher than it will be if the plan of the Commission for the improvement of the Sacramento channel is carried out. The ultimate gain to the Sacramento would therefore seem to be negative. Meanwhile, unless the old Sacramento were left open, the navigation route up that river would be two miles longer than at present and three miles longer than it would be if the Horseshoe bend cut-off were to be made. The relative cost of making the new channel and of improving the present one, and the relative cost of subsequent maintenance, it is impossible to estimate closely, but the difference would not materially favor either route. On the whole the advantages to be gained by the cut-off do not appear sufficient to justify its adoption.

(28) It has been proposed, in order to avoid the bad effects of sediment from the Sacramento, not to turn the entire river into the San Joaquin, but to make Three-mile slough a flood-relief channel of large capacity; and to construct across its head a long overflow weir of fixed height so that no water can escape while the river is below the level of its crest. Advocates of this plan assume that the heavy sediment, which travels mainly on the bottom of the river, would not pass over the weir in any considerable quantity, but would continue on down the Sacramento. Experience seems not to support this theory. The example of the Elkhorn weir, as well as experiences of a similar kind on the Mississippi and other rivers, show that the sands are drawn up and over the weir in great quantity, while, of course, matter held in suspension is carried over. Moreover, the diversion of a large volume

of water from the main channel would diminish its current energy and lessen its scouring capacity.

(29) It will be better for the San Joaquin to close Three-mile slough entirely, and it will ultimately be better for the Sacramento as soon as its channel has adapted itself to the increased volume.

(30) *Plan Presented by the Present Commission of Engineers.*—Having cleared the ground by discussing the several remedial measures that have been advocated by various authorities, and which have been passed upon with disapproval by the Commission, it is now proposed to develop the plans that are to be recommended for the solution of the problem. These are:

(a) To confine the flood waters to the channels of the various streams by means of levees, so as to prevent destructive inundations of the fertile valley lands.

(b) To correct the alignment of the river by cut-offs where necessary, and to increase its channel capacity by mechanical means wherever current action fails to accomplish this purpose.

(c) To collect the hill drainage, which now loses itself in the basins, in intercepting canals and convey it into the river at selected points.

(d) To provide escapeways over the levees for surplus flood waters during the period of channel development, and to provide for the disposal of this water in connection with the hill drainage.

(e) To provide for the relief of the basins from accumulation of rain and seepage water by means of pumps wherever gravity drainage is not practicable.

(31) It should be premised that this is an undertaking of great magnitude. It can not be expected that the work is to be consummated and these objects fully attained in a short time. Indeed, the work must of necessity be of a progressive nature, and the treatment of some of its features must be a matter of development from experimentation. While the fundamental features, as here laid down, should be adhered to, considerable latitude is to be allowed in matters of detail in carrying out these recommendations, as only by exact and accurate instrumental examinations on the ground can all the details be properly adjusted and provided for. Neither can all contingencies now be foreseen that may arise in the progress of the work which may demand modifications in the detailed operations.

IV.

FLOOD DISCHARGES OF THE SACRAMENTO RIVER.

(1) The run-off from the Sacramento watershed has never been measured in a way that makes it possible to determine with close accuracy what it has been in any one year. On account of the large amount of overflow into the flood basins, the interception of hill drainage by these basins, and the permanent escape of large volumes of water through channels connecting with the San Joaquin, the determination of the actual run-off, as it would be if delivered directly into the river channel and carried off by it, would require a great number of simultaneous observations throughout the valley during an entire flood season. This has never been done. Even if it were done, it would not give the full information desired—a hydrograph of the river with the flood confined to its channel—because of the great modifying influence of the flood basins, which it is extremely difficult to measure or calculate.

(2) *Various Estimates of Maximum Flood Discharges.*—

EX-STATE ENGINEER HALL.

	Cu. Ft. per Sec.
Putah creek.....	70,000 to 75,000
Cache creek.....	30,000 to 35,000
Stony creek.....	80,000 to 85,000
Sacramento (at Iron cañon).....	180,000 to 200,000
Feather.....	100,000 to 110,000
Bear.....	10,000 to 12,000
American.....	50,000 to 55,000
Sacramento (Feather river to American, if confined to channel).....	200,000
Sacramento (American river down, if confined to channel).....	240,000

Hall gives the maximum discharge at Collinsville as 160,000. This, of course, is exclusive of the amounts escaping through Three-mile slough and Georgiana slough.

(3)

ISAAC W. SMITH.

	Cu. Ft. per Sec.
Putah creek.....	65,000
Cache creek.....	35,000

J. R. PRICE.

	Sec. Feet.
Sacramento river at Newtown shoals (Feb. 1, 1896).....	163,400

A careful measurement by the same authority of the discharge of the Sacramento just below the mouth of the Feather at the crest of the flood of 1896 gave 121,000 cubic feet per second.

(4) Manson and Grunsky state that the flood of 1881 brought 195,000 second feet through Iron cañon, and that if the river were confined to its banks, 150,000 second feet would be a low estimate of the amount to be carried at Colusa at extreme flood.

(5) *United States Geological Survey Records.*—During the great flood of 1904, the United States Geological Survey kept gauge records on the Sacramento at Iron cañon, the Feather at Oroville, the Yuba at Smartsville, Stony creek at Julian's ranch, and Cache creek at Yolo. The discharges deduced from these records are fairly consistent throughout and give a more comprehensive view of the run-off from the watershed than has been found elsewhere. The maxima during the three months of February, March, and April are as follows:

SACRAMENTO RIVER.

February 14.....	22,360	March 6.....	56,200
February 15.....	85,160	March 7.....	77,200
February 16.....	184,600	March 8.....	143,500
February 17.....	69,500	March 9.....	96,800
February 18.....	56,200	March 10.....	88,940
February 19.....	34,300	March 11.....	73,700

The two above dates were the only ones when the river rose materially above a discharge of 100,000 second feet.

FEATHER RIVER.

February 12.....	7,410	February 25.....	78,860
February 15.....	24,000	February 26.....	64,180
February 16.....	95,675	March 16.....	24,500
February 17.....	60,500	March 17.....	52,220
February 18.....	25,000	March 18.....	96,700
February 21.....	16,200	March 19.....	89,400
February 22.....	69,300	March 20.....	83,300
February 23.....	57,400	March 21.....	60,100
February 24.....	100,900		

The above are the only dates when the discharge rose materially above 50,000 second feet.

YUBA RIVER.

Between February 16th and 25th, the river rose several times above 50,000 second feet, but the records are defective, and the actual maximum can not be determined. At no other time during the flood season did it rise materially above 30,000 second feet.

CACHE CREEK.

February 16.....	9,400	March 11.....	12,600
February 24.....	9,200	March 18.....	9,200
February 27.....	9,200	March 28.....	9,400

Each of these discharges was preceded and followed by much lower ones; as, for example, the discharge on March 10th was 1,230 second feet, being less than one tenth that of the next day. These figures are especially important in view of the claims by the earlier investigators that the flood discharge of Cache creek is at times as great as 35,000 second feet.

STONY CREEK.

February 16.....	12,300	February 24.....	15,400
February 22.....	11,100	March 10.....	14,200

The above are the only dates on which the discharge reached 10,000 second feet. Remarks upon disparity of estimates under "Cache Creek" apply here as well.*

(6) A study of the combined effect of the various discharges, after making a time allowance for their arrival at a common point, and also for the flow from the unrecorded watershed, gives the following as some of the maxima that would have had to be provided for below the mouth of Cache slough if the entire flood had been confined to the river:

February 17	267,000	March 10	259,000
February 18	361,000	March 11	219,000
February 23	208,000	March 18	262,000
February 24	302,000	March 19	290,000
February 25	273,000	March 20	285,000
February 26	257,000	March 21	253,000
February 28	245,000	March 22	216,000

All other discharges were below 200,000.

(7) In this study no allowance was made for the gradual diminution of the height of a flood wave as it progresses down stream. This always takes place, chiefly from two causes—the gradual flattening of a wave as the distance from its source increases, and the absorption of enough volume to fill up a channel when there is a general rise in the water plane. In the case of the Sacramento and its several tributaries this attenuation of flood wave is very marked, owing to their short and sharp character. The discharge of the various streams frequently trebles or quadruples itself in the course of a few hours and almost as quickly returns to its first condition. The effect of such waves rapidly wears out as they progress down stream. Mr. Grunsky in one instance concludes that the volume of flow at flood would fall from 133,000 at Iron cañon to 83,000 at Feather river; in another from 152,000 to 87,000, much depending upon the stage of the river when the flood waves enter it. March 16, 1904, the Sacramento at Iron cañon rose from 69,000 the previous day to 184,000 and fell to 52,000 on the third day. It is probable that this wave, if confined to the channel, would not have caused a greater discharge at Feather river than 100,000.

(8) From the foregoing data, and with the allowance for the conditions described in the last paragraph, it is believed that any scheme looking to the carrying of the run-off of the Sacramento watershed within the leveed banks of the river should make provision for a discharge of 250,000 second feet below the outlet of Cache slough; 230,000 from Sacramento to Cache slough; 190,000 between Feather and American rivers; 150,000 in the Sacramento just above the mouth of

* Unfortunately the Geological Survey records do not include American river and Putah creek.

Feather river, increasing to 180,000 at the mouth of Stony creek,* and 120,000 in the Feather river below Marysville. The short duration of extreme flood waves, the fact that they rarely reach a common point from the several tributaries at the same time, and the attenuation of the waves as they progress down stream, make the foregoing figures reasonable maxima.

(9) Below the mouth of Cache slough tidal influence is considerable, even at high water, but rapidly diminishes above, and is negligible above the mouth of the American. As the tide comes in and checks the outflow for a time, the river must flow out at ebb with a corresponding increase over the normal. What this discharge would be at Collinsville in an extreme flood is uncertain, but it might probably exceed 300,000 cubic feet per second. This does not, however, imply a necessity for an increased channel section. The increased slope due to the fall of the tide at the outlet, largely compensates for the greater duty forced upon the channel.

(10) *Putah and Cache Creeks.*—The flood discharges assigned to these streams by the first investigators are so excessive as to throw doubt upon their correctness.† The discharge of Putah creek, for instance, is given as 65,000 second feet, or 108 second feet per square mile of watershed, equivalent to a run-off of 4 inches per twenty-four hours. A similar run-off for the entire watershed of the Sacramento would amount to 2,700,000 second feet, fully ten times its probable maximum. From personal examination of the valleys of these streams by the Commission, it is believed that a maximum of 40,000 for Putah creek and 25,000 for Cache creek would be a large allowance for the discharge at the points where they emerge from the foothills. The smaller discharge of Cache with a much greater watershed than Putah is partly due to the moderating influence of Clear lake. These extreme waves are of very short duration, lasting only five or six hours and falling back immediately. They flatten out rapidly as they approach the

*The reason for assuming an increase of discharge from the mouth of Feather to Stony creek is the attenuation of flood waves passing down the river referred to in paragraph 7. It is assumed that a wave which crests at say 190,000 second feet at Iron cañon will drop to at least 150,000 at Feather River. From Iron cañon to Stony creek is more than one third of the distance from Iron cañon to Feather river. The wave at Stony creek would therefore have fallen to 177,000 second feet, and probably lower, for the channel storage is relatively greater in the upper reaches of the river. The assumption of 180,000 second feet makes some allowance for tributary accession.

† Isaac W. Smith seems to be the authority responsible for these extraordinary figures. In the case of Cache creek he estimated the discharge from a measured cross-section and slope and found 35,000. By a series of independent measurements of the amounts escaping from the Sacramento into the Yolo basin above the railroad bridge and the amount flowing under the railroad trestle, he deduced a flow of 19,000 for Cache creek. This was probably more nearly correct than the other. The maximum discharge for this stream in 1904, as measured by the United States Geological Survey, was about 12,600.

basin and probably rarely exceed maxima of 25,000 and 15,000 respectively where they enter the tule.

(11) *Influence of the Basins.*—The fact that no recorded measurements below Cache slough give a greater flood discharge for the Sacramento than 163,000 second feet (probably not less than 180,000 second feet, including Georgiana slough), and the fact that a careful measurement at high water just below Feather river in 1896 gave only 121,000 second feet, at first seem inconsistent with the flood-discharge figures given above. The explanation is undoubtedly to be found in the moderating effect of the great basins into which the surplus water flows and which act as enormous regulating reservoirs. This influence is not wholly lost, even when the reservoirs are practically full, for to increase their outflow at all means a rise in their surface and the storage of a corresponding amount of water. Their effect at all times—though in a less degree when full than when empty—is to cut down the crests of the great flood waves passing through them, and to distribute their discharge over longer periods than if the river were confined to its channel; so that, on the whole, the discharge of the river below the reservoir will never be either as high or as low as if the reservoir were not there.*

It should, therefore, not be expected that keeping the river water entirely out of the basins is going to lower the extreme height of the flood plane of the river, which will undoubtedly be higher in nearly every part of its course than at present. This is certain to be the immediate effect, though a general lowering of the high-water profile from the elevations first created should logically follow as the ultimate result of final adjustment of its channel to the increased flood flow. But while the fluctuations of the river will be greater under the new régime than at present, these higher stages will be of brief duration.†

* An apparent exception to this rule is the effect of wind action, which, on broad shallow areas, may be very great.

†An example of the failure to recognize the reservoir effect of a great basin like the Yolo is found in the exaggerated ideas of the discharge of the Yolo basin first put forward by Isaac W. Smith in 1879, and adopted by Manson and Grunsky in 1894. Smith measured the discharge through the Southern Pacific trestles over the Yolo basin in 1879 and found it to be 66,000 second feet. He also estimated that Putah creek had a maximum discharge of about 65,000 feet. He therefore concluded that the flow of the basin below the railroad was not less than 130,000 second feet. Manson and Grunsky adopt this figure, saying that, of the 130,000 second feet, Cache and Putah creeks were furnishing 100,000 second feet.

Now if we accept the wholly improbable figure of 100,000 second feet for the simultaneous discharge of these two streams, for how long a time shall we apply it? All evidence shows that these extreme waves are of very short duration—five or six hours at most—the ordinary flood discharge being less than 10,000 second feet on each stream. Assume, however, that the average increase of discharge for twenty-four hours was 50,000 second feet at this particular time, how much would it increase the outflow through the Yolo basin? It could increase it at all only by raising its water plane, which, at this particular time, had an area of not less than 200 square miles. To raise

V.

REFERENCES, DIMENSIONS, AND CHANNEL CAPACITIES OF THE PROPOSED IMPROVED WATERWAY.

(1) For the purpose of determining the elevation of the high-water plane of the Sacramento river and the slopes per mile in various parts of its course, that portion of the river from its mouth to Stony creek is here considered in the following divisions:

From the mouth at Collinsville to foot of Grand island.

From the foot of Grand island to the head of Grand island.

From the head of Grand island to American river.

From American river to Feather river.

From Feather river to Meridian (in the vicinity of Butte slough and upper Sycamore slough).

From Meridian to Calden's landing.

From Calden's landing to Stony creek.

For the purposes of levee construction and channel improvement this subdivision is modified above the mouth of Feather river as follows:

From Feather river to Colusa.

From Colusa to Stony creek.

(2) The reason for the particular subdivision of the upper river adopted in the first case is that, in the matter of slopes and elevations,

it one inch would require a continuous flow for twenty-four hours of 5,400 second feet; to raise it ten inches would require more than the entire 50,000 second feet assumed above.

The discharge from Yolo basin finds its way to the river through Cache slough. The largest recorded discharge of the slough that has come to the knowledge of the Commission is about 100,000 second feet. To increase its discharge by 50,000 second feet would require a rise in its water surface of several feet. These facts show that any sudden inflow of water of short duration into the Yolo basin when well filled can have no considerable immediate effect upon its outflow. It is absorbed in storage and flows out gradually afterwards.

Manson and Grunsky not only adopt Smith's impossible figures as to the discharge through Yolo basin, but state that the discharge in 1879 exceeded 200,000 second feet, and was "still more" in 1878 and 1881. There is no apparent warrant for these figures. No record of discharge measurements of the Sacramento below Cache slough gives more than 163,000 second feet. With "still more" than 200,000 second feet flowing down the basin in 1878 or 1881, and, say, 80,000 second feet coming down the Sacramento, the discharge below Grand island must have approximated 300,000 second feet, a figure which it is believed has never been reached. On the whole, the discharge of the Yolo basin and those of Putah and Cache creeks have been given a degree of importance in all discussions of the Sacramento flood problem that would seem to be unwarranted by any available data.

Considering all the moderating influences involved, it is believed that the estimate given in paragraph 8 above of an increase of only 20,000 second feet in the flood discharge of the river under ultimate regulation by the outflow from Cache slough is well on the safe side.

the river changes between Calden's and Meridian from the steep slope above Calden's to the flat slope below Meridian; and it was necessary, for a rational determination of the high-water plane and of levee heights, to consider this reach by itself. In the matter of channel improvement, on the other hand, Colusa is the natural point of division. The character of the river above is practically uniform, requiring a certain character of treatment; while that below is entirely different and demands a different kind of treatment.

(3) The slopes and elevations of the high-water plane of the regulated river are:

	Distance to Nearest Even Mile.	High-Water Planes.	
		Slope, in feet, per Mile	Elevations, in feet, Above Datum.
Collinsville to foot of Grand island	Miles. 16	0.45	{ At Collinsville, mean tide.. 7.0* Foot of Grand island..... 14.2
Foot of Grand island to head of Grand island (via Steamboat slough).....	12	0.60	At head of Grand island..... 21.4
Cache slough to head of Grand island (via Old river).....	18	0.40	At head of Grand island..... 21.4
Head of Grand island to American river	28	0.52	At mouth of American..... 36.0
American river to Feather river...	20	0.55	At mouth of Feather..... 47.0
Feather river to Meridian.....	40	0.60	At Meridian..... 71.0
Meridian to Calden's landing	22	0.786	At Calden's landing
Calden's landing to Stony creek...	38	1.3	At Stony creek..... 137.6

(4) The present distance between Feather river and Colusa is assumed to be shortened 23 miles by cut-offs. Slopes and elevations are computed on this basis.

(5) For the purposes of making computations for discharge the slopes of the banks are assumed at 3 to 1, extending from the bed of the stream to the top of the levees, the inner slope of which is taken to be continuous with the slope of the bank. No allowance has been made for the space gained wherever the levees are located farther back. In applying Kutter's formula, *N* has been taken at 0.30 (see Manson and Grunsky, page 110).

(6) The levee heights are assumed at 3 feet above high-water plane.

*The assumed elevation of mean tide at Collinsville when the Sacramento is in high flood—high tide being 9 feet and low tide 5 feet—may seem too high, and probably is so, for any but extraordinary conditions. Long-continued high southerly winds may force the tide in the bay far above the normal height. This figure was practically reached once during the high water of 1904.

(7) *Collinsville to Cache Slough*.—Flood discharge to be provided for, 250,000 second feet. The following channel section approximately fulfills requirements:

Slope, .45 foot per mile.
 Mean depth, 35 feet.
 Mean width of section, 1,400 feet.
 Area of section, 49,000 square feet.
 Capacity of assumed section, 251,370 second feet.
 Ground elevation at Collinsville, approximately 5 feet.
 Ground elevation opposite foot of Grand island, approximately 7 feet.
 High-water plane at Collinsville, 7 feet.
 High-water plane at foot of Grand island, 14.2 feet.
 Average height of levees over entire distance, approximately 8 feet.
 Minimum width between center lines of levees, 1,575 feet.

(8) *Foot of Grand Island to Head of Grand Island*.—Flood discharge to be provided for, 230,000 second feet. The present channel of Old river may be depended upon to carry about 36,600 second feet, which leaves 193,400 second feet to be carried via Steamboat slough. The following section approximately fulfills the requirements:

Slope, .60 foot per mile.
 Mean depth, 35 feet.
 Mean width of section, 1,000 feet.
 Area of section, 35,000 square feet.
 Capacity of assumed section, 198,450 second feet.
 Ground elevation at foot of Grand island, approximately 7 feet.
 Ground elevation at head of Grand island, approximately 13.4 feet.
 High-water plane at foot of Grand island, 14.2 feet.
 High-water plane at head of Grand island, 21.4 feet.
 Average height of levees over entire distance, approximately 13 feet.
 Minimum width between center lines of levees, 1,175 feet.

(9) *Head of Grand Island to American River*.—Flood discharge to be provided for, 230,000 second feet. The following section approximately fulfills the requirements:

Slope, .52 foot per mile.
 Mean depth, 35 feet.
 Mean width of section, 1,200 feet.
 Area of section, 42,000 square feet.
 Capacity of assumed section, 227,430 second feet.
 Ground elevation at head of Grand island, approximately 13.4 feet.
 Ground elevation at mouth of American river, approximately 28 feet.
 High-water plane at head of Grand island, 21.4 feet.
 High-water plane at mouth of American river, 36 feet.
 Average height of levees over entire distance, approximately 13 feet.
 Minimum width between center lines of levees, 1,360 feet.

(10) *American River to Feather River*.—Flood discharge to be provided for, 190,000 second feet. The following section approximately fulfills requirements:

Slope, .55 foot per mile.
 Mean depth, 35 feet.
 Mean width of section, 1,000 feet.

Area of section, 35,000 square feet.
 Capacity of assumed section, 189,875 second feet.
 Ground elevation at mouth of American river, approximately 28 feet.
 Ground elevation at mouth of Feather river, approximately 32 feet.
 High-water plane at mouth of American river, 36 feet.
 High-water plane at mouth of Feather river, 47 feet.
 Average height of levees over entire distance, approximately 13 feet.
 Minimum width between center lines of levees, 1,200 feet.

(11) *Feather River to Meridian*.—Flood discharge to be provided for, 150,000 second feet at Feather river and 163,000 second feet at Meridian. The following section approximately fulfills requirements:

Slope, .60 foot per mile.
 Mean depth, 35 feet.
 Mean width of section: Feather river, 770 feet; Meridian, 830 feet.
 Area of section: Feather river, 26,950 square feet; Meridian, 29,050 square feet.
 Capacity of assumed section: Feather river, 150,400 second feet; Meridian, 162,700 second feet.
 Ground elevation at mouth of Feather river, approximately 32 feet.
 Ground elevation at Meridian, approximately 57 feet.
 High-water plane at mouth of Feather river, 47 feet.
 High-water plane at Meridian, 71 feet.
 Average height of levees over entire distance, approximately 18 feet along present channel and 21 feet along cut-offs.
 Minimum width between center lines of levees: Feather river, 950 feet; Meridian, 1,000 feet.

(12) *Meridian to Calden's*.—Flood discharge to be provided for, at Meridian, 163,000 second feet; at Calden's, 168,000 second feet. The following section approximately fulfills requirements:

Slope, .786 foot per mile.
 Mean depth to Colusa, 35 feet.
 Mean width of section, 830 feet.
 Area of section, 29,050 square feet.
 Capacity of assumed section, 181,000 second feet.
 Ground elevation at Meridian, approximately 57 feet.
 Ground elevation at Calden's, approximately 76 feet.
 High-water plane at Meridian, 71 feet.
 High-water plane at Calden's, 88.3 feet.
 Average height of levees over entire distance, approximately 16 feet.
 Minimum width between center lines of levees: Meridian, 1,000 feet to Colusa—much wider above.

(13) *Calden's to Stony Creek*.—Flood discharge to be provided for, 168,000 second feet at Calden's; 180,000 second feet at Stony creek. Provision to be made by means of levees only, no channel enlargement being contemplated.

VI.

THE LEVEE SYSTEM.

(A) Specifications.

(1) *Section*.—Crown width is to be 10 feet, and the slopes 3 horizontal to 1 vertical on each side. This standard may be departed from where exceptional conditions may appear to justify such departure.

(2) *Clearing and Grubbing*.—All trees, bushes, weeds, high grass or other growth, or other objectionable material, are to be removed from the ground occupied by the levee; all stumps and roots are to be thoroughly grubbed out and the excavations refilled with earth and tamped until firm.

(3) *Surface Breaking*.—The ground to be occupied by the levee should be thoroughly broken by a heavy plow to a depth of at least 6 inches, and the covered surface of old levees, when enlarged, is to be similarly treated with the plow, shovel, or spade.

(4) *Foundation*.—Where there is reason to suspect that defects exist in the foundation of the levee, as in crossing channels or depressions, excavation is to be made of such depth and dimensions as the circumstances require, the excavation to be refilled with well-tamped earth.

(5) *Perishable Matter*.—All roots, weeds, and other perishable matter are to be excluded from the levee while being constructed.

(6) *Sodding*.—The levee is to be sodded after completion with the most suitable and available kind of grass. No kind of growth other than grass is to be permitted on the levee. An exception to this specification may be made in the tide-water region where protection from wave action is to be provided for.

(7) *Borrow Pits*.—Excavations for material for building the levee are not to be made on the land side thereof; and a berm 20 feet in width is to be left undisturbed between the base of the levee and the borrow pit. The depth of borrow pits is to be limited to 5 feet next to the berm.

(8) The grade of the levees is to be 3 feet above high-water plane as prescribed.

(9) Banquettes are to be built across channels and deep depressions to the level of the banks and to be 40 feet wide.

(10) Where the present levees are of such a character, by reason of their mode of construction or other cause, as to develop imperfections that may vitiate the new system if embodied therein; or if they are located so near the river banks or other depressions as to afford

insufficient space for the construction and proper maintenance of the standard levees; in such cases the new system of levees is to be moved farther back to a sufficient distance to afford the necessary room and insure sound levees.

(B) Location of Levees.

(11) *Sacramento River*.—In the location of all levees on the Sacramento river this rule is to be observed:

Where the distance between existing levee lines is less than the prescribed minimum, the additional width required is to be obtained on only one side of the river in localities where the disturbance of valuable buildings and improvements can thereby be avoided; but in cases where the existing levee and the buildings and other improvements are too near the bank of the river to admit of the construction and proper maintenance of the standard levee, then such buildings, etc., are to be moved far enough back to afford sufficient room for this purpose. The location of levees should as far as practicable be made with reference to the improvement of the channel alignment.

(12) Lines of levees are to be constructed on both sides of the Sacramento river from Stony creek on the west and Chico creek on the east down to its mouth, including both sides of Old river and Steamboat slough, except where existing levees are adopted into the system.

(13) *Below Grand Island*.—On the east side the levee is to extend to the lower point of Sherman island opposite Collinsville. This contemplates the closing of Three-mile slough and building the levee line across its channel. Along the lower part of Sherman island the instability of foundation is to be corrected by the use of brush mats, if necessary, and protection from wave wash to be provided by similar means or by willow growth.

On the west side the levee is to extend to Collinsville, except where interrupted by the approach of high ground to the river bank. The minimum width between levees is to be 1,575 feet from center line to center line.

(14) *Along Old River*.—The existing levee lines along Old river on both sides are to be adopted and enlarged where necessary. It is in contemplation to close Georgiana slough and extend the levee line across its channel. This is not to be done until the levees elsewhere are sufficiently developed to contain the full flood flow of the river.

(15) *Steamboat Slough*.—The minimum distance between the levees on opposite sides of Steamboat slough to be 1,175 feet from center line to center line. The levee on the west side is to be extended across Sutter slough so as to eliminate that as an outlet or inlet channel.

(16) *Grand Island to American River.*—The minimum distance between these levee lines is to be 1,360 feet from center line to center line. The lines are to be continuous on the west side, cutting off Merritt slough.

The distance between existing levees along the front of the city of Sacramento and the town of Washington is so insufficient that the levee on the west side is to be moved back to Second street in the town of Washington, and the property between that street and the river bank is to be appropriated for levee purposes.

(17) *American River to Feather River.*—The minimum distance between levee lines is to be 1,200 feet from center line to center line.

(18) *Feather River to Colusa.*—The minimum distance between levees on this division is to be 950 feet at Feather river and 1,000 feet at Colusa from center line to center line. The west line is to extend across the lower end of the excised portion of the old channel of Sacramento river near the mouth of Feather river. Along a large proportion of this division channel cut-offs are to be made and the excavated earth, in so far as may be required or may be available, is to be utilized for levee building. The lines of levees are to be extended across the ends of the excised portions of the old channel. The existing levees are to be utilized where available until the fills can be made across the old channel.

(19) *Colusa to Stony and Chico Creeks.*—The distance between existing levee lines above Colusa is everywhere in excess of requirements for flood flow. The existing levees are to be utilized where available.

(20) *Stony Creek.*—A line of levee is to extend from the upper end of the west-side Sacramento levee, up the south side of Stony creek to high ground, so as to prevent the escape of any water over its south bank.

(21) *Chico Creek.*—A line of levee is to extend from the upper end of the east-side Sacramento levee, up the south side of Chico creek to high ground, so as to prevent the escape of any water over its south bank.

(22) *Butte Creek.*—In the vicinity of Parrott's landing the east-side Sacramento levee is to be diverted up both sides of a canal through which the Butte creek water is to flow into the river.

(23) *Feather River.*—Lines of levees are to be built on both sides of Feather river from its mouth where they are to connect with the Sacramento levees. On the west side the levee is to be continuous up to the mouth of the canal through which Table Mountain creek is to enter the river and to extend up the southeast side of the canal to high ground. On the east side the levee is to extend from the mouth of Feather river up the east bank, except where interrupted by tributaries, to the mouth

of Honcut creek, and to extend thence up the south bank of Honcut creek to high ground.

Only general expressions can be made regarding the Feather river levees, as the Commission is without sufficient data upon which to base exact specifications either as to the location or standard of grades. Existing lines of levees are to be utilized where they may be available and are to be enlarged to a safe standard. Sufficient distance between the opposite levee lines is to be allowed for the passage of the floods.

(24) *Yuba River*.—Along both sides of Yuba river the existing levees are to be utilized so far as they may be available, to be enlarged where necessary. The distance between existing levee lines is deemed to be ample to pass the floods.

(25) *Reed Creek*.—From the mouth of Reed creek levees are to extend up both sides to high ground, connecting at its mouth with the Feather river levee.

(26) *Bear River*.—From the mouth of Bear river a line of levee is to extend up the north side to high ground, connecting at its mouth with the Feather river levee. On the south side of Bear river the levee is to connect at its lower end with the north-side levee of the canal through which Auburn ravine and Coon creek are to flow, and to extend thence up the south side of Bear river to high ground.

(27) *Auburn Ravine and Coon Creek*.—Lines of levees are to extend up both sides of the canal through which Auburn ravine and Coon creek are to flow, from its mouth to high ground. The levee on its northern and eastern side is to connect at the lower end with the south-side Bear river levee. On the southern and western side it is to connect with the Feather river levee at the mouth of the canal.

(28) *American River*.—On the north side of the American river where no levee now exists a levee is to be built from the Sacramento river levee up the American river to contour 43, a distance of about 6 miles. There is to be an interruption in this line where the Pleasant Grove creek canal is to enter, about $1\frac{1}{2}$ miles above the mouth of American river. On the south side of American river the existing levee is to be utilized and to be enlarged to the required standard.

(29) *Pleasant Grove Creek*.—Lines of levees are to extend up both sides of the canal that is to carry the water of Pleasant Grove creek and several smaller streams lying to the south of that creek, into American river. These levees are to connect with the American river levee at the mouth of the canal, and extend up the canal to high ground.

(30) *Cache Slough*.—Lines of levees are to extend up both sides of Cache slough from its mouth to high ground, except where interrupted

by the entrance of tributaries. On the north side the levee is to connect at the mouth of the slough with the lower end of the Sacramento (Steamboat slough) levee, and extend up the north side of Cache slough, interrupted by the entrance of Miner slough and passing by Maine Prairie to contour 20 above that place. On the south side the levee is to connect with the Sacramento levee at the mouth of the slough, and, interrupted by the entrance of Lindsey slough, to extend up the south side of Cache slough, passing opposite to Maine Prairie to contour 20 above that place. These levees are to be located in conformity to the banks of the slough and are to cut off Prospect slough, Haas slough, and Alamo creek. The drainage of the two streams last above mentioned is to be carried into Cache slough above Maine Prairie.

(31) *Miner Slough*.—At the mouth of Miner slough the levees are to connect with the Cache slough levees, and extend northward up each side of Miner slough. On the east side, from the mouth of the slough to the northwestern projection of Ryer Island, where the slough turns eastward, the existing levee is to be utilized and enlarged to the required standard. Later on in the development of the Commission's plan this levee is to be extended across Miner slough at this point and northward to form the east side of the Yolo canal.

On the west side the levee is to be located at a minimum distance of 900 feet from the east-side levee from center line to center line, and generally parallel to same, from the mouth of the slough to the northwestern corner of Ryer island, and to be a continuation of the levee on the west side of the Yolo canal. The space between these Miner slough levees is to constitute the lower reach of the Yolo canal.

(32) *Lindsey Slough*.—Lines of levees are to extend on each side of Lindsey slough from its mouth to contour 20 near its head. These levees are to be located in conformity with the banks of the slough and are to be connected at its mouth with the Cache slough levees.

(33) *Yolo Basin*.—A levee is to be constructed at once defining the west side of the Yolo canal. This levee is to be an extension northward along the trough of the basin of the levee above described on the west side of Miner slough. It will pass through the west side of the long trestle where the Southern Pacific railroad crosses the basin and will continue thence to Gray's bend. Its location is shown on the accompanying map.

(34) The east side of the Yolo canal is to be for the present left unleveed, except along the west side of Ryer island and for a distance of 3.7 miles below Gray's bend. The east-side levee from Gray's bend is to extend southward and parallel to the west-side levee, at a distance of 900 feet between center lines, from the head of the cut at Gray's bend to the mouth of Cache creek canal, from which point to its tem-

porary terminus the width is increased to 1,100 feet. A temporary levee about three fourths of a mile in length is to connect the lower end of this east-side levee with the Sacramento river levee to the eastward, in order to inclose temporarily the basin above for reclamation purposes. After the conditions of flood flow have been developed in the Yolo canal the east-side levee is to be located and constructed to Ryer island in accordance with such development.

(35) *Cache Creek*.—The levees to inclose Cache creek water are to begin at the railroad about 5.5 miles west of the Yolo canal. The north-side levee is to extend thence about due east to the canal. The south-side levee is to extend parallel to the opposite levee to a point about three fourths of a mile from the Yolo canal, from which point it is to curve southward so as to expand the mouth to a width of half a mile to allow space for the deposition of débris in Cache creek.

(36) *Willow Slough*.—The levees to inclose the water of Willow slough are to be built on each side of the channel beginning at a point 4 miles west of the Yolo drainage canal. They are to extend thence parallel to each other in an easterly direction to a junction with the Yolo canal levee. The north-side levee is to be straight; the south-side levee is to diverge from the north-side levee three fourths of a mile from the Yolo canal, expanding its mouth to a width of half a mile in order to leave a space for the deposition of débris.

(37) *Putah Creek*.—The levees to confine the water of Putah creek are to be built one on each side of the channel beginning at the railroad about 8.5 miles west of the Yolo drainage canal. They are to extend thence in a southeasterly direction parallel to each other, the south-side levee diverging to the southward about one mile west of the Yolo canal, expanding the mouth of the Putah creek canal to a width three fourths of a mile where it joins the Yolo canal in order to afford a space for the deposition of the débris in Putah creek.

(38) The exact location of the levees in connection with the Yolo canal above described may be modified somewhat to suit the topography of the ground as developed by instrumental examination.

(39) *Smaller Tributaries*.—The levees to confine the waters of the smaller tributaries of the Sacramento, Feather, and American rivers can not now be exactly described as to the width between them, grades, etc., which are to be determined on the ground and adjusted to the requirements in each case.

(40) It should be noted that of the above described levees all those bordering the drainage and diversion canals are expected to be formed from the earth excavated from the canals themselves; and that in the estimate of cost given in this report they are therefore not included as levee embankment, but only as "Excavation."

(41) *Easement Weir Levees.*—Two lines of levees are to be built at each of the easement weirs prescribed to confine the overflow and conduct the water to the outfall designed for it in each case.

At the weir near Calden's these levees are to be located from the front levee back to the trough of the basin, about 4 miles distant, and are to be spaced 1,150 feet apart between center lines, and to connect with the east-side levee of the Colusa canal.

At the upper Sycamore slough weir two lines of levees to confine the overflow are to extend along each side of Sycamore slough from the front levee to the trough of the basin, a distance of about 5 miles. At the weir they are to be spaced 1,150 feet apart between center lines. These lines are to converge toward each other so that the distance between center lines shall be 650 feet at a point about 1,000 feet from the weir, and to extend thence along parallel lines to a junction with the east side of Colusa canal.

At the Fremont weir (below the mouth of Feather river) the overflow is to be conducted into the old cut-out channel of Sacramento river at a point about a mile distant from the weir between suitable lines of levees as shown on the accompanying map.

The Paine's break weir is to have two lines of levees to confine and conduct the overflow back to the trough of Yolo basin. These levees are to be spaced 1,150 feet apart between center lines, and for the present are to extend back to a distance of only about one mile from the weir. When the east-side levee of the Yolo canal is constructed, these levees are to be extended to a connection therewith.

The cross-sectional dimensions of the easement weir levees are to be: slopes, $2\frac{1}{2}$ to 1 on each side; crown width, 6 feet.

(42) *Estimate of Levee Volumes.*—

COLLINSVILLE TO FOOT OF GRAND ISLAND.

Mean levee height over entire distance, approximately 8 feet.

Volume of levee embankment..... 1,773,000 cu. yds.

No deduction is here made for existing levees, although it may be found that some of these can be utilized.

FOOT OF GRAND ISLAND TO HEAD OF GRAND ISLAND.

Mean levee height over entire distance, 13 feet.

Volume of levee embankment 2,763,000 cu. yds.

Volume of existing levees that can be utilized 633,000 cu. yds.

Volume remaining to be built..... 2,130,000 cu. yds.

Reinforcement of levees along Old river 1,422,000 cu. yds.

HEAD OF GRAND ISLAND TO AMERICAN RIVER.

Mean levee height over entire distance, 13 feet.

Volume of levee embankment..... 6,929,000 cu. yds.

Volume of existing levees that can be utilized 848,000 cu. yds.

Volume remaining to be built 6,081,000 cu. yds.

AMERICAN RIVER TO FEATHER RIVER.

Mean levee height over entire distance, 16 feet.	
Volume of levee embankment.....	3,583,000 cu. yds.
Volume of existing levees that can be utilized	622,000 cu. yds.
Volume remaining to be built.....	2,961,000 cu. yds.

FEATHER RIVER TO COLUSA.

Mean levee height along existing channels, 21 feet.	
Volume of levee embankment along existing channels	13,880,000 cu. yds.
Volume of existing levees that can be utilized	575,000 cu. yds.
Volume along existing channels remaining to be built	13,305,000 cu. yds.
Volume of levee embankment along cut-offs	9,300,000 cu. yds.

COLUSA TO STONY AND CHICO CREEKS.

Mean levee height over entire distance, 15 feet.	
Volume of levee embankment.....	13,290,000 cu. yds.
Volume of existing levees that can be utilized	840,000 cu. yds.
Volume remaining to be built.....	12,450,000 cu. yds.
Total for Sacramento river levees.....	49,422,000 cu. yds.

(43)

FEATHER RIVER AND TRIBUTARIES.

Mean levee height from mouth to Marysville, 15 feet.	
Mean height from Marysville up, 9 feet.	
Volume of levee embankment, Feather river	10,600,000 cu. yds.
Volume of existing levees that can be utilized	880,000 cu. yds.
Volume remaining to be built.....	9,720,000 cu. yds.
Approximate volume of lateral levees along tributaries	2,000,000 cu. yds.
Total for Feather river and tributaries	11,720,000 cu. yds.

(44)

AMERICAN RIVER AND TRIBUTARIES.

Work is nearly all on north shore.	
Mean levee height over entire distance, 8 feet.	
Volume of levee embankment.....	532,000 cu. yds.

(45)

CACHE SLOUGH AND TRIBUTARIES.

Mean levee height below junction of Lindsey slough, 15 feet; thence to upper end, 9 feet.	
Volume of levee embankment.....	1,953,000 cu. yds.
Volume of existing levees that can be utilized.....	237,000 cu. yds.
Volume remaining to be built.....	1,716,000 cu. yds.

(46) The foregoing estimates of the volume of existing levees that can be utilized on new construction work are based upon surveys made seven to ten years ago. Some of these old levees have been greatly enlarged and strengthened, particularly around Grand island and around Marysville. Between Colusa and Stony creek much new levee work has been done and more is now in progress. In fact, levee work is going on to a greater or less extent on various portions of the river. It would probably be within the truth to increase the estimated volume of all these levees, as taken from the old surveys, by 1,000,000 cubic yards.

(47) *The Island Levees.*—The Commission has not taken cognizance

of the levees inclosing the islands in the lower Sacramento and San Joaquin valleys. These are in the nature of private enterprises, and the Commission deems that its function is limited to those levees that are required to confine the flood water to the river channels, and that have a direct effect upon the regimen of the flood flow in the rivers. The confinement of the floods to the rivers must simplify the problem and lighten the burden of maintaining levees around the islands; and the cutting off of outlet channels should eliminate many miles of doubled levee lines that are now maintained, unless these channels are to be kept open at their lower ends for purposes of navigation, and in such cases the height of the levees may be much diminished as they recede from the outfall of the river.

VII.

PLAN OF CHANNEL DEVELOPMENT.

(1) The channel of the Sacramento from about the town of Colusa to its mouth is generally very deficient in capacity to carry its floods. It is therefore found necessary in conjunction with the principle of concentration of flood flow through the agency of levees, to provide for extensive rectification of the channel by means of cut-offs and enlargement work. For the purpose of giving a particular description of the work that comes in this class, the Sacramento river will be considered by divisions, as given in Part V, Par. 1.

(2) *Suisun Bay to Foot of Grand Island.*—The estimated maximum flood flow between Suisun bay and the foot of Grand island, 250,000 cubic feet per second, will require a channel with a cross-sectional area of 49,000 square feet. It is assumed that the high-water plane will be 2 feet above the banks at Collinsville, and 7.2 feet at the foot of Grand island. The mean width between banks is taken as 1,400 feet. The minimum distance between levees from center line to center line is to be 1,575 feet. The cross-sectional area between banks will therefore be 46,000 square feet at Collinsville and 38,600 at the foot of Grand island, and the total volume of the completed channel below banks will be about 132,352,000 cubic yards. The total volume of the present channel within banks for the same distance is estimated to be approximately 75,000,000 cubic yards. The difference is 57,352,000 cubic yards, which represents the volume of material to be removed in order to give the required channel dimensions.

(3) *Horseshoe Bend Cut-off.*—In considering the question of the proposed cut-off of Horseshoe bend between Three-mile slough and Toland's landing, the Commission takes the view that this is a desirable thing to be done in itself and that the feasibility is wholly a question of cost.

Among the advantages that would result the following may be mentioned:

The length of this reach (Horseshoe bend), which is 23,000 feet, would be shortened by 6,640 feet. It is conservatively estimated that the flood plane would be permanently lowered at the head of the cut by about one foot.

The cut-off would materially facilitate the passage of the floods through this part of the river.

The lowering of the flood plane would add considerably to the security of the levees in the Cache slough and Grand island regions and below. The quantity of material required to be excavated in the cut is estimated at 24,000,000 cubic yards.

(4) There is a possibility that some degree of instability might develop in the material through which the cut is proposed to be made, which might result in sloughing of the sides to some extent, thereby increasing the quantity of material to be handled; but judging from analogous conditions where cut-offs have been made in the San Joaquin river it is believed that this difficulty would not prove formidable.

(5) The cost of the work would be made up of the cost of excavation and the cost of right of way. The total volume of the cut is estimated at about 24,000,000 cubic yards, of which, under arbitrary rule adopted by the Commission, 16,000,000 cubic yards would have to be removed by mechanical means. This would be offset in part by eliminating the channel enlargement around Horseshoe bend, amounting to about 5,300,000 cubic yards; and by the saving in levee construction due to a lowering of the high-water plane, about 1,000,000 cubic yards; leaving 9,700,000 cubic yards which would have to be removed. To the cost of this work must be added that of about 500 acres for right of way.

(6) As before stated, the advisability of adopting this measure resolves itself into a matter of cost. After deducting the off-sets mentioned above, the net additional cost of making the Horseshoe bend cut-off would be about \$1,000,000. The Commission declines to make a positive recommendation either way on this proposition, but submits that if the total cost of the entire plan of reclamation will not be unduly increased by this additional amount, the advantages above enumerated may justify the expenditure.

(7) *Three-mile Slough.*—Three-mile slough should be permanently closed. Whether this closing should follow or precede the improvement of the river below is doubtful, but when done, it should all be done at once during a single season of low water. A point should be selected where the bank-full section is smallest, unless the depth be too great, for a shallow section of greater area might present less difficulty than a smaller one with excessive depth. Willow mattress and rock

reinforced by earth fill should be the general character of the work. The earth fill should be made a part of the levee which must turn in from the Sacramento along both banks of the slough to the site of the dam.

(8) *From the Foot to the Head of Grand Island.*—As a general principle the bifurcation of a river channel, as when it passes around an island, diminishes its ability to maintain a good depth by scour. For this reason it is a frequent practice in non-tidal rivers, as one means of improving their navigable depths, to close secondary chutes and force a more powerful current through the main channel.

The existence of two channels, Old river and Steamboat slough, around Grand island, is therefore an undesirable condition, and it would be better, so far as the river itself is concerned, to close one and make the other do all the work. Unfortunately the interests of local commerce make it seem at present inadvisable permanently to close either channel. It will probably be better, nevertheless, as a measure of flood relief, to leave one channel practically as it is and devote all improvement work to the other with a view of making it the main flood carrier.

(9) As between Old river and Steamboat slough, the latter offers the greater advantage for development. Its length is one third less than that of Old river and its gradient must therefore be one half greater; so that with equal conditions as to channel cross-section, it will carry more water. This gain is not indeed in proportion to the increase of slope. For similar cross-sections, such as that elsewhere assumed for Steamboat slough, the velocity by the latter route would be only a foot per second greater than by Old river; but a gain of one foot per second in mean velocity is of great value where economy of cross-section is so important. It is therefore decided to make Steamboat slough the main flood carrier and leave Old river to be maintained to its present carrying capacity.

(10) It will be necessary to give Steamboat slough a cross-section of 35,000 square feet below the high-water plane in order to carry the excess which Old river is unable to carry, estimated as a maximum flow of 193,400 second feet. This work should be so done as to rectify the course of the channel by cutting off convex banks, and substituting long even curves for the present abrupt ones. The entry at the head should be entirely changed so as to conform to the course of the main river above. The work already done at the mouth of Cache slough, to give a better junction of the two streams, could advantageously be carried somewhat farther, though the need of it will diminish as the discharge from Cache slough is diminished.

(11) A small extent of work should be done in Old river to bring the contracted sections up to the present general average.

(12) The question of the effect upon Old river of opening up Steamboat slough is one that can not be settled in advance. It is not deemed advisable at first to put in works at the head of Steamboat slough designed to maintain a certain low-water flow through Old river. It will be better to await developments, and if it ever becomes necessary to restrain the low-water flow through Steamboat slough it will be time enough to do it when that necessity arises.

(13) Georgiana slough should be permanently cut off. The dam might advantageously be located at the site of the drawbridge just below the head of the slough, and be made a permanent causeway, thereby removing the necessity for future maintenance of a bridge. The closing of this slough might possibly cause some inconvenience to navigation interests, but nothing of consequence, because nearly all freight is carried down the slough to the San Joaquin. The relief to the levees, on the other hand, by cutting off all connection with the Sacramento, would be a gain of great and lasting importance.

(14) Sutter slough should be cut off at its head, and Miner slough likewise where it leaves Sutter, so as to remove entirely the existence of subsidiary channels around Rycer and Sutter islands. It is also advisable to cut off Sutter at its mouth and thus remove further necessity for the maintenance of levees along this slough.

(15) *Steamboat Slough: Estimate of Quantities.*—

Average area of completed section below banks, 26,900 square feet.	
Volume of completed channel below banks—	Cu. yds.
Below Sutter slough	40,000,000
Above Sutter slough	20,000,000
Volume of present channel below banks—	
Below Sutter slough	7,500,000
Above Sutter slough	2,700,000
Total quantity to be removed for a completed channel—	
Below Sutter slough	32,500,000
Above Sutter slough	17,300,000

(16) *Head of Grand Island to American River: Estimate of Quantities.*—

Average area of completed section below banks, 29,320 square feet.	
Volume of completed channel below banks	Cu. yds. 155,000,000
Volume of present channel below banks	56,000,000
Total quantity to be removed for a completed channel.....	99,000,000

(17) The first bridge across the river is encountered at Sacramento—a combination railroad and highway bridge belonging to the Southern Pacific Railroad Company. It is not an up-to-date bridge, and obstructs

the channel to an unnecessary degree. It will probably be rebuilt in the near future. Its grade should be raised so that no point of the superstructure shall project below 37 feet. It is nearly that high now, and the change of grade, which will depend somewhat upon the depth of floor system, will not exceed 3 or 4 feet. The total length should be 1,350 feet, of which 400 feet should be taken up by the draw spans of 200 feet on each side of the pivot pier. The remaining distance should be covered by three equal spans. This would require four piers in the water, and these should be especially designed to oppose as little resistance as possible to the current of the river. The foundation for the masonry should, of course, be carried below any possible limit of scour.

(18) *American River to Feather River: Estimate of Quantities.*—

Average area of completed section below banks, 20,000 square feet.	
Volume of completed channel below banks.....	Cu. yds. 78,000,000
Volume of present channel below banks.....	48,000,000
Total quantity to be removed for a completed section	30,000,000

(19) On both this reach and the one preceding, easement weirs are to be provided, but these special structures will be discussed in another place.

(20) *Feather River to Colusa.*—The character of the river over this reach is essentially different from that above and below. The slope is flat, the channel excessively crooked, the banks stable and the cross-section very deficient in dimensions. The river can not carry more than one third of an ordinary flood nor more than one fifth of a great flood. The remedy proposed for this condition, besides the construction of high levees, is (a) to straighten the channel of the river by cutting off excessive curvature, and (b) to enlarge it over the remainder of the distance.

(21) The river distance from Feather river to Colusa is 70.3 miles. By cutting 13.4 miles of new channel this distance can be reduced by 22.9 miles, which would make it 47.4 miles. It has been taken as 47 miles in the table of slopes and distances. (See Part V, Par. 3.) The following table gives the essential data regarding these cuts:

	Stations.	River Distance.	Cut-off Distance.	Saving.	Length of Cut.	Right or Left Bank.
		<i>lin. ft.</i>	<i>lin. ft.</i>	<i>lin. ft.</i>	<i>lin. ft.</i>	
Sacramento slough to Portuguese bend -----	948-883	65,000	18,000	47,000	18,000	Left.
Four-mile bend -----	858-850	8,000	5,550	2,450	4,000	Right.
Railroad bend -----						
Victor bend -----	843-832	11,000	5,500	5,500	4,600	{Right. {Left.
Missouri or Elbow bend -----						
El Dorado bend -----	828-814	14,000	8,250	5,750	5,800	{Left. {Left. {Left.
Smith's ferry -----						
818 to 814 -----						
Stone monument -----	807-804	3,000	2,100	900	1,500	Left.
Collins's eddy -----	803-798	5,000	2,100	2,900	1,600	Right.
Ministerial bend -----	795-785	10,000	2,250	7,750	2,100	Right.
Race Track bend -----	782-773	9,000	2,400	6,600	2,000	Right.
Boyers's bend -----	756-752	3,500	2,400	1,100	1,800	Left.
Steiner's bend -----	738-720	18,000	7,900	10,100	7,100	Right.
Seepage bend -----	710-706	4,000	2,100	1,900	1,500	Left.
Bend above Grimes -----	676-671	5,000	3,100	1,900	2,800	Right.
Byers's bend -----	668-662	6,000	4,000	2,000	3,200	Left.
Doty b'nd, or 20-Mile b'nd -----	658-652	6,000	2,650	3,350	2,000	Right.
Earps's bend -----	652-647	5,000	2,600	2,400	2,400	Right.
Sycamore bend -----	644-629	15,000	5,150	9,850	4,300	Left.
Butte slough bend -----	612-596	16,000	6,700	9,300	6,000	Right.
Totals -----		203,500	82,750	120,750	70,700	

(22) *Estimate of Quantities.*—

Area of completed section below banks at Feather river, 14,500 square feet:
at Colusa, 16,000 square feet.

Volume of completed channel below banks—	Cu. yds.
Along present channel -----	94,700,000
Along cut-offs -----	31,900,000
Volume of present channel below banks -----	47,000,000
Total quantity to be removed for a completed channel—	
Along present channel -----	47,700,000
Along cut-offs -----	31,900,000

(23) The old channel of the river at Portuguese bend and near Sacramento slough should be permanently dammed off and the dams made a part of the levee line.

(24) At Knight's landing the river is spanned by a combination railroad and wagon bridge. Its total length is 362 feet, with a draw the two arms of which are 120 feet. The elevation of the base of the

rail is 48 feet (San Francisco bay datum, 49 feet). It should be replaced by a bridge with a total length of 1,000 feet, made up as follows: Draw spans, 300 feet in all, and two spans of 350 feet each. The lowest point of superstructure should have an elevation of not less than 52 feet.

(25) *Colusa to Stony Creek*.—On this reach of the river it is not proposed to do any channel work, but to rely for the necessary capacity upon the increased width between levees. The character of the river is quite different from that below. The banks are more unstable and the channel more shifting. The cross-sectional area increases from Colusa up until at Stony creek it is capable of carrying ordinary floods in its natural condition.

(26) For the purpose of making some definite estimate, it has been assumed that as to channel development in general, from Colusa to the mouth of the river, two thirds of the material is to be removed by the agency of the current and one third by mechanical agency; and as regards the new channel cut-offs, it has been assumed that two thirds of the work is to be done by direct human agency and the remaining third by the flowing water. The degree of approximation to correctness of these assumptions can of course only be determined by the event.

(27) On the basis of these assumptions, the quantities to be removed by mechanical means on the various divisions are as follows:

	Cu. yds.
Collinsville to foot of Grand island.....	19,117,000
Foot of Grand island to head of Grand island—	
Below Sutter slough	10,800,000
Above Sutter slough	8,650,000*
Head of Grand island to American river	33,000,000
American river to Feather river	10,000,000
Feather river to Colusa—	
Along present lines	15,900,000
Along cut-offs.....	21,270,000
Total	118,737,000

(28) *Clearing between Levee Lines*.—On the Sacramento river from Colusa down, all trees, buildings, and other obstructions to the flow of the flood water are to be cleared off between the opposite lines of levees; and this interspace is to be kept clear of such obstructions. Above Colusa the width between levees is excessive for the flood-carrying purpose, but it is essential that a sufficient width be kept clear of obstructions to the flood flow. This cleared interspace is to have a width, including the channel, at Colusa, of 1,200 feet; at Calden's, of 1,400 feet; at Stony creek, of 1,600 feet, and at intervening points in proportion.

*See paragraph 33.

Along the tributaries in general, where the width between levees is not excessive for flood passage, the whole interspace is to be kept clear of obstructions, and where width is excessive, a space proportionate to the size of the channel and flood volume is to be cleared.

(29) *Work to be Undertaken First.*—Referring to the large estimate of cubic yards of earth to be removed from the channel of the Sacramento river, it is proper here to state that after the flood flow shall be largely confined by levees it is expected that a very large proportion of this work is to be accomplished through the agency of current erosion. During the process of this channel development, mechanical aid is to be applied when and where conditions may indicate the expediency of such application, the extent of which mechanical work, and the period of time during which it is to continue, can not be foreseen.

(30) Certain features of the work of channel rectification of definite extent and quantity outlined in the foregoing description it has been determined must be done by direct mechanical means as a first operation, for which arrangements should be made at the outset, to wit:

(31) In the matter of cut-offs between Colusa and Feather river, two thirds of the material in the new channels is to be excavated by mechanical agency. The portions of the old channel that are to be connected by the cut-offs in this division of the river are so narrow as to require immediate enlargement by mechanical means, and one third of the material that is required to be removed to enlarge the channel to its ultimate dimensions must be removed as a first operation.

(32) The cut at the head of Steamboat slough falls in the same category as the cut-offs above the Feather, and is to be similarly treated. For the enlarging of the channel of Steamboat slough from the head to the mouth of Sutter slough about one half is to be arranged for as a first operation, and about one third from Sutter slough to the mouth, the work to be adjusted to making a channel of uniform dimensions throughout.

(33) Below the foot of Grand island it is important that channel correction be applied as a first operation where marked deficiency of channel capacity now exists, and the same provision is here to be made, as specifically indicated elsewhere, for doing one third of the required enlarging by direct mechanical means. The Commission has not been furnished with sufficiently detailed information about the present exact dimensions and other conditions pertaining to this part of the Sacramento channel to serve as a basis for a more specific recommendation as to the application of enlargement work here. An elaborate detailed survey must be made of this division of the river as a necessary preliminary upon which to base a definite plan of operations.

(34) *Bank Revetment.*—The plan adopted for the enlargement of the channel contemplates that a large part of the work is to be done by current erosion and must of necessity involve a considerable extent of caving of the river banks. It is to be expected that in this process of widening of the channel there will be localities where, either from threatened encroachments upon the levee lines or from the danger of developing undesirable channel alignment, it will be necessary to adopt measures to restrain the caving where such unfavorable effects are to be apprehended. From observations made by the Commission and information obtained from other sources, it is believed that this purpose can be accomplished by comparatively simple and inexpensive work of bank revetment. It is not possible to foresee where or to what extent this class of work must be done, or to make an estimate to cover the cost with any confidence as to its correctness. As a basis for some definite expression, however, it is arbitrarily assumed that 250,000 lineal feet, or about 47 miles of river bank, must be so treated.

(35) *The Mouth of Sacramento River.*—It is not deemed to be strictly within the province of the Commission to deal with this question beyond the exact limits of the river's mouth. Nevertheless, it is believed that an intimate relation obtains between the conditions immediately beyond the mouth and the channel regimen above. It is believed that a deep channelway across the bar just outside the mouth of the river, to shorten the distance and give a better alignment to deep water, is desirable and important, as ingress and egress of the tidal flow into the river channel would thereby be greatly facilitated, and an important influence be thus exerted toward maintaining suitable channel conditions in the lower river. It is suggested that the proper authorities be invoked with a view to the accomplishment of this object by such means as they may approve.

VIII.

THE WEST-SIDE DRAINAGE CANAL AND TEMPORARY BY-PASS.

(1) In deciding upon the system of drainage for the west-side basins before described, the following considerations were had in view: The general plan recommended provides for the construction of levees on both sides of the Sacramento river from Stony creek and Chico creek down, which are to be high enough and strong enough to confine to the river a much larger proportion of the flood flow than has ever been carried, or contemplated to be carried heretofore; and it is expected that even in the primary stage of channel development in the majority of flood seasons there shall be no escape of water over the casement weirs to be provided. It is contemplated by the plan proposed that the

capacity of the river channel shall be progressively developed until the entire volume of the great floods shall pass to the bay with no escape out of their confining levees.

(2) A considerable period must, however, elapse in the process of this development during which the river will not be able to carry the entire run-off from the watershed in seasons of great floods. Some temporary provision must therefore be made for disposing of this surplus. This can be done by using temporarily for the passage of overflow water the system of canals hereafter described, designed primarily to carry the west-side drainage; or by giving the overflow free access to the low basins on either side as at present. The latter alternative has been rejected in the interest of more speedy reclamation of the overflowed lands, and the west-side drainage system is to be used for disposing of the overflow water so long as may be necessary.

(3) In seeking a suitable location for this temporary by-pass, the topography of the low lands on the two sides of the river has been taken into account. From Chico and Stony creeks down, the land on either side is lower than the banks of the river, and floods have escaped over both banks through an indefinite, but very long, period in the past. An auxiliary channel along either or both sides to gather up this overflow water and convey it down the valley would seem to be a rational measure. But on the east side there are two formidable, and practically insuperable, obstacles to the construction of a continuous channel—the Feather and the American rivers. Both of these streams bar the way absolutely and render it impossible to carry a canal continuously along the bottom of the basins, where it should be carried to be effectual. It must be carried on such a high line as to be capable of discharging into these rivers at floods, and this condition renders it quite useless for the important additional purpose of drainage. Besides this, with the proposed increase in the height of the high-water plane, the difficulties will be so far increased as to be practically prohibitory.

(4) On the west side the situation is different. Upper and lower Colusa basins are connected by a narrow depression which affords gravity drainage from the one to the other. Lower Colusa basin, however, is separated from the Yolo basin by a broad ridge of ground 10 feet in height above the lowest point in the basin. This ridge is about 6 miles broad, and it would be a very costly matter to excavate a large canal through it. But the proposed abandonment of the present channel of the Sacramento from Portuguese bend to Gray's bend removes a large part of this difficulty by affording a fine channel through the greater part of the ridge. The deep cut would thus be limited to a distance of about 2 miles from Sycamore slough to Portuguese bend just

in rear of Knight's landing, and 1.4 miles from Gray's bend to the low ground in the Yolo basin. The length of cut on this route is about 3 miles shorter than on a line directly through the ridge, while the excised portion of the Sacramento will give a better channel over that portion of the route than it would be feasible to excavate.

(5) With this cut made, a direct gravity route is open all the way from the head of Colusa basin to the foot of Yolo basin, where a free outlet is had via Cache slough directly into the Sacramento.

(6) A canal thus located will serve three important purposes: (a) The carrying of the surplus flood waters from the river; (b) The interception of tributaries from the hills which now lose themselves in the basins; and (c) The drainage of the basins themselves of seepage and rain water. The last two purposes may be considered together under the head of drainage.

(7) The by-pass function is expected to be only temporary, but the drainage function will be permanent. It is a rational arrangement, therefore, to gauge the capacity of the new canal through the deep cut at Knight's landing, by the necessities of drainage rather than by those of overflow, which it is expected will eventually disappear. From the exhaustive report of Mr. C. E. Grunsky in 1896 to the land-owners of Drainage District No. 108 (page 35), the maximum run-off likely to occur from the entire watershed tributary to the basin is about 11,000 second feet. The canal is therefore to be proportioned to carry this volume. While it will not carry the overflow from the Sacramento as fast as it may come in high floods, it will dispose of it rapidly after the flood wave passes. Mr. Grunsky states (see above report, page 34) that in the high water of 1896 the flow did not exceed 4,000 second feet for more than eight days, and that it exceeded 8,000 second feet on only three days. It did not reach the assumed possible maximum at all. From this it will be seen that accumulations in the basin due to overflow from the river will be drawn away rapidly except at very short intervals of excessive inflow from the hills. To store the surplus which can not be carried off as fast as it comes in times of heavy overflow from the river, the west-side embankment of the canal throughout its entire length above the Knight's landing cut should be left unbuilt until the river floods are under sufficient control to eliminate the greater part of the overflow. The area thus submerged for a few days at a time will be less than one fourth of that which now lies under water for several months in seasons of heavy floods.

(8) To provide for the temporary overflow from the river, two easement weirs into Colusa basin are to be made at those points where the strain upon the capacity of the river channel is greatest. From about Calden's landing to Butte slough and upper Sacramento slough, the

river changes from the steep slope of the river above to the much flatter slope which prevails below to Feather river. There is naturally a checking of velocity in this reach and a tendency of the water to bank up unduly. The gauge records show that the range between high and low water is greater at Colusa than either above or below. That there has always been a tendency for the river to escape from its banks in this vicinity is evidenced by the deep and permanent escape channels—Butte slough on the east and Sycamore slough on the west. It is decided that one weir be placed at a point near the upper course of Powell slough in the vicinity of Calden's landing, and the other at upper Sycamore slough, which latter is to be reopened by dredging to give it the required capacity. The weirs are designed to carry 10,000 second feet each, but in the earlier stages of the development they may have to carry more, and Sycamore slough should be given a capacity of at least 15,000 second feet. The slope of this channel is about 2.5 feet per mile, and the necessary cross-section will be about 2,000 square feet. The present section averages about 700 square feet, leaving 1,300 square feet to be excavated.

(9) Below the Sycamore slough weir, there is no necessity for further easement until the mouth of Feather river is reached. Here the lower half of the excised portion of the Sacramento is to be utilized to carry off the surplus overflow. The weir is to be located immediately below the mouth of the Feather, is to carry its overflow directly into the old channel of the Sacramento and through it to Gray's bend and thence to Yolo basin. The capacity of this weir at two feet depth is to be 20,000 second feet.

(10) This will give as the total estimated flow at Gray's bend in the later stages of the development work 31,000 second feet, and the excavation below banks must provide for at least this volume. Should the overflow momentarily exceed this, as may be expected in extraordinary floods if such should occur during the earlier stages of development, and temporarily raise the water at Gray's bend above the banks, the space inclosed by the old and new river channels between Portuguese bend and Feather river becomes at once a regulating reservoir which will materially moderate any sudden pressure upon the channel at Gray's bend. The present levees on the south bank of the old river, with slight improvement, will safely admit a high-water plane of elevation 35, or 2 feet above the banks. The ground slopes rapidly back from the river and the average depth over this entire space at the above stage will probably be not less than 6 feet. The area is about 6 square miles, and the storage thus represented is equivalent to a continuous flow for twenty-four hours of about 6,000 second feet. The outflow at Gray's bend at this high stage will considerably exceed 40,000 second feet (see Pars. 20-22), and the total volume therefore that

can be provided for during a short period, without taxing the Gray's bend channel beyond its capacity, will exceed 50,000 second feet.

To drain the low ground in this reservoir area a small canal should be cut from the old channel of Sacramento slough to Pennybaker bend, as indicated on the map.

(11) The fourth and last easement weir is to be located below the mouth of American river, at the site of the old Paine break, and is to have a capacity at two feet depth of 10,000 second feet.

(12) From the point 3.5 miles below Gray's bend, at first only the west embankment of the canal is to be constructed. The reason for not fixing at present definite limits to the width of the canal through the Yolo basin is to give an opportunity to await the development of the system of improvement. The space between the west-side embankment and the river will be virtually a by-pass of ample capacity to carry all the water which will pass down the basin during the process of development. As the results of the improvement develop, the dimensions of the permanent canal can be determined and the east-side embankment can then be constructed.

(13) There remains to be considered the disposition of Cache, Willow, and Putah creeks. The difficulty of caring for these streams has been magnified by former investigators into one of the most serious features of the entire problem. This difficulty presents itself under two phases—the great volume of discharge and the enormous quantity of sediment carried. The question of discharge has been discussed elsewhere. It is not believed that it presents any very serious features. As to sediment, these streams undoubtedly bring down large quantities into the basin. But the basin has ample room to store it for centuries to come, and the proper plan is to train these streams so that they may deposit their silt in the low parts of the basin and gradually build them up to a greater elevation. While the aggregate deposits in the past have been great, the annual increment is not so, and it is believed that it can be handled without difficulty.

(14) The foregoing scheme for permanently intercepting the west-side hill drainage and affording an outlet for the low land drainage, and for temporarily carrying off the surplus waters from the Sacramento while the channel of that stream is being developed, can be, in large part, put into effect in the earlier stages of the work. The complete reclamation of three fourths of the Yolo basin is entirely practicable without doing any work on the river proper, while at least ninety per cent of the area overflowed in 1904 can be reclaimed without waiting for the development of the river channel to its final capacity. Should this development take longer than expected, the delay will not be a matter of great moment in the main purpose sought to be accomplished.

(15) The slope of the canal over that portion where it occupies the excised bed of the river from Gray's bend to near Portuguese bend may be disregarded so far as the flow is concerned, for the channel section is disproportionately large for the duty required of it.

(16) *Cross-section of the Canal.*—The section adopted for the reach from Wallace's crossing to Portuguese bend is 100 feet wide at the bottom, with slopes of 3 to 1, giving an area at 20 feet depth of 3,200 square feet. The distance is 31 miles; the fall, 22 feet, and the slope, .71 foot per mile. The discharge computed upon these data is a trifle less than 12,000 second feet.

(17) The length of the canal through the Yolo basin is 41 miles. The elevation of the high-water plane at Gray's bend is assumed at 35, and at the mouth of Cache slough at 14.54. Assuming that a practically uniform slope will develop after the canal is closed in by the construction of the east-side embankment, the slope will be .5 foot per mile. Applying the Colusa basin section to the cut through Gray's bend, but placing the bottom 27 feet below the assumed high-water plane, gives an area of 4,887 square feet and a discharge of 21,300* second feet.

(18) To increase the above section so that it will carry the surplus water in times of discharge over the Fremont weir, the cut at Gray's bend is to be widened to a depth of 13 feet below banks, or down to reference 20'. This cut will terminate in the bottom of the basin in a distance of about 1.4 miles. The width of this cut is assumed at 600 feet and the maximum depth below the assumed high-water plane at 15 feet. This section will carry 22,500 second feet.

(19) The total outflow at Gray's bend, therefore, is 43,800 second feet, which, with the storage capacity in the basin above, as previously given, makes 49,800 second feet, or practically 50,000 second feet that can be safely taken care of. (See Par. 10.)

(20) In the later stages of development, when the time has arrived for building the east-side embankment through Yolo basin, it may be assumed that the great floods are so far under control that the maximum outflow at Gray's bend will not much exceed 30,000 second feet, and that for only very brief periods. This is assumed to be increased at Cache creek by 10,000 second feet, at Willow creek by 2,000 second feet, at Paine's break by 10,000 second feet, and at Putah creek by 20,000 second feet, giving 42,000 second feet at the railroad crossing, 72,000 second feet from Putah creek to Cache slough, and probably 75,000 second feet from there to the mouth of Cache slough.

*N in Kutter's formula is here taken at 0.25, because a portion of the wetted perimeter is a water surface. (See Par. 18.)

(21) The section at the railroad crossing will have a mean width of 400 feet, an area of 10,800 square feet, a mean depth of 27 feet below high-water plane or about 13 feet below ground, and a surface width of about 470 feet. It will be necessary to raise the present grade of the road about 8 feet and to put in a bridge of two spans of 250 feet length each. This work, however, will not be necessary until the east-side embankment is built.

(22) The section at Miner slough will have a mean width of 700 feet, which, at a mean depth of 27 feet, will carry 80,000 second feet.

(23) *Easement Weirs.*—Owing to the considerable height of the new flood plane above the natural banks of the river, the easement weirs must be substantial structures, with ample precautions against leakage or cutting-out underneath and on the flanks, as well as against under-scour from the overpour.

The foundations of the structures to be on piles, with one line of triple lap sheet piling extending the entire length.

During the earliest stage of channel development the crest is to be 6 feet below the high-water plane, later on to be raised to 2 feet below, when channel conditions and flood flow may warrant such elevation; and ultimately to be entirely closed.

Upon the low crest of first construction is to be placed a steel frame for the support of stop planks, by which the volume of overflow can be regulated by increasing or decreasing it, as circumstances may require. The frame is to be securely anchored into the weir, the top to be at the height of the levee and surmounted by a walkway.

The body of the weir and the tail-bay at the foot of the overfall are to be of solid concrete, as well as the abutments, which are to be built up to the top of the levee and securely connected therewith.

Provision is to be made for raising the crest to higher elevations from time to time as the progress of the plan of development may demand.

The length of the weir is to be so apportioned that a two feet depth of overflow will give the normal volume intended to escape in the later stages of the plan of improvement.

The location, length, and normal volume of overflow of the weirs are as follows:

- No. 1. Near Calden's landing: length, 1,000 feet; overflow, 10,000 second feet.
- No. 2. Head of upper Sycamore slough: length, 1,000 feet; overflow, 10,000 second feet.
- No. 3. Fremont: length, 2,000 feet; overflow, 20,000 second feet.
- No. 4. Paine's break: length, 1,000 feet; overflow, 10,000 second feet.

(24) The weir at Fremont (mouth of Feather river) is of exceptional importance and must be constructed with especial care, with the expectation that in the earlier stages of the work its overflow may be as much as 40,000 second feet under extraordinary flood conditions.

Particular provision is to be made for a timber spillway founded on deep-driven piles, to let the water down into the Old river channel on its way to Gray's bend, to prevent erosion and gorging back toward the weir.

(25) *Estimates of Quantities.*—

	Cu. yds.
Yolo basin canal for 37.5 miles above mouth of Cache slough....	15,840,000
Canal excavation thence to Gray's bend	2,646,000
Putah creek levees from canal to railroad.....	940,000
Willow creek levees back four miles	412,000
Cache creek levees from canal to railroad.....	436,000
Cut through Knight's landing ridge	430,000
Colusa basin canal from eight miles above Portuguese bend to Wallace's crossing	580,000
Wallace's crossing to opposite Calden's.....	2,464,000
Opposite Calden's to Willow creek.....	1,030,000
Total	24,778,000

IX.

DRAINAGE OF THE BASINS.

(1) The plans submitted in this report for the general reclamation of the Sacramento valley contemplate, when fully developed, the passage of the entire volume of river floods along their channels to Suisun bay, including the hill and upland drainage to be intercepted and conveyed into the river channels through canals, as heretofore described. It remains to make provision for the drainage of the low lands in the basins of the water that may accumulate from the local rainfall and seepage which can not be disposed of by gravity drainage and must be handled by pumping plants located at the lowest points in the basins, as the means of conveying the water into the rivers. The basins will be considered in detail, first taking those on the east side. The areas to be considered embrace all the territory that lies between the rivers and the canals to intercept the hill drainage.

(2) *Butte Basin.*—This basin contains about 478 square miles, all of which is flat land except Sutter buttes, 54 square miles in area. The local water in this basin is to be gathered by laterals into a main drain down the trough of the valley and to be passed thence into Sutter basin by the present route of Butte slough. No pumping plant is considered to be necessary in this basin, as gravity drainage is practicable.

(3) *Sutter Basin.*—The water to be disposed of in this basin, will be the run-off from Butte basin just described, in addition to the direct rainfall and seepage within the basin itself, the area of which is 378 square miles. The possible maximum run-off of both basins, based upon Grunsky's report upon the drainage of lower Colusa basin, will

not exceed 6,000 second feet.* This should be conducted by a main drainage canal to the bank of the river where Sacramento slough joins the line of the new cut-off channel from Portuguese bend to the mouth of Feather river.

(4) There should be established at this point a pumping plant with a capacity of 450,000 gallons per minute. This pumping plant might not at times be able to dispose of the entire run-off as fast as it comes, but it is nevertheless believed to be large enough. It is possible that the above estimate of run-off is much exaggerated, considering the flat character of all but about six per cent of the areas of these basins, which hold the water and give time for large infiltration into the soil; and considering also the relatively low rainfall on the basins. In Grunsky's observations on the run-off into lower Colusa basin as the result of the protracted rainstorm of January and February of 1896, he found that it did not exceed 4,000 cubic feet per second for more than eight days, and did not exceed 8,000 cubic feet for more than three days. Accepting this same rainfall and topographical conditions as applicable to Butte and Sutter basins (which is probably largely overstating the case for them, as the watershed considered in Grunsky's estimate is mainly upland and hill drainage), the proportionate figures are 2,666 and 5,333 second feet respectively for the periods named. During most of the time in the rainy seasons the run-off will be less than 1,000 second feet, and much of the time no pumping at all will be necessary. Should more water present itself at any time than the pumps can dispose of promptly, it can accumulate in the low depression about seven miles above the pumping station, where it will probably not remain more than a few days at a time.

(5) *Yuba River to Coon Creek.*—Small pumping plants will be required in the sub-basins between Yuba river and Reed creek, between the latter and Bear river, and between Bear river and the Coon creek canal.

(6) *American Basin.*—A pumping plant of 80,000 gallons per minute capacity should be located at the foot of American basin at the mouth of Bannon slough, and a main canal made along the bottom of the trough to convey the rain and seepage water to the pumps.

(7) *Yolo Basin.*—Pumping plants should be located in the several sub-basins within the Yolo basin. It is estimated that the combined capacity of the pumps required for the entire basin is 160,000 gallons per minute. The largest of these sub-basins lies between Putah creek and Cache slough. This should have two pumping stations, one located at Big lake to deliver its water into Yolo canal, and the other

* Report of Board of Consulting Engineers to the land-owners of Reclamation District No. 108. (1896.)

at the mouth of Prospect slough near Cache slough. The combined capacity of these two plants should be 90,000 gallons per minute, probably equally divided between them. A plant should be located on the south side of Cache slough near the mouth of Lindsey slough, with 30,000 gallons per minute capacity. Another small plant of about 7,000 gallons per minute should be placed between Lindsey and Cache sloughs at their confluence. Above Putah creek canal and near its junction with Yolo canal should be placed a 25,000-gallon plant, and above Willow slough canal a small plant of 8,000 gallons per minute capacity.

In determining the capacity of the Yolo basin pumping plants it is recognized that a large proportion of the adjacent upland drainage will be intercepted and absorbed in irrigation.

(8) *Colusa Basin*.—The drainage canal provided for Colusa basin will afford gravity drainage for the entire basin, as the bottom of the canal will be well below the lowest ground. This function of the canal may be temporarily interrupted during heavy rushes of water from the hills or over the easement weirs in the levee; but these periods will probably be so short that pumping plants will not be required. Numerous inlets into the canal to admit local drainage will be required, provided with flood gates to exclude the canal water when full.

(9) All of the pumping plants to be installed in the various basins should be constructed on stable foundations of piles and concrete, by the most approved methods and with the most efficient machinery.

(10) *Inverts Under River*.—The Commission has considered the project presented by certain gentlemen who have given much thought to the subject of securing gravity drainage for both the Sutter and American basins by means of inverts under the Sacramento river. Were such a scheme practicable it would, of course, be very desirable. But the Commission is of opinion that it is not practicable. It is doubtful if advocates of this plan appreciate the enormous difficulty of laying an invert, particularly one of large capacity, at a safe depth under a great river like the Sacramento. But the greatest difficulty of all would be to secure the necessary slope. A level line from the lowest ground in Sutter basin to equally low ground in Yolo basin would be 15 miles long, and from the American basin 5 miles long. The situation is one in which auxiliary power must be employed, even if inverts were used, and it will be more practicable and economical to pump directly into the river.

(11) In determining what proportion of the cost of the drainage of the basins, after the overflow water from the river and the drainage from the hills have been excluded, should be assigned to the general fund, the Commission has assumed that all that can be reasonably ex-

pected is that main canals be built along the trough of each basin on the east side, into which all lateral drainage may empty by gravity, and that at the lower end of each of such main canals pumping plants be established of sufficient capacity to remove the water promptly as it accumulates. The location of these canals is indicated on the map. Yolo and Colusa basins are served in this respect by the west-side drainage canal, and no further estimate for them is required.

(12) *Estimates of Quantities.*—

	Cu. yds.
Butte basin canal.....	400,000
Sutter basin canal.....	2,813,000
American basin canal.....	580,000
Total.....	3,793,000

X.

MISCELLANEOUS.

Administration and Execution of the Work.

(1) *Unity of Plan.*—All parts of the Sacramento flood plain are so connected with one another that they can not be considered as independent units in any scheme of reclamation, but must rather be treated as a whole. Each portion of the territory should therefore be included in the general scheme, and all reclamation work within its limits should be in conformity with the broad plan embracing the entire valley. Even purely local work desired to be inaugurated by private parties should first be submitted for the approval of the proper authority, and its execution should be under State control. It is essential to the comprehensive and efficient management of the work in all its manifold details that it be under the complete control of one central authority, responsible directly to the State. This authority, whether a single individual or a commission, should be given the necessary power to prosecute the work with efficiency unhampered by any considerations except those of the best interests of the work itself.

(2) If at all practicable the entire funds for the work should be guaranteed from the start. It is only in that way that a close following out of the scheme can be expected, or a close adherence to the original estimates of cost be possible. Any prolonged suspension of work in the progress of the development would probably have disastrous consequences.

(3) *Order of Prosecution of the Work.*—In the plan of operations embraced in this report there is no reason for giving precedence in time to any part of the work recommended over the other parts, but the work may and should be prosecuted in all parts of the field simultane-

ously. The single qualification to this statement is that, in the case of river levees, new cut-offs and drainage canals, for obvious reasons an upper section in either case should not be brought to a state of completion in advance of the lower section. For example, in leveeing a river channel it would not be wise to complete the inclosing levees of an upper section and thus send down an additional flood burden into a lower section before the latter is ready to receive it. But this consideration need not hinder the carrying forward of the work in all sections at once, the completion of the levee lines, cut-offs, and canals to be effected progressively upstream. A vigorous prosecution of the work in all parts of the field will promote the early completion of the whole plan and will be more satisfactory to the people throughout the valley. There will be an especial advantage in pushing to completion the west-side drainage system, both because of the developmental features involved, necessary to determining the ultimate widths of the canals and so admit of the consummation of this important feature, and because this part of the general plan of improvement will of itself result in immediate and large benefit in promoting the reclamation of lands that are now overflowed, both in Colusa and Yolo basins, and particularly in the latter.

(4) *Preliminary Surveys.*—The estimates of quantities submitted in this report, and the dimensions and locations pertaining to the various features of the work, are based upon very general and for the most part inexact data. It is believed that on the whole the results thus arrived at bear a reasonable approximation to correctness. It is necessary, therefore, that, as preliminary to the inauguration of any part of the work, a general revision should be had, based upon accurate and detailed surveys in each case. As this involves a great extent of field work, measures should be taken at once to set it going and push it actively until completed. In this connection an extended series of gauge and discharge observations should be taken throughout the valley during the next flood season, and continued through the next and subsequent years, as being a vital part of the ground work of reclamation plans. Co-operation with the United States Engineer Officer in charge of the improvement of the Sacramento river is suggested. The work now being done jointly by the Government and by the State through the United States Geological Survey in making a detailed contour survey of the valley should be continued with a view to its early completion. It will be of great value in supplementing the work of the Hall surveys, which, though very thorough, is now about twenty-five years old. Many changes have taken place in that time which it is important to have defined.

(5) *Right of Way.*—The power of prompt and speedy acquisition of the necessary right of way for the inauguration and prosecution of the

work without hindrance or delay from this source is vitally related to the whole subject and must necessarily be invoked at the very inception of practical operations. It is therefore highly essential that the administrative authority be vested by law with power to act by peremptory process which shall eliminate the element of undue delay in acquiring these rights.

(6) *Irrigation Reservoirs.—Influence on Sacramento Flood Problem.*—The Reclamation Service of the United States Geological Survey has made extensive examinations of the watershed of the Sacramento valley with a view to developing its capabilities for a general system of irrigation. This investigation has resulted in the location of sites for a number of large reservoirs in the higher lands adjacent to Sacramento valley, designed for the storage of water for irrigation purposes. Mr. J. B. Lippincott, the engineer in charge of the field work, has submitted a list of eight reservoir sites for which definite estimates have been made of their possible storage capacity. According to these estimates the total volume that can be stored, if the design is ever fully perfected, will be over 148,000,000,000 cubic feet.

(7) It is believed by many persons, engineers as well as others, that the storing of considerable bodies of water in these numerous reservoirs must have an important moderating effect upon the floods in the Sacramento valley, some going so far as to assert that the solution of the flood problem is to be sought in this direction. After due consideration the Commission is unable to accept these sanguine views in such full measure; because mainly—the extent of watershed that can thus be brought under control is but a very small proportion of the whole; again, the available sites for these reservoirs are the very situations which are most fully occupied by settlements and the necessary disturbance of these will make it impracticable to occupy all of these sites to their full capacity, if at all; and further, when a reservoir is once filled, so long as it remains so, its holding capacity is exhausted, and it can only retard the flow of additional flood water but not withhold altogether. The power of retardation, however, of additional storm water, after the reservoir is full, is believed to be of some considerable importance, as a large surface area is afforded over which this water must spread before flowing over the reservoir weir.

(8) In the cases of certain storage reservoirs in the east, having relatively large surface areas, this effect in retarding the passage of flood crests has been found to be quite appreciable. The Sacramento river with its short and sharp flood culminations would seem to be especially susceptible to the moderating influence of such an agency in delaying the passage of flood wave crests; and the aggregate area

of these reservoir surfaces may be sufficient to count for a good deal in this way.

(9) On the whole the Commission is of the opinion that while no very substantial reliance is to be placed on the irrigation scheme as a means of moderating the floods of the Sacramento river in the near future, still the promise of some beneficial effects to result from a fully developed irrigation system is sufficiently alluring to warrant all the encouragement that can be given to this enterprise by the reclamation interests.

(10) *Telephone Lines.*—It will be important that telephone communication be established along Sacramento and Feather rivers, as necessary to facilitate the administration of the work, and for timely information of the approach and progress of flood waves. A line should be constructed from Collinsville up the Sacramento river at least as far as Red Bluff, and perhaps to Iron cañon, and another from Sacramento to Oroville on the Feather river. It is believed that lines along only one side of these rivers will prove sufficient, as ready means of access to the telephone stations should be available from the opposite side of the rivers, or stations can be established by means of high wires across the channels. Telephone stations should be at intervals not exceeding 5 miles along the banks of the rivers. The lines should be constructed in the most approved manner and supplied with the most efficient appliances.

(11) *Bridges.*—In the execution of the plans presented in this report the necessity will arise for disturbing a number of existing bridges and the building of a number of new ones.

The Southern Pacific railroad bridge crossing the Sacramento river at Sacramento, it will be necessary to raise to a higher grade and make other changes with a view to facilitating the passage of flood water under it. (See Part VIII, Par. 17.) It is understood that the Railroad Company intends to build a new bridge at this place in the near future, and, if so, it should be made to conform to the requirements above alluded to.

The railroad bridge at Knight's landing must also be reconstructed with a higher grade and with less obstruction to the flood flow. (See Part VIII, Par. 24.)

The highway bridge at Colusa must be so treated also.

There will be two new railroad bridges to be built over the west-side canal, one at Knight's landing in the earlier stages of the work, and one at the Yolo crossing in the later stages of its development.

The various canals to be built in both the east and west valleys will intersect public roads at many points and necessitate the rebuilding of existing bridges or the building of new ones. The number and size

of the bridges so involved can not now be determined, nor can an exact estimate be made of the cost. An allowance has been made, however, from the best information obtainable, of a gross sum to cover this feature.

XI.

ESTIMATES.

(1) The question of fixing unit prices upon which to arrive at an expression of the cost of the work recommended to be done is perhaps the most difficult one that presents itself for decision; yet upon this one factor must directly depend the important matter of the sum total of the estimate of cost. The earth work in its various forms constitutes by far the largest part of the subject to be considered, and there is no certain basis known to the Commission upon which to fix unit prices to represent the cost of the different characters of the work of this class. From statements made by persons whose experience in this kind of work gives value to their expressions, the Commission is led to believe that, under proper management, a large part of the excavation and levee building can be done at as low a cost as three or four cents a cubic yard through the agency of large dredges.*

(2) The current contract prices that have come to the attention of the Commission generally very much exceed these figures, and it is believed that a great advantage might be realized in the saving of cost by the installment of a large dredging plant by the State authorities, to be operated under the direction of the officials who are to administer the work of improvement, sufficient to do a considerable part, if not the whole, of the dredging. Such an installment, if only applied in part, would act as a salutary restraint on the prices bid by contractors.

(3) The large masses of excavation to be made in the cut-offs must necessitate the conveyance of the material to considerable distances, placing the bulk of it outside the reach of the ordinary clamshell dredge. It is believed that hydraulic dredges, or other modern machinery, can be utilized for this class of work, and that it can be so handled at a price not far from 15 cents per cubic yard, or possibly less. The large quantity of work to be done will serve as a stimulus to contractors to devise the least costly methods of operating and will justify the installation of expensive plants.

(4) A considerable part of the levee work must also be done by teams and scrapers on ground that is inaccessible to dredges and not sufficient

*The term "dredge" is in general use in the United States east of the Rocky Mountains and is accepted by the engineering profession; that term is therefore used in this report instead of "dredger," which is in use in California.

in bulk to justify the application of other means. This character of work, it is believed, ought not to exceed an average cost of $12\frac{1}{2}$ cents per cubic yard.

The foregoing considerations have led to the adoption of the prices for earthwork as tabulated below.

(5), *Right of Way*.—The item of right of way will prove a costly feature of the work. In endeavoring to arrive at a unit value per acre to represent the cost of this item, consideration was given to the great diversity of land values that obtains in different parts of the valley, ranging from low to very high valuations in different localities; also to the costly improvements that must be invaded in places. After due consideration an average price per acre of \$125 was adopted.

(6) In this connection it may be stated that along that part of the Sacramento river extending from Stony creek to Colusa it will be necessary, as before noted, to clear the timber from a space along the river banks in order to afford a wider unobstructed waterway for the passage of the floods. It is estimated that 3,200 acres of wood and brush land must be so cleared and the right to exercise such measure of control over this land must be acquired. As the use of the land in this class for cultivation or pasturage will not be impaired nor interfered with, it is believed that an average price not exceeding about \$25 per acre will cover the cost of this item.

(7) Owing to the uncertainty as to unit prices and the probability that many small items have been overlooked in the general estimate, the item of "Administration and contingencies" is taken at 15 per cent instead of the more usual 10 per cent.

TABLE OF ESTIMATES.

(8) *Levees*.—

Sacramento river and tributaries:		
Collinsville to foot of Grand island	1,773,000 cu. yds.	
Foot of Grand island to head of Grand island—		
Via Steamboat slough.....	2,130,000 cu. yds.	
Via Old river.....	1,422,000 cu. yds.	
Head of Grand island to American river	6,081,000 cu. yds.	
American river to Feather river.....	2,961,000 cu. yds.	
Feather river to Colusa:		
Along existing channels.....	13,305,000 cu. yds.	
	<hr/>	
	27,672,000 cu. yds., at 10c.....	\$2,767,200
Feather river to Colusa:		
Along cut-offs.....	9,300,000 cu. yds., at 15c.....	1,395,000
Colusa to Stony and Chico creeks.....	12,450,000 cu. yds., at $12\frac{1}{2}$ c.....	1,556,250
		<hr/>
Total		\$5,718,450
Feather river and tributaries	11,720,000 cu. yds., at 10c.....	1,172,000
American river.....	532,000 cu. yds., at 10c.....	53,200
		<hr/>
		\$6,943,650
Less 1,000,000 cu. yds. (Part VI, Par. 46), at an average price of 11 cents.....		110,000
		<hr/>
		\$6,833,650

(9) *Cost of Channel Development.*—

	To be Re- moved from Channel.	Already Allowed for in Levee Estimate.	Remainder to be Esti- mated for.	Price.	Cost.
Collinsville to foot of Grand island	<i>cu. yds.</i> 19,117,000	<i>cu. yds.</i> 1,773,000	<i>cu. yds.</i> 17,344,000	7 cents	\$1,214,080
Foot of Grand island to head of Grand island	19,450,000	2,130,000	17,320,000	8 cents	1,385,600
Head of Grand island to American river	33,600,000	*3,000,000	30,000,000	8 cents	2,400,000
American river to Feather river	10,000,000	*2,000,000	8,000,000	8 cents	640,000
Feather river to Colusa—existing channels	15,900,000	*10,000,000	5,900,000	10 cents	590,000
Feather river to Colusa—along cut-offs	9,567,000	9,300,000	267,000	15 cents	40,050
Bank revetment, 250,000 lineal feet, at \$4					1,000,000
					\$7,269,730

* Arbitrary proportions of the total levee volumes on these reaches have been taken because it is not probable that all the levees can be built from the channel excavation. The proportions assumed are based upon existing conditions on the reaches in question.

(10) *West-Side Canal.*—

Yolo canal	15,840,000 cu. yds., at 7c.	\$1,108,800
Cache slough	1,716,000 cu. yds., at 7c.	120,120
Putah creek	940,000 cu. yds., at 8c.	75,200
Willow creek	412,000 cu. yds., at 8c.	32,960
Cache creek	436,000 cu. yds., at 8c.	34,880
Gray's Bend cut	2,646,000 cu. yds., at 15c.	396,900
Knight's Landing cut	4,285,000 cu. yds., at 15c.	642,750
Colusa basin	5,800,000 cu. yds., at 8c.	464,000
Wallace's crossing to opposite Calden's	2,464,000 cu. yds., at 8c.	197,120
Calden's to Willow creek	1,030,000 cu. yds., at 8c.	82,400
		\$3,155,130

(11) The following work included in above estimates will not be required until the final stage of the development:

Raising of west-side embankment on an average of about 5 feet from a first height of 12 to 13 feet; say 8 cubic yards per running foot for 25 miles: 1,056,000 cubic yards, at 7 cents	\$73,920
East-side embankment, Yolo basin, 7,970,000 cubic yards, at 7 cents	557,800
West-side embankment, Colusa canal, 2,900,000 cubic yards, at 8 cents	232,000
West-side embankment, Wallace's crossing to opposite Calden's landing	98,560
	\$962,280

(12) *Drainage of the Basins.*—

Butte basin canal	400,000 cu. yds., at 8c.	\$32,000
Sutter basin canal	2,148,000 cu. yds., at 8c.	171,840
American basin canal	590,000 cu. yds., at 8c.	47,200
		\$251,040
Pumping plants, 700,000 gallons per minute		420,000
		\$671,040

(13) *Easement Weirs.*—

Main structures	\$500,000
Timber spillway (Fremont weir).....	12,000
Levees from weirs to west-side canal, 2,234,000 cu. yds., at 8c.....	223,400
	<hr/>
	\$735,400

(14) *Intercepting Canals* (Butte, Auburn ravine, Pleasant Grove creeks).—

Excavation, 2,880,000 cu. yds., at 8c.....	\$230,400
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(15) *Bridges.*—

New bridges and old bridges changed.....	\$500,000
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(16) *Land Damages.*

Acreage required, 10,000 acres, at \$125.....	\$1,250,000
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(17) *Telephone Lines.*

Copper wire, 56,000 lbs., at 16c.....	\$8,960
Poles, 8,000, at \$1.50.....	12,000
Telephones, 41, at \$12.....	492
Erection of line, 200 miles, at \$40 per mile.....	8,000
	<hr/>
	\$29,452

(18) *Summary.*—

Levee construction.....	\$6,833,650
Channel development.....	7,269,730
West-side canal.....	3,155,130
Drainage of basins.....	671,040
Easement weirs.....	735,400
Intercepting canals.....	230,400
Bridges.....	500,000
Land damages.....	1,250,000
Telephone line.....	29,452
	<hr/>
	\$20,674,802
Add, for administration and contingencies, 15 per cent.....	3,101,220
	<hr/>
	\$23,776,022

XII.

THE SAN JOAQUIN AND ITS TRIBUTARIES.

(1) It appears to be an obvious fact that the Sacramento river and its tributaries constitute the great problem that the Commission was expected to deal with, and that the San Joaquin river with its tributaries occupies a position that is quite subordinate to the other group. The literature that was placed in the hands of the Commission as a basis for its investigations conveys but meager information respecting the San Joaquin valley, the references being of a general nature only.

(2) As a result of such attention as the Commission has been able to bestow upon this part of its field of inquiry the impression is made that the San Joaquin problem is one involving navigation interests

rather than land reclamation, the latter being of limited extent and therefore of secondary importance.

Furthermore, it may be said that the plans recommended for controlling the Sacramento floods, when finally consummated, must result in greatly mitigating the difficulties that have been encountered in the efforts to protect from overflow the lands adjacent to the lower San Joaquin, the Mokelumne, and Cosumnes rivers.

So far as this inquiry is concerned, however, it must be sufficient to say that the time at the disposal of the Commission was much too short for the exhaustive investigation demanded by the larger problem, that of the Sacramento valley.

The San Joaquin group of rivers, with their involvements of navigation and reclamation interests, must therefore be made the subject of special study at a future time, the task to be placed in such hands as may be selected for it.

XIII.

SUISUN BAY.

(1) The letter of the Commissioner of Public Works under which the Commission was organized does not call for any recommendation as to the flow of the Sacramento and the San Joaquin rivers after their entrance into Suisun bay; and the recommendation of any system of training works for either river within the limits of the bay seems of doubtful advisability with the limited information at present at the disposal of the Commission.

(2) The problem of what ought to be done in the bay is a large one in itself, and should be considered on the broad basis of the probable future fate of the entire bay as a result of the deposition of sediment. It seems inevitable that the bay must, in the not remote future, become entirely filled up. Human agencies in recent years have greatly accelerated this natural process and there is no conceivable method by which it can be successfully prevented. The popular view of such a result, as in the nature of a calamity, is an erroneous one, for the conversion of this extensive area into productive agricultural land will be worth far more to the State than it can ever be in its present condition. This ultimate development should be kept in view and it should be accepted as probable that the mouths of the Sacramento and San Joaquin rivers, either separately or conjointly, will eventually be transferred westward to the Carquinez straits.

(3) The following consideration would seem to be important: If the Sacramento and San Joaquin rivers are to be absolutely divorced above their confluence by cutting off Georgiana and Three-mile sloughs,

the character of the two streams will be even more distinct from each other than at present. The Sacramento, for a considerable distance above its mouth, will be a tidal stream in which, however, the current of the river will predominate over tidal influence during high and medium stages, and during low stages except near its mouth. Its channel capacity will be mainly dependent upon its own discharge. There will be a pronounced hydraulic gradient at high and medium stages all the way to the mouth and a perceptible gradient at low stages even near the mouth.

(4) The San Joaquin, on the other hand, will remain essentially a tidal estuary as far up as Stockton, in which tidal influence will strongly predominate over river current. The channel will be maintained, as at present, largely by tidal scour. The flood flow of the river is probably not a third as great as that of the Sacramento, while the channel cross-section, and particularly the width, are so much greater that there is practically no hydraulic gradient at low water and only a very slight one at high water. Tidal action is therefore effective at all stages.

(5) The union of two streams of such different characteristics will probably work to the disadvantage of the San Joaquin, for reasons stated in detail elsewhere (see Part III, Pars. 21-27); and it may therefore be desirable, in the progressive silting up of Suisun bay, to keep their channels apart as far down the bay as possible. For this reason, before recommending any works to control the ultimate course of either river within the present limits of Suisun bay, the situation ought to be considered in its entirety. The rate of deposition of sediment, the probable rate of emergence of land area, and the progression of the mouths of the rivers beyond their present positions should be determined as fully as possible. In that way the most desirable ultimate confluence of the two streams can be better determined and training works be planned accordingly.

This, however, is a matter that falls strictly under that department of the Federal Government having in charge the navigable waterways of the country.

(6) The Commission having stated the case as above, declines at present to propose any works within the limits of the bay, but advises that the whole question be taken up at an early date by the proper authorities.

XIV.

CONCLUSION.

(1) As has been intimated elsewhere in this report, it is a matter greatly deplored by the Commission that, under the limitation of time imposed upon it by the circumstances attending this investigation, and from the imperfectness of the information at its command as a consequence of this limitation of time, so important and interesting a problem as this, one which has engaged the attention of a number of eminent engineers during the past quarter of a century and to the study of which the Commission has earnestly devoted itself for several months past, must now be dismissed, the labors of the Commission closed, and the results of those labors handed over to you in a report that is more honest of purpose than satisfactory to the Commission itself. With sufficient time to master all the intricacies of the very complicated task that was committed to its hands, and to familiarize itself with all the details of the varied physical phenomena that enter into the problem, the Commission feels that it might have acquitted itself with greater credit and with more justness to the interests here involved—interests which are of great magnitude and of vital importance. But notwithstanding a certain measure of crudeness which has necessarily characterized its disposition of the many and varied questions that have presented themselves for treatment, as a consequence of unavoidable haste in its proceedings, the Commission is firmly of the opinion that the general plan recommended embodies the true solution of this difficult problem.

(2) The methods of procedure that have been detailed in this report may savor of the heroic in character and bear a semblance of extravagance in the magnitudes involved. But the Commission is constrained to believe that nothing of less magnitude than the measures proposed, and no other general plan than has been advanced, can be relied upon to bring about a permanent correction of the onerous evils under which the Sacramento valley has so long labored. The direct benefits to the entire valley to be realized as a result of the perfecting of the plan of improvement in the reclamation of about 1,000,000 acres of extremely fertile land, and placing it in a position of assured safety from overflow, together with direct and indirect advantages to many associated interests, must be expressed in a moneyed valuation reaching at least a hundred millions of dollars, which will assuredly justify the cost of the work required to bring about these results. It should, moreover, be considered that, while the estimated cost of all the work, if suddenly imposed on the country, would prove a burden too heavy to be borne, yet, when distributed, as it can and ought to be, over a series of years,

the load, while endurable at the beginning, will continually grow lighter as the improvement progresses.

(3) The Commission has been exceedingly fortunate in having for reference the valuable maps containing the results of the Hall surveys, which are very complete and cover the whole territory embraced in this investigation. These maps may well serve as a basis for any future study of the Sacramento valley, requiring only to be supplemented by local detailed observations to bring up to date such features as may have undergone change since the original surveys were made.

(4) The particular locations of the various structures provided for in this report, the assignment of magnitudes and the estimate of quantities are based upon data of too general a character and of a time too remote to give assured value to the detailed results obtained. These must undergo revision based upon detailed surveys on the ground before the work is begun in each case. These surveys and exact relocations can be carried forward as the work progresses and need not be a cause of delay in its general conduct.

(5) The Commission has exercised care not to minimize estimates nor to understate magnitudes or difficulties in any features of the plan of work, and it is believed that these will be found not to exceed the statements here made.

(6) In this connection it may be well to note that, as regards a large part of the work contemplated to be done, the efforts of man must go hand in hand with those of nature, and both the time over which this joint action is to extend and the proportionate part that each of these agencies is to perform, are matters to be determined in the course of future developments. As before intimated, the aggregate amount of all the estimates representing the assumed total cost of the work is directly dependent upon the unit prices adopted for the estimates. If these are too low the sum total will be proportionately increased. If too high, the amount will be similarly decreased. Those who are interested in this report are capable of forming their own conclusions in relation to this question.

Respectfully submitted.

T. G. DABNEY,

Chairman.

HENRY B. RICHARDSON.

M. A. NURSE.

H. M. CHITTENDEN,

Secretary.

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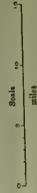
MAP
OF THE
SACRAMENTO VALLEY
FROM

CHICO LANDING TO SUISUN BAY
showing PLAN OF IMPROVEMENT proposed by
COMMISSION OF ENGINEERS OF 1904

for the solution of the

FLOOD PROBLEM IN THIS VALLEY

To accompany Commissioner's Report of
December 15 1904



MAP REFERENCES

- Contour lines — Elevations refer to mean low tide at low water in Suisun Bay.
 Level lines — Channel lines — Areas subject to temporary overflow during development of work — Margin of the flood plain —
- A Butte Creek Interlocking Canal.
 - B Table Mountain Creek Interlocking Canal.
 - C Colton's Landing Easement Weir.
 - D Eganston Slough Easement Weir.
 - E Ashum Basin Creek Interlocking Canal.
 - F American Basin Drainage Canal.
 - G Grays' Canal Interlocking Canal.
 - H Grays' Canal Easement: See Report, Part VIII, paragraph 10.
 - I Promont Easement Weir.
 - J Cache Creek Canal.
 - K Willow Slough Canal.
 - L Pitkin Creek Canal.
 - M Pitkin's Brook Easement Weir.
 - N Montezuma Pass.
 - O Cut-off along "Pitkin" — mks slough into the San Joaquin, as suggested by various parties.
 - P Pumping Plants.
 - Q Cut-off through Buchanan Island into the San Joaquin, as suggested by various parties.
 - R Horsehide Bend cut-off, as suggested by various parties.
 - S Butte and Sutter Basins Drainage Canal.





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1891

1891

REPORT

OF THE

DEBRIS COMMISSIONER

FROM

December 1, 1902, to November 1, 1904.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
1905.

REPORT OF THE DEBRIS COMMISSIONER.

NEVADA CITY, CAL., November 15, 1904.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California:

SIR: I have the honor to herewith report the operations of my office from December 1, 1902, to November 1, 1904.

BARRIER No. 1.

At the date of my last report, the California Débris Commission had entered into a contract with the Atlantic, Gulf, and Pacific Company to construct a barrier, known as Barrier No. 1. It consisted of a series of rows of sheet piles, an earth embankment, and a rock spur, the whole being described in my last report. A cross-section of this barrier, which was to be 2 feet high, is shown herewith.

The contractors began work on November 13, 1902, and completed the earth embankment with its brush protection, and had nearly completed the rock spur. At the same time, they endeavored to drive the Wakefield sheet piles, which consisted of three planks 3 by 10 inches, 16 feet long, spiked together so as to form a tongue-and-groove pile. After experimenting for three weeks, they abandoned the operation, having found it impossible to drive the piles into the cobble and gravel with satisfactory penetration.

On January 27, 1903, there came a storm which carried away the track upon which they conveyed the stone to the rock spur from the quarry; and the California Débris Commission then suspended all operations.

After the storm had subsided, the Commission undertook, at their own expense, a series of experiments driving the piles; but they could not get either the proper penetration or alignment. The piles would either broom up, break, or if driven full down, it was uncertain that they did not break under ground, so the operation was abandoned.

In July, 1903, a supplementary contract with the Atlantic, Gulf, and Pacific Company was approved by the State Board of Examiners, after having been approved by the War Department. By this agreement, the contractors were paid for the work they had done and for the lumber for piles they had on the ground. The pay sheet was as follows:

944 linear feet of Wakefield sheet piles, at 23 cents.....	\$217 12
9 Wakefield sheet piles driven, at 85 cents.....	7 65
0.93 tons stone over 500 lbs., at \$3.....	2 79
626 tons stone less than 500 lbs., at \$2.50.....	156 50
7,101 cubic yards of earth fill, at 30 cents.....	2,130 30
757 cubic yards of gravel, at 20 cents.....	151 40
1,815 cubic yards of loose brush, at 60 cents.....	1,089 00
100.9 cubic yards of poles, at \$1.....	100 90
113,230 feet (board measure) of lumber, at \$22 per M.....	2,491 06
Total.....	\$6,346 72

BARRIERS NOS. 1 AND 2.

On July 24, 1903, the State Board of Examiners approved another set of plans and specifications for barriers at the sites of Barriers Nos. 1 and 2. These plans were of a different type from the original plans or the preceding ones, under which the Atlantic, Gulf, and Pacific Company operated.

The barriers were to be built of fascines made into the form of a mattress with a series of pockets, which were filled with stone. The whole was to be 5 feet high. Barrier No. 1 was to be 950 feet long, and Barrier No. 2, 750 feet long. They were described as follows in the specifications, and illustrated by the accompanying cut:

General Description.—A brush mattress, loaded with stone, with a brush curtain, is to extend across the bed of the Yuba River at the site of each barrier.

The length of the mattress and curtain, measured up and down stream, is 52 feet, the height of the part to be loaded with stone is 5 feet, except as hereafter modified.

The lower part, or curtain, is 16 feet long, the upper part, which forms pockets to be loaded with stone, is 36 feet long.

The entire mattress is made of brush fascines, one foot in diameter after compression—the stone to be heavy and durable, not liable to disintegrate, and no single stone must be used whose least dimension is less than one foot.

It is probable that stone, and perhaps brush, in sufficient quantity, for which no charge will be made, can be found near the sites on land owned or controlled by the United States, but the United States does not guarantee this nor assume any responsibility for providing such materials.

Bidders should visit the sites and determine the quantities and circumstances for themselves.

Construction of Fascines.—Fascines are to be made of brush and poles—none larger than two inches diameter at the butt. Live straight brush of suitable quality must be used, willow preferred.

The fascines are to be strongly compressed and securely fastened with two turns of No. 13 black annealed wire, tightly twisted together, and the ends then bent into the brush. The fastenings are to be 3 feet apart, except in the curtain, where they will be 2 feet apart.

Construction of Mattress where the River-bed is Approximately Level.—See picture of model of mattress. The lower layers will consist of fascines each 52 feet long, laid up and down stream, 2 feet apart, center to center. Between them, at the lower end forming the curtain, are fascines 23 feet long.

The fascines forming the curtain will be fastened to each other with four wire ropes (old street-car cables, or their equivalent, will answer). These wire ropes will be 5 feet apart, the lower rope being one foot from the lower end of the curtain. These ropes will pass over and under the upper and lower part of the curtain, and will be fastened to each other between each fascine with one turn of No. 13 black annealed wire, the ends of the wire twisted together and bent down between each fascine.

The second layer consists of nine rows of fascines laid at right angles to the first, as follows: One foot below the upstream end there are two rows of fascines in contact with each other; the next row is 3 feet from these rows; the other rows are 5 feet apart, center to center.

The third layer consists of fascines 40 feet long, placed parallel to the bottom layer, and six feet apart, center to center. The lower ends of this layer are secured to the first layer.

The fourth layer is the same as the second.

The fifth layer consists of fascines each 40 feet long, laid 2 feet apart, center to center, and parallel to the bottom layer.

Loading with stone must proceed simultaneously with the construction of the mattress, and before the fifth, or top, layer is placed the pockets must be entirely filled.

The lower ends of this layer are bent down and fastened with No. 13 black annealed wire as securely as possible to the first and third layers.

Wherever fascines cross each other, each layer, at the crossing, must be securely fastened to the one below it with two turns of No. 13 black annealed wire, the ends of the wire twisted together and bent into the fascines.

The California Débris Commission advertised for bids for their construction, which were opened on August 5, 1903. The lowest bidder was Samuel Montgomery of Woodland, his bid being 7 cents per linear foot for fascines, and \$2.35 per ton for rock for Barrier No. 2.

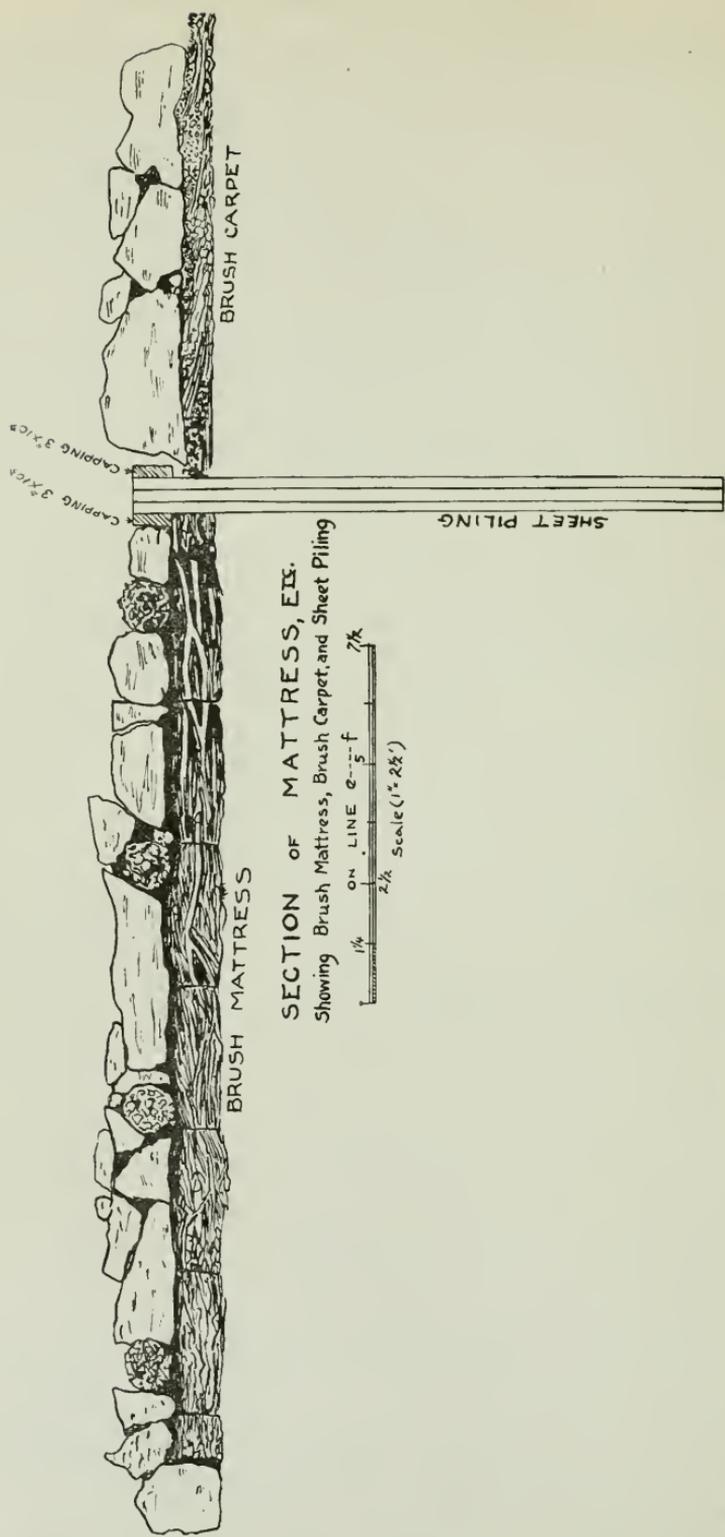
Mr. Montgomery began work in August, 1903. On November 2, 1903, he had Barrier No. 2 completed and the fascines of Barrier No. 1 completed about one third across the river, when a storm caused a suspension of operations. When Barrier No. 2 was completed, it was found to average about 3 feet high, the fascines having settled by drying and loading with rock.

On November 12th work was suspended on account of a storm, which lasted more or less continuously for three days. During this storm, the fascine work of Barrier No. 1 was carried away. During the night of November 14, 1902, Barrier No. 2 was breached in two places, the water having flowed over it for fully twenty-four hours, and was estimated to have been 2 feet deep.

On November 17th, I visited the barrier when the flood had subsided and found it breached near the north end at the shore, and at the south end about 170 feet from the shore, being respectively 160 and 120 feet long; the flood had filled the barrier with débris before breaking, and had undercut the apron below the barrier, forming a deep pool. The flood twisted and broke the fascines, and piled them up on the edges of the breaks like so much kindling wood, and carried the cables to which the apron was fastened several miles down the stream.

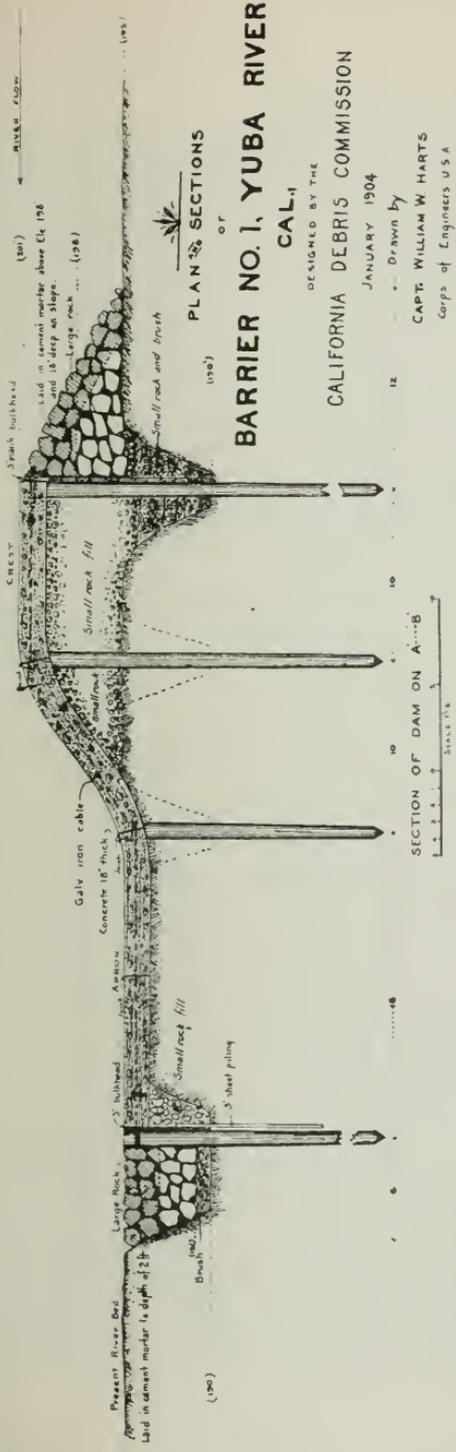
The storm that wrecked the barrier was of a very moderate nature in the mountains; the ground was dry and there had fallen previously but little rain—at Nevada City, according to the United States Weather Bureau, only 6.52 inches of rain had fallen, and at Marysville, only 2.40 inches. The flood was as nothing compared to those which occur when the higher elevations are covered with snow.

On November 19th and 20th, a second storm came, which it was my



SECTION OF MATTRESS, ETC.
 Showing Brush Mattress, Brush Carpet, and Sheet Piling

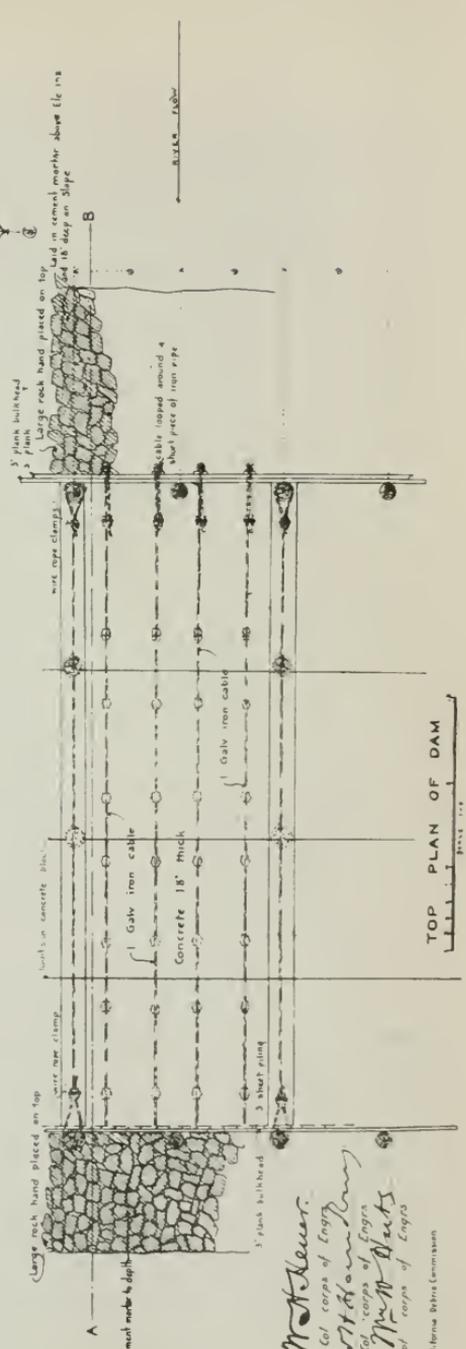




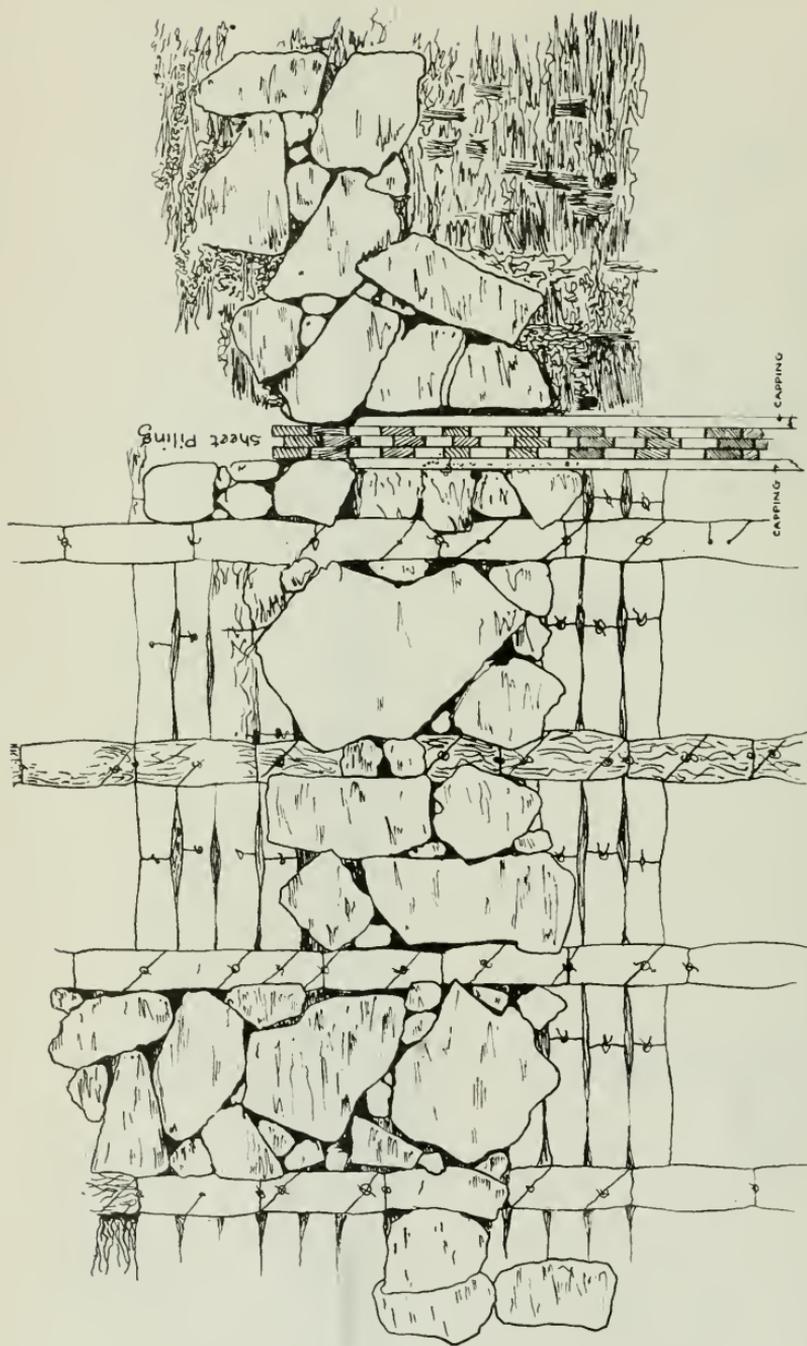
BARRIER NO. 1, YUBA RIVER

DESIGNED BY THE
CALIFORNIA DEBRIS COMMISSION

JANUARY 1904
DRAWN BY
CAPT. WILLIAM W. HARTS
Corps of Engineers U.S.A.



Approved,
W. H. Keiser
 Lt. Col. Corps of Eng'rs
Thos. H. Brown
 Lt. Col. Corps of Eng'rs
Wm. W. Harts
 Capt. Corps of Eng'rs
 California Debris Commission



PLAN SHOWING CONSTRUCTION OF MATTRESS
SHEET PILING AND BRUSH CARPET.

CURTAIN

POCKETS TO BE FILLED WITH STONE

.PLAN

WIRE CABLE
WIRE CABLE
WIRE CABLE
WIRE CABLE

CURTAIN

POCKETS TO BE FILLED WITH STONE

SCALE

5
3
2
1
0

10

20



fortune to witness. I noted that this storm still further widened the breaches, and wrecked the barrier. During this summer, only the approaches at the ends, and a small relic near the center of the dam, are to be seen.

On January 30, 1904, the State Board of Examiners approved a supplementary agreement with Samuel Montgomery, after having been approved by the War Department, by which he was paid for Barrier No. 2 as follows:--

60,906 linear feet of brush fascines, at 7 cents.....	\$4,263 42
2,503.12 tons of rock in place, at \$2.35.....	5,882 33
Total.....	<u>\$10,145 75</u>

Mr. Montgomery was also allowed \$2,000 for 285 cords of loose brush, and 500 tons of rock for stock he had on hand.

DAGUERRE POINT EMBANKMENT.

During June, 1904, the State Board of Examiners approved a change in the original plans, by which an arrangement was entered into with W. P. Hammon and associates, looking to their conveying rights to impound material upon certain lands upon the bed of the Yuba River that were not included in the original estimate; these parties being allowed to dredge other areas for the gold therein contained. They also agreed to build an embankment under the direction of the Government, from Daguerre Point easterly to near Hallet's Point, and thence southerly to the south bank of the Yuba.

By this arrangement, the Government and State gained impounding area it would have been impossible under the conditions and law to have otherwise obtained; also much elaborate work, comprised in the settling basin and Daguerre Point barrier, became unnecessary.

The embankment is to be built by the dredging process, and will be composed of gravel and bowlders, and will be used to divert the flood waters into the Daguerre Point cut. It is to be at least 100 feet wide on the bottom, and to be 5 feet above high water. The contract calls for the work to be completed by July 1, 1906.

DAGUERRE POINT CUT.

On July 24, 1903, the California Débris Commission submitted plans and specifications for the enlargement and construction of Daguerre Point cut. The original plans contemplated the cut to be 400 feet wide, part of the floods passing over the Daguerre barrier on the south. By these plans the cut was to be 600 feet wide, its entrance being made 870 feet wide, about 1,000 feet long, and an average depth of 25 feet. The purpose of the cut and project is to collect the waters so that with the assistance of training works they will be able to scour a channel westward to Marysville.

The specifications call for the excavation of 667,000 cubic yards of earth and 2,000 cubic yards of rock.

After advertising, the California Débris Commission opened bids on August 15, 1903. The lowest bidder was Edward Malley of San Francisco, whose bid was 23½ cents per cubic yard for earth work and 90 cents per cubic yard for rock, amounting to \$158,545.

Under this contract, work was begun December 12, 1903, by Palmer & McBryde, who have equipped themselves with an admirable outfit for such work, having a 65-ton steam shovel and two trains of ten cars each, with locomotives. The work has been prosecuted diligently.

Up to November 1, 1904, they had moved 341,000 cubic yards of earth and 300 cubic yards of rock. They have earned \$80,405, ten per cent being retained until completion of the contract.

RAISING EMBANKMENT.

On October 9, 1903, the California Débris Commission, after due advertising, opened bids for raising the earth fill constructed by the Atlantic, Gulf, and Pacific Company. The lowest bidder was Lewis Moreing of Stockton. The State Board of Examiners approved the same on October 21, 1903. Under this contract, Mr. Lewis Moreing was paid as follows:

9,780 cubic yards of earth, at 32½ cents.....	\$3,178 50
100 cubic yards of gravel, at 30 cents.....	30 00
	<hr/>
	\$3,208 50
Less overtime, services of inspector.....	33 20
	<hr/>
Total.....	\$3,175 30

In addition to the contract of Mr. Moreing, the California Débris Commission did considerable work by hired labor—building brush mattresses, loading them with cobblestone, and making a gravel embankment at Barrier No. 1.

During the winter of 1903-04 there was more rain than usual. During February of this year, after a very severe fall of rain, the Yuba River rose higher than had been known for many years, and carried away the work of the Atlantic, Gulf, and Pacific Company that had withstood the floods of the preceding year fairly well, together with that of Lewis Moreing, except about 25 feet immediately at the north bank.

BARRIER No. 1.

On April 1, 1904, the State Board of Examiners approved plans and specifications for a concrete and pile dam at the site of Barrier No. 1, after it had been approved by the War Department. The work is to consist and is thus described in the specifications, and illustrated by plans as shown by the accompanying cuts:

Work.—The work is, briefly, the construction of a dam, or barrier, built of piles, lumber, brush, rock, and concrete, about 6 feet high above the present river-bed, extend-

ing across the Yuba River from the south shore to connect with the old embankment on the north shore, in the manner prescribed. The dam is to be in total crest length about 1,200 feet. The dam is to have a flat crest 10 feet wide, a sloping downstream face about 10 feet wide, and a level apron about 20 feet wide, all faced with concrete about 18 inches thick. It will also have a sloping upstream face covered with heavy rock laid in mortar. It is to be held together with timber, wire cables, and piles.

For this construction the contractor is required to furnish all labor, plant, and materials necessary to its completion within the specified time.

This dam will consist of:

(1st) Four parallel rows of piles extending across the river-bed, the upstream or first row to be located by the engineer officer in charge, the second row to be 10 feet between centers of piles downstream from the first row, the third row 10 feet between pile centers from the second row, and the fourth row 18 feet between centers of the piles from the third row. In the first and fourth rows the piles are to be 6 feet between centers, and in the second and third rows 12 feet between centers. They will all have at least 20 feet penetration, and more if practicable and necessary, and will be driven in trenches excavated for 4 or 5 feet deep to the underground water-level if found necessary to secure the desired penetration. The first and fourth rows of piles are to be driven in such trenches in any case, to allow bulkheads of 3-inch lumber in horizontal rows to be constructed entirely across the river, from the bottom of the trench to the top of the dam. These latter mentioned trenches are to be afterwards filled with brush and rock as shown in the drawing, and with sand and gravel sluiced in. In addition to the bulkhead in the lower trench, sheet piling of 3-inch lumber will be driven as deep below the bottom as may be required and the conditions will allow.

Piles will be held together in the direction of the river flow by 1-inch wire cables properly fastened.

(2d) The space between the first and third rows of piles is to be filled with rock and cobbles having gravel and sand sluiced in the interstices, for the main body of the dam, and between the third and fourth rows the river bottom is to be graded down for the apron, so that the apron will be approximately flush with the river bottom at the locality when finished.

(3d) A layer of concrete 18 inches thick is to be placed over all the dam, properly divided by planes of weakness into blocks about 10 feet by 12 feet. One-inch cables of wire, running up and down stream, will be built in these blocks about 3 feet apart, holding together all the blocks of a tier parallel to the stream. Blocks are to be so molded that they are not supported by the pile work, but will follow down any considerable scour.

(4th) A heavy rock backing with a sloping upstream face will be placed against the upstream face of the dam. Gravel will be sluiced in to make the backing compact, and the dam then covered with heavy rock from the dam's crest to the original river-bed, placed by hand and well chinked.

In the upper 3 feet measured vertically and for a normal depth of 18 inches on the sloping face, the rock shall be laid in Portland cement mortar, mixed in the proportion of one part cement to three parts sand by volume.

(5th) A brush mattress one foot thick, made of fascines one foot in diameter, interwoven with one fourth inch galvanized wire strand every 4 feet, will be placed in the channelway or channelways where there is flow of water. It is to be weighted down with sufficient rock to sink it to place and hold it there. The channelway or channelways are to be later filled with rock and cobbles until the surfaces are brought to a point where the concrete top of the dam and the apron may be laid on this rock fill and be continuous, as before described. The mattress will extend as far up stream and down stream beyond the limits of the dam as the engineer officer in charge may require.

(6th) Connection of the dam with the old embankment on the north bank, and with the south shore.

After advertising for bids, which were opened on April 4, 1904, a contract was entered into with Lewis Moreing, the lowest bidder, for \$47,132.

In addition to this work, the Commission had extra work done by the contractor in securing the south end to the bedrock of the shore, and building a large bulkhead at the north end to protect an earth fill to be made in a portion of the river-bed where the river was turned while constructing the main dam.

The work under this contract cost as follows:

Excavation, 6,473 cubic yards, at 30 cents.....	\$1,941 90
Lumber, 61,655 M, at \$40.....	2,466 20
Loose brush, 95 cubic yards.....	332 50
Large rock, 1,808.93 tons, at \$2.....	3,617 86
Small rock, 4,251 tons, at \$1.....	4,251 00
Large rock in cement mortar, \$7.....	11,631 90
Cable, 30,300 feet at \$18.....	5,454 00
Concrete, 3,754.2 cubic yards, at \$7.50.....	28,156 50
	\$57,851 86
Deduct materials furnished by State and United States:	
Lumber, 82.73 M feet (B. M.), at \$22.....	\$1,820 06
Loose brush, 90 cords, at \$3.....	285 00
Large rock, 40 tons, at \$1.....	40 00
Small rock, 125 tons, at 50 cents.....	62 50
	2,207 56
	\$55,644 30
Add following, being for repairs, occasioned by high water:	
Fill, 473 cubic yards, at 25 cents.....	\$118 25
Large rock, 401.88 tons, at \$3.....	1,205 64
Lumber, 8,250 feet (B. M.), at \$22.....	181 50
Spikes, 250 lbs., at 4 cents.....	10 00
Services of laborers, 164½ days, at \$2.....	328 25
Services of laborers, 14½ days, at \$2.20.....	31 35
	1,874 99
	\$57,519 29
Deduct materials furnished by State and United States:	
Large rock, 195 cubic yards, at \$1.45.....	\$282 75
Cement, 32 sacks, at 75 cents.....	24 00
Cement sacks, 160, at 5 cents.....	8 00
	314 75
Total costs, \$1,560.24.	\$57,204 54

In February, the California Débris Commission bought in open market a pile-driving outfit and began work of experimenting upon driving piles, called for in the above work. In this they were successful and continued the operation until all the piles called for in the Moreing contract just mentioned were driven, amounting to about 600 in all. This work cost:

Pile-driving outfit.....	\$1,695 04
Piles, 32,113 linear feet.....	7,270 60
Supplies.....	1,753 22
Labor.....	4,482 26
Hauling piles.....	2,196 20
Hauling supplies, and incidental expenses.....	775 84
Total.....	\$18,173 16

On October 13, 1904, the State Board of Examiners approved an

emergency contract entered into with Lewis Moreing on October 3, 1904. The work consisted of a fill between the abutment at the north end of the concrete dam and the north shore, a distance of 150 feet. This gap was left to turn the water into while building the section of the dam in the waterway. The embankment is to be 20 feet high, 30 feet wide on top, with an upstream slope of $2\frac{1}{2}$ to 1, and a downstream slope of $1\frac{1}{2}$ to 1, with a berm 10 feet wide. The contract calls for 8,000 cubic yards of earth at \$1 per cubic yard, and 300 yards of riprap at \$1 per square yard.

CLOSING SLOUGHS.

On November 9, 1904, the State Board of Examiners approved an emergency contract with Lewis Moreing, dated October 18, 1904, for closing two sloughs about 600 and 900 feet long respectively, about one mile west of Daguerre Point, to prevent the water at flood time from flowing along the Brown's Valley grade levee. They were to be approximately 7 feet high, with a crown of 10 feet wide, with an upstream slope of 1 vertical to 3 horizontal, and a downstream slope of 1 vertical to 2 horizontal; the ends of each embankment to be protected with brush. This work cost:

1,166 cubic yards of gravel, at 35 cents	\$4,081 00
245 square yards of brush protection	85 75
Planting willows and cottonwoods along embankments.....	12 50
Total.....	<u>\$4,179 25</u>

In all of the work mentioned in this report, it is to be understood that one half of the expenses therein incurred was borne by the National Government, and the other half by the State of California.

THE PROBLEM OF DEBRIS.

The purpose of the appropriation for this work was to restrict the continual flow of debris from entering the navigable rivers. It is the great problem affecting the State to-day. Upon it depends the effectiveness of our waterways, the protection of the great fertile valley, and the prosperity and development of the mines. Upon it much study and money have been expended during the past twenty-five years; thus far but little has been accomplished, because the investigators have not given full and equal consideration to all the interests involved.

The Sacramento Valley forms the northern half of the great valley of California, lying between the Coast Range and the Sierra Nevada Mountains. Through it passes the Sacramento River, with a watershed of 26,167 square miles. Of this amount, 4,196 square miles can be counted in the valley proper, with only 38 square miles covering the perennial streams; the remainder being the surrounding mountain regions.

The Sacramento River has numerous branches whose sources reach

the summits of the mountains. Those of the Sierra Nevadas rise to a height of 8,000 feet above sea-level. These branches and their tributaries run, roughly, at right angles to the direction of the Sacramento, and have cut deep cañons into the general western slopes. Each of the mountain streams has numerous tributaries and minor branches with the surface sloping to them with a general inclination of 15° to 45° , that may be compared to the roofs of houses.

The grades of the main streams flowing in the cañons are very steep, varying from 25 to 150 feet per mile. These slopes cause a large proportion of the rainfall to run off instead of sinking into the ground as in the valley. The water flows down these cañons with a frightful velocity and more water is discharged into the navigable channels than they can carry away. It must of necessity overflow the surrounding country, forming one vast reservoir, until such time as the cessation of the storm allows the water to be drained and discharged into the ocean.

RAINFALL AND RUN-OFF.

The rainfall upon the Sacramento River watershed is also very variable. In the valley proper it is only 18 to 20 inches per annum; on the Coast Range, about 30 inches; while upon the Sierra Nevada side it varies up to 75 inches, and often exceeds 100 inches, per annum; here a rainfall of 3 to 4 inches in twenty-four hours may be expected during any general storm, while a fall of $8\frac{1}{2}$ inches in the same time has been known, rivaling the monsoons of India. It is also marked, in that it falls during five months of the year upon soil that is parched and cut into dust by the avocations of man, in contrast with those regions where the rain is distributed throughout the year and where the run-off is less in proportion to precipitation. This precipitation is due to the great cyclones that pass over the coast every winter and exhaust their load of moisture against the high mountains.

It seems strange that the engineers, in studying the hydrography of the Sacramento River, use only the rainfall of the valley as a basis, while the American, Bear, Yuba, and Feather rivers, which have a watershed of 7,870 square miles, or nearly twice that of the Sacramento Valley, and with the heaviest mean precipitation for a great area in the State, pass unnoticed.

The flood run-off has also been misstated. The flood discharge of the lower Sacramento River is estimated at 170,000 cubic feet per second, and the Yuba River is rated at 26,000 cubic feet per second. Yet, on February 23, 1904, the Yuba River was discharging at Barrier No. 1 over 140,000 cubic feet per second, and there have been but few years that it did not discharge 70,000 cubic feet per second for at least twenty-four hours. At the same time the Bear and American rivers are sending their quota for an increasing flood wave. No wonder that the Sacramento Valley is converted into a storage reservoir.

THE PROCESS OF EROSION.

With the aid of this great precipitation the rocks near the surface have been decomposed, often to a depth of several hundred feet, covering the surface with a mantle of soil, which provided the great forest growth for which the Sierra are noted.

It is by this decomposing action of the elements and the eroding of the material by the heavy rains that the great cañons were formed, the excavation of which represents billions of cubic yards of earth that has been sent to the areas below. At times, when the wind beats the rain against the steep slopes, and the water is flowing away nearly as thick as blood, it would seem as if all the forces of nature were bent upon the leveling of the mountains.

Concrete data as to the rate of this erosion are very meager, on account of the time, labor, and difficulties involved in collecting the facts. However, Prof. J. C. Nagle conducted a series of investigations in Texas for the United States Department of Agriculture to determine the probable silting of certain proposed reservoir sites. For the Wichita River, with a watershed of 3,050 square miles (or five sixths that of the Feather River) there was discharged 17,920,907 cubic yards of material in one year.

On the Brazos River, with a watershed of 37,400 square miles, or nearly one half more than the Sacramento River watershed, there passed the gauging station, during twenty-nine months, 167,222,000 cubic yards of material.

These figures are the results of observations made by an able investigator upon rivers flowing in a region with a less rainfall than the Sierra and in a section devoted wholly to agriculture.

Were it not for the fact that much of this material is so finely divided that it requires days to settle in quiet water and is carried out into the ocean and precipitated by the saline salts of the sea-water, the valleys would be filled to a greater depth than now. But, when relatively a small amount of coarse material is gathered from over a large mountainous watershed and is deposited upon the few square miles of the river-bed, through a long term of years, with the increasing demand of river commerce, the problem becomes serious.

This denuding action of the elements is one of the wisest provisions of nature for man. By it, valleys are formed and the rich soil is furnished that makes them the great food-producing centers for the people.

ALLUVIUM AS SOIL-FABRIC.

Ordinarily, the mountains are looked upon as the source simply of mineral wealth, of both the precious and useful metals. But they are more than that, for from them comes the inorganic matter that mingles with the organic growth of the valley swamps and thus makes the fertile soil.

A swamp though deep in organic matter produces only a low order of aquatic plants, while among the mountain fastnesses, where only a scant soil is found among the rocky crags, there also a low order of vegetation is seen.

The mountain ranges with their tilted strata expose thousands of feet of the earth's crust with its varied chemical composition. By the action of the elements this varied mineral wealth is decomposed and sent to the lowlands to produce soils of the more varied mineral composition, so necessary for the growth of the seed plants that enter into the life of man.

This is illustrated by the hop lands along the Bear River and by the rich tracts along the Yuba River, that were, a few years ago, considered a waste and a total loss on account of the deep deposits of alluvium from the mines. The overflow of the Nile is often cited as an illustration of the effects of such deposits in soil-making and of the maintaining of their efficiency through centuries. Hence it will be seen that it is the great accumulation and the proper blending of the inorganic with the organic matter that produce the productive soil.

It will suggest itself that when the great tule swamps of the valley are properly reclaimed, it will be through raising the surface above high water by depositing thereon the alluvium that comes down from the mountains.

CARRYING POWER OF WATER.

Let us consider the law of denudation. It is recognized that the eroding action of water varies as the square of its velocity, while its transporting power varies as the sixth power of the velocity. That is, if the velocity is doubled, its scouring action is increased four times, and the transporting power is increased sixty-four times. While this seems incredible, it is the reason that water moving through a valley with but little velocity and with power to carry only the finest silt, was able to move bowlders of many tons weight, when flowing as a torrent in mountain cañons near its source.

The velocity of the water depends upon the action of gravity, or what is termed the "fall per mile"; the steeper the slopes, the faster it moves. The velocity also depends upon the roughness of its bed, which produces friction that retards its flow, and upon the ratio of the depth to the volume. It is well known that a given volume of water with a deep channel will move with a strong current, but that when spread out to a great width, it becomes slow and sluggish.

Combining these simple and fundamental laws, the heavy rain beating upon the soil of the steep hillsides, washes the products of the decay of the mountains, comprising the fragments of rock, the sand, and the vegetable mold, into the creeks that gather the water, to form, during times of freshet, raging floods that debouch upon the valley.

These freshets, moving with a high velocity, are able to carry to the valley the eroded matter that reaches them. Here the flatter slopes check the velocity, and the transporting power has been reduced. It drops part of its load upon its bed, which increases the slope of the river. This increases the velocity and transporting power in the endeavor to carry the matter to the sea for the building of continents. As the water continues to course down the rivers, the slopes decreasing to less than three inches per mile at the river's mouth, the particles of matter have deposited according to size, leaving only the finest suspensory matter to be carried out into the ocean.

This is illustrated by the Yuba River near the base of the foothills. Originally the slope of the river was about 6 feet per mile; but, owing to the great flow of mining débris, there has been an immense deposit, estimated to vary up to 100 feet in depth, with a present slope of 20 feet per mile.

LAW OF RIVER DEPOSITS.

When the cause of the saturated flow has ceased, the water with the lesser or eroding force picks up the load that was dropped, carrying it onward in its endeavor to restore the base level that existed before the deposit was made.

Generally, the rivers of a valley are not large enough to carry the entire flood flow. When the freshets come, they overflow the river banks and spread out over a wide section of country. The water so overflowing drops the heavier part of its load next to the river's bank, on account of the increased friction due to its spreading out over a great area. The continuance of this form of deposit causes natural levees of high ground to be built up next to the river bank, and necessarily leaving lower ground, back some distance from the river, to become a swamp.

This is illustrated in the Sacramento Valley. Here the rivers have built high ground along their banks, with swamps some distance back, through which the various creeks from the Coast Range, even with their limited rainfall, have built similar natural levees, which have divided what was once a grand basin into a series of smaller ones.

When man settles in the valley, he naturally locates upon these high tracts next to the rivers. He builds levees to keep the floods away from his farm. As the country settles up, the levees of individuals are consolidated to form one grand effort to confine the water in one channel with a view of forcing the river to carry its load of débris to some lower place, instead of allowing it to be deposited where it was wont. But as the water nears its mouth, the grades decrease, hence, the water drops its load on its bed, to steepen the slope that the material might be carried onward. This necessitates the raising and building up of the levees.

To increase the river's carrying capacity, both for navigation and as a storm sewer, the wide places are narrowed by the use of jetties that force the water to scour and enlarge its channel, that the deposits may also be prevented in the reaches above. But the material so eroded is deposited at some point of lower elevation.

As a result, in time, the mouth of the river becomes choked with the material, unless prevented by a tidal action that exists in some rivers. Where this congestion occurs, the people are then forced to open it by means of dredges.

In the San Pablo Bay, even with the present system of leveeing, the General Government has to dredge a channel to keep the river open for navigation. At the mouth of the Mississippi, with its magnificent system of levees, the Government makes an annual appropriation of \$100,000 for dredging in order to maintain a channel, in spite of the assertion that the Eads jetties are a success.

This constitutes the science of river improvements with its three methods—leveeing, jettying, and dredging.

If a river was thus so improved in an ideal manner from the mountains near its source to its mouth, all the material that nature intended to restore a depleted soil would be carried to its mouth, and unless removed by dredging and carried to a distant point, would cause the river to soon fill up until the building of levees became a practical impossibility and the whole system destroyed that had involved the expenditure of millions of dollars.

STOP DETERIORATING ACTION.

In addition to the deteriorating effect of natural erosion as above outlined, our California rivers have suffered from the effects of the flow of mining débris, which I discussed in my former report. This débris is now principally banked up upon the beds of the tributaries adjacent to the navigable rivers, having been deposited there during the early days of mining, and by the cleaning of the cañons. These deposits have been in the past greatly underestimated, but actually bear a direct ratio to the great output of gold that made California famous, and laid the foundation for its present greatness. The stopping of the later hydraulic mines, although they were moving only coarse, heavy material, was in harmony with the natural growth of the country.

The demands of commerce, not only of the valley, but of the mountains, require that the navigable rivers be maintained without impairment. The time will come, even on the Klondike, when it will be necessary to restrict the flow of débris into the navigable rivers.

Nor is it proper that manufacturing wastes be allowed to pollute the rivers. And above all, sewage should be stopped from contaminating with its filth and disease-producing germs the great source of water supply of the people.

It is time that engineers should consider means of improving rivers other than at the expense of the people living at their mouths.

In my former report I called attention to the *débris* upon the Yuba River. Since the stopping of the hydraulic mines the floods have been cutting a channel through this deposit and washing the material into the Feather River. At that time only fine gravel was to be found at the mouth of the Yuba; now large gravel may be seen under the bridge at Marysville. The material is becoming coarser at a faster rate than I anticipated.

This heavy *débris* is being washed into the Feather, where it is deposited. The flat grades that there obtain will prevent the coarse *débris* being carried far down stream, and at the present rate, unless something is done to prevent it, it will soon fill the entire waterway of that river. Should this occur, it will require the raising of the levees, the cost of which is now well nigh unbearable, and eventually cause the destruction of thousands of acres of beautiful fields with a loss that would pay for restriction works.

SUGGESTIONS AS TO DEBRIS.

It is estimated that the Feather and Sacramento rivers have been filled to an average depth of 9 feet, representing 120,000,000 cubic yards of material. If the *débris* flow were stopped, the rivers would scour their beds, until this deposit should be removed, and by so doing, the carrying capacity of the rivers would be doubled.

While it must be conceded that the transporting powers of the rivers is great, the dumping of this vast amount into the bay may cause serious harm, inasmuch as it is heavier and coarser material than the lower river has yet had to contend with. The harm, however, may be minimized by dredging. The increasing of the carrying capacity and the lowering of the bed of the rivers would allow the flood waters to be drained off earlier in the season, and thereby facilitate farming operations.

This great deposit may be treated in three ways:

First—By confining the water and forcing it to scour a channel until it carries the entire flood flow; the material so moved being dumped into the Feather River. This is the object of the existing project.

Second—Spreading the water over the entire area and producing the maximum of frictional resistance. This can be accomplished by excavating a trench, say 100 feet wide, near Marysville, and filling it with rock to the general level of the present bed, forming a great artificial bar. By this means the water at flood time would be spread out to a thin sheet with a low velocity. It would stop the present channel building and cause the depressions to be filled. Only fine silt would

be found at the barrier, as was the case twenty-five years ago. The coarser material (sand, gravel, and cobblestones) would be forced to be deposited farther up stream, and in the mountain cañons. It would be necessary to raise the levees along its banks as the filling increased. The débris would be deposited with a greater efficiency than that of twenty-five years ago. The river below the bar or barrier would scour and lower the present bed of the river, and relieve the congestion that there exists. While this method will give quick relief and is economical, it will interfere in time with the dredge-mining interests that are being built upon the area involved. It has a further drawback, in that the floods would be kept in their present elevated position.

Third—The taking of the flood waters off of the present bed and giving them a new, clean channel which would forever impound the great deposit of the débris and prevent it from entering the rivers. This is popularly known as “Losing the Yuba.”

“LOSING THE YUBA.”

To fully restrict the débris flow from the Yuba—and the principles involved apply to the other débris-laden streams—requires, first, that a new channel be provided upon the plains for the flood waters, to remove them from their present elevated position; second, the construction of dams for the storing of the present deposits in the main channel, and its tributaries above the head of the new channel, with an additional capacity sufficient for the storing the annual increment of sand and gravel for a long term of years, to keep the channel clean; finally, the depositing of the alluvium upon the low lands for soil building, before discharging the floods into the navigable rivers.

To carry out such a project requires that the new channel start at the base of the foothills, where proper head works can be constructed, and follow any general direction, as down Dry or Reed’s Creek, where its location would be most advantageous and economical. The ground over which the channel would pass has a general slope to the west to Feather River, and to the southwest toward the mouth of Bear River. The channel can be built by constructing strong levees far enough apart to carry floods with ease. The land as a whole is not very productive, and can be had at a reasonable price.

Along the east side of the Feather, there is a great area of low land that can be utilized for the depositing of the fine silt or alluvium until such a time as it was raised above high water and then utilized for farming operations. The water could best be discharged over a weir into Feather River, to prevent the caving of the banks.

ESPECIAL ADVANTAGES FOR THE WORK.

For the construction of head works especial advantages are offered. Mr. W. P. Hammon and associates are now constructing a great

embankment for the Government, as described in the fore part of this report, by their dredging operation. The work consists of making a great embankment of cobblestones and bowlders from Daguerre Point to Hallet's Point on the east. From this point a headland exists through which a wasteway can be cut, into the solid bedrock, the formation being a hard diabase.

By excavating the wasteway, say 50 feet above the bed of the river, and strengthening and raising the embankment, with the cobblestones from the river and the rock from the excavation, to a sufficient height to turn the entire flood flow of the Yuba into the wasteway and diversion channel, the plane of the river above these works would be obtained, amounting to hundreds of millions of cubic yards.

The stability of the embankment would be assured, as no water would be allowed to flow over it, thereby obviating the insecurity to an overflow dam built upon an unstable foundation. The embankment, being constructed of rock and of great width, will not be subject to failure, as are the levees of the valley, through the burrowing of gophers. The hardness of the bedrock will assure the stability of the wasteway from erosion, and necessarily all undercutting will be prevented.

The construction of these storage works above the head of the diversion channel will prevent the sand and gravel from filling this new channel, and from reproducing out on the plains the conditions now existing in the Yuba River. By maintaining such works to keep this channel clean, additional security will be afforded to the navigable rivers from deterioration through the deposit of detritus and débris.

BARRIERS AND DAMS.

Additional barriers should be built in the main channel of the Yuba and its tributaries for the storage of débris and to afford additional security. Such dams may be of two classes—masonry dams founded upon bedrock, and built upon modern lines for the storage of water; or at places where the bedrock is not available, drystone dams may be built by blasting the mountain sides into the cañon, forming a great barrier. The rock by this operation may be made of many tons weight. The excavation of the rock for either class of dam should be made in such a manner that a wasteway would be afforded to carry the greatest flood without allowing any to flow over the dam.

Numerous sites for such dams are to be found within the mountains. By this means the channels can be filled hundreds of feet deep and affording unlimited storage for any and all demands. The cañons have practically no economic value, and it would greatly facilitate the industries of the region to have them filled. When such dams have been filled and the river plane proportionately raised, other barriers can be constructed at other eligible sites in the same manner.

Each successive raising of the river plane would afford greater storage and necessarily longer intervals of time between such additions. The building of such barriers has been advocated by the hydraulic miners in order that they might operate their mines.

Inasmuch as it has been shown above that the only sure relief of the navigable rivers is by the restriction of the débris, it follows that the interests of the mountains and valley are identical and that the carrying out of this plan would comply with the main objects of the people during the past twenty-five years.

When it is considered that there has not been any official investigation of what the annual denudation actually is, although known to be great, and it is a question of capacity alone, by making ample provision for the operating of the mines for, say fifty years, it would be reasonable to say that the rivers would have relief for a generation at least.

PRACTICAL SOLUTION OF THE PROBLEM.

The starting of the hydraulic mines would also cause great reservoirs to be built for the storage of the flood waters, which would of itself tend to reduce the intensity of the floods.

The water from such works would be available to be carried out upon the valley for irrigation, and would be among the cheapest systems known for that purpose. To-day such barriers have an additional value as headworks for plants for the generation of electrical power, the demand for which is increasing daily with the growth of the State, and the financial returns are very large.

If the proper inducements were made, capital would build these dams for the industrial uses for which they could be put, and afford additional security for their construction, if any were needed.

The ownership of the navigable rivers lies in the General Government, which has, through the policy of its officers, restricted its operations to the low-water stages, although the people for whom the service is rendered are deeply interested in the high-water conditions as well. No substantial benefit can be expected until a new chapter has been added to the science of river improvements by the restriction of the débris, and the rivers considered at all their stages.

We live in the twentieth, not the nineteenth, century. The men who came to this country fifty years ago, and upturned the hills of the Great El Dorado, and made this State what it is, have for the most part passed away. The débris they sent down is banked against the navigable rivers to-day.

What we want is for the State and Nation to build restriction works in every stream that will permanently store this material. Then, with liberal appropriations to store the débris from natural causes, the mining interests can build works that will impound their own débris, and

develop the water and power interests; and the farmers, relieved of their undue burdens, can reclaim and protect their own lands, and the task is done.

In conclusion, I beg to state I have given much time, and careful study and attention, to the duties of my office, and since my last report I have visited the Yuba River at the site of the barriers a great number of times, and have carefully noted the conditions of the river, at all the various stages, both as a tranquil stream and as a raging torrent, and my report regarding these conditions is based upon personal observation.

The sums heretofore appropriated for contingent expenses (\$25 a month) and also for printing, stationery, etc. (\$25 per year) are insufficient to properly carry out the work of the Commissioner. I therefore recommend that both of these appropriations be increased for the good of the service.

Respectfully submitted.

W. W. WAGGONER,
Débris Commissioner.

FINANCIAL STATEMENT.

Appropriations for the Fifty-fifth and Fifty-sixth Fiscal Years.

Salary of Débris Commissioner.....	\$1,200 00
Traveling and incidental expenses.....	600 00
Salary of Secretary.....	600 00
Printing.....	50 00
Total appropriations.....	\$2,450 00

Expenditures.

(From December 1, 1902, to December 1, 1904.)

Salary of Débris Commissioner.....	\$1,200 00
Salary of Secretary.....	600 00
Traveling and incidental expenses.....	426 10
Printing.....	5 50
Total expenditures.....	\$2,231 60

Appropriation for débris work, March 17, 1897.....	\$250,000 00
Appropriation for débris work, February 14, 1901.....	150,000 00
Total appropriation for débris work.....	\$400,000 00

Expenditures.

(From December 1, 1902, to December 1, 1904.)

Land.....	\$9,699 50
Advertising.....	167 62
Salary of inspectors.....	1,630 05
Atlantic, Gulf, and Pacific Co.—Barrier No. 1.....	3,887 61
Samuel Montgomery—Barrier No. 2.....	6,072 88
Lewis Moreing—fill.....	1,587 66
Edward Malley—Daguerre Point cut.....	36,182 25
Lewis Moreing—Barrier No. 1.....	28,602 28
Incidental expenses.....	736 85
Labor, teams, and supplies.....	10,935 53
Lewis Moreing—closing sloughs.....	2,089 63
	101,581 86
Remaining on hand.....	\$298,418 14

ELEVENTH BIENNIAL REPORT

OF THE

BUREAU OF LABOR STATISTICS

FOR THE

STATE OF CALIFORNIA.

1904.

W. V. STAFFORD, Commissioner.

SAN FRANCISCO.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1904.

OFFICE OF THE STATE BUREAU OF LABOR STATISTICS,
927 MARKET STREET, SAN FRANCISCO, October 19, 1904.

To His Excellency, GEORGE C. PARDEE, Governor of California:

SIR: I have the honor to submit herewith the Eleventh Biennial
Report of this Bureau.

Respectfully yours,

W. V. STAFFORD,
Commissioner.

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REPORT OF BUREAU OF LABOR STATISTICS.

INTRODUCTION.

There runs through the preceding reports of this Bureau a persistent cry that it is impossible properly to do the work laid down by law without a material increase in the appropriation, and this appeal seems to have been met, in most instances, by a reduction at the hands of the Legislature, so that the amount allowed for the maintenance of the Bureau by the organic law, namely, \$4,500 per annum, has been reduced to \$2,500 per annum, and the amount allowed for printing has been reduced from \$1,750 to \$1,250 at the present time. The most serious feature about this latter reduction is that it does not provide even sufficient means to print an ordinary report of the Bureau work.

The following matter has been compiled practically within a little over sixty days and it will exhaust the printing allowance for two years, leaving nothing for supplying blanks, books, etc.—materials so essential either in gathering statistics or in calling attention to violations of existing laws.

The reduction of the contingent fund leaves the Bureau without a margin sufficient to carry out its work throughout the State. It is impossible to make the occasional personal inspection of stores, factories, etc., which is essential in order to enforce the laws regarding child labor, protection to women, sanitation, etc., and as a consequence that part of the work has been almost entirely confined to the neighborhood of San Francisco Bay.

In addition to the ordinary work of the Bureau, during the year 1905 the Federal Government has arranged to take an exhaustive manufacturing census and asks this department to make arrangements to work in conjunction with it. While the burden of the expense will fall upon the National department, naturally our expenses will materially increase, for while we shall have unprecedented opportunity to acquire matter of great value to the commercial and labor world, it will entail expense to put such matter in shape and place it before the people.

The foregoing is offered as a plea for the restoration of the original contingent fund, \$4,500 per annum, and for an appropriation for printing commensurate with the work of the Bureau. In any event there will be no cessation of effort through lack of funds, but an endeavor to show, what should be in evidence at all times, that the State can get returns for its investments and that work can be performed as well for

governments as for private citizens, one essential for all good work being, however, sufficient means to purchase proper tools.

The matter in the following pages does not come up to the standard aimed at, but is the best possible under the present conditions. When the change in the administration of the Bureau was made but little data were found that could be used for the purpose of this report, and prompt action being necessary, it was decided to take up such matters as could be handled immediately and that could be relied upon to give correct data for a foundation for future work. The article on female and child labor in San Francisco and Oakland is simply an outline of what is intended to be carried out through the entire State in accordance with the law. And it is a work that has its pleasant side, for, while we find many employers who will take every advantage possible and abuse their help, unless held in check by some higher power, we also find a growing tendency toward industrial betterments—an interest in the comfort and well-being of the workers on the part of many employers, regardless of the fact that sometimes the improvements entail considerable cost.

The list of labor unions is perhaps not quite complete, but it is much nearer correct than any previous list, and it will be the aim of the Bureau to keep it as nearly correct as possible; and a request is here made that all those interested will give such aid as is consistent with their own laws and purposes, so that the Bureau may be the better equipped to impart information to those concerned.

In the prosecution of these inquiries, a percentage of both employers and employed seemed to look upon this department of the State government with suspicion. On the one hand it could easily be imagined that we were thought to be anarchistic in tendency and organized for the purpose of embarrassing all who had vested rights; while, upon the other hand, we were received as State emissaries of the oppressor, to be given fiction for fact and figures incorrect and unsatisfactory. However, this type in either case is so small by comparison that it deserves but passing mention.

While we hear much regarding the unsettled and restless condition of the labor world, inspection at close range gives the impression that the average employer is concerned in the welfare of his help and is on fairly good terms with them. At the same time we are forced to the conclusion that it may be said of the great mass of the workers that they possess, in a marked degree, interest and pride in work well done; and this characteristic seems to be more especially in evidence where the work calls for the maximum in ability and training.

That part of the report bearing upon the relative standing of the people of California with that of the population of continental United States brings out results well worthy of study. It can be seen that just

as our population increases, in the same ratio increases the proportion of women and children that become wage-earners, or, in other words, it would seem that only up to a given point of density of population can the head of the family produce the living for the entire family; and while the male adult, in his organized effort to maintain wages and conditions that shall make it possible for him to advance with his age and race, may seem at times to harass and burden some of the industries, a deeper study of the complex situation may demonstrate the knowledge that his strenuous endeavors to keep his family well provided for, counts as one of the greatest factors in our national advancement.

The article on seafaring is exhaustive and gives a faithful account of long struggle in behalf of a hard-working, long-suffering class. Probably no man has done more for commerce and received less of its benefits than the deep-water sailor.

The laws relating to labor have been reviewed and are here presented, together with the principal decisions affecting them, and all that have been declared unconstitutional by a court of last resort have been eliminated.

All the matter in this report has been compiled with as much thoroughness as time and conditions would allow, and in each instance care has been exercised to insure as correct a statement of data and conclusions as though each subject had been treated exhaustively. We are especially indebted for the article on "Comparative Statistics in California and Continental United States" to Mr. George D. Leslie, of the Federal Census Bureau. The article on "Maritime Labor Organizations" is the work of Mr. Walter Macarthur, of the Coast Seamen's Journal; and Miss Lucile Eaves, of the South Park Settlement, gathered the statistics and furnished the matter for the article on "Women and Children Wage-Workers," Miss Eaves and Mr. Macarthur both having been temporarily employed by this Bureau.

To Mr. C. T. Deane of the California Petroleum Miners' Association, Mr. Arthur H. Briggs of the State Board of Trade, the Manufacturers and Producers' Association, Mr. R. I. Wisler, of the San Francisco Labor Council, Prof. Carl C. Plehn of the Department of Finance and Statistics of the State University, and Prof. George C. Merrill of the California School of Mechanical Arts, we are especially indebted for valuable and reliable information.

Whatever merit appears in the detailed work of the following report is largely due to the persistent, careful, and competent assistance rendered by Deputy J. M. Eshleman and Special Agents L. L. Stevens and K. Zwicker of this office.

LAW CREATING THE BUREAU.

The statutes creating this Bureau, providing for its maintenance, fixing its responsibility, and delegating its powers, are as follows:

Stats. of Cal., 1883, p. 27.

An Act to establish and support a Bureau of Labor Statistics.

[Approved March 3, 1883.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. As soon as possible after the passage of this Act, and every four years thereafter, the Governor of the State shall appoint a suitable person to act as Commissioner of a Bureau of Labor Statistics. The headquarters of said Bureau shall be located in the City and County of San Francisco; said Commissioner to serve for four (4) years, and until his successor is appointed and qualified.

SEC. 2. The Commissioner of the Bureau, before entering upon the duties of his office, must execute an official bond in the sum of five thousand (5,000) dollars, and take the oath of office, all as prescribed by the Political Code for State officers in general.

SEC. 3. The duties of the Commissioner shall be to collect, assort, systematize, and present, in biennial reports to the Legislature, statistical details, relating to all departments of labor in the State, such as the hours and wages of labor, cost of living, amount of labor required, estimated number of persons depending on daily labor for their support, the probable chances of all being employed, the operation of labor-saving machinery in its relation to hand labor, etc. Said statistics may be classified as follows:

First—In agriculture.

Second—In mechanical and manufacturing industries.

Third—In mining.

Fourth—In transportation on land and water.

Fifth—In clerical and all other skilled and unskilled labor not above enumerated.

Sixth—The amount of cash capital invested in lands, buildings, machinery, material, and means of production and distribution generally.

Seventh—The number, age, sex, and condition of persons employed; the nature of their employment; the extent to which the apprenticeship system prevails in the various skilled industries; the number of hours of labor per day; the average length of time employed per annum, and the net wages received in each of the industries and employments enumerated.

Eighth—The number and condition of the unemployed, their age, sex, and nationality, together with the cause of their idleness.

Ninth—The sanitary condition of lands, workshops, dwellings, the number and size of rooms occupied by the poor, etc.; the cost of rent, fuel, food, clothing, and water in each locality of the State; also the extent to which labor-saving processes are employed to the displacement of hand labor.

Tenth—The number and condition of the Chinese in the State; their social and sanitary habits; number of married and of single; the number employed, and the nature of their employment; the average wages per day at each employment, and the gross amount yearly; the amounts expended by them in rent, food, and clothing, and in what proportion such amounts are expended for foreign and home productions, respectively; to what extent their employment comes in competition with the white industrial classes of the State.

Eleventh—The number, condition, and nature of the employment of the inmates of the State Prisons, county jails, and reformatory institutions, and to what extent their employment comes in competition with the labor of mechanics, artisans, and laborers outside of these institutions.

Twelfth—All such other information in relation to labor as the Commissioner may deem essential to further the object sought to be obtained by this statute, together with such strictures on the condition of labor and the probable future of the same as he may deem good and salutary to insert in his biennial reports.

SEC. 4. It shall be the duty of all officers of State departments, and the Assessors of the various counties of the State, to furnish, upon the written request of the Commissioner, all the information in their power necessary to assist in carrying out the objects of this Act; and all printing required by the Bureau in the discharge of its duty shall be performed by the State Printing Department, and at least three thousand (3,000) copies of the printed report shall be furnished the Commissioner for free distribution to the public.

SEC. 5. Any person who willfully impedes or prevents the Commissioner, or his deputy, in the full and free performance of his or their duty, shall be guilty of a misdemeanor, and upon conviction of the same shall be fined not less than ten (10) nor more than fifty (50) dollars, or imprisoned not less than seven (7) nor more than thirty (30) days in the county jail, or both.

SEC. 6. The office of the Bureau shall be open for business from nine (9) o'clock A. M. until five (5) o'clock P. M. every day except non-judicial days, and the officers thereof shall give to all persons requesting it all needed information which they may possess.

SEC. 7. (As amended, Stats. of Cal., 1889, p. 6.) The Commissioner shall have power to send for persons and papers whenever in his opinion it is necessary, and he may examine witnesses under oath, being hereby qualified to administer the same in the performance of his duty, and the testimony so taken must be filed and preserved in the office of said Commissioner. He shall have free access to all places and works of labor, and any principal, owner, operator, manager, or lessee of any mine, factory, workshop, warehouse, manufacturing or mercantile establishment, or any agent or employé of such principal, owner, operator, manager, or lessee who shall refuse to said Commissioner, or his duly authorized representative, admission therein, or who shall, when requested by him, willfully neglect or refuse to furnish to him any statistics or information pertaining to his lawful duties, which may be in the possession or under the control of said principal, owner, operator, lessee, manager, or agent thereof, shall be punished by a fine of not less than fifty nor more than two hundred dollars.

SEC. 8. (As amended, Stats. of Cal., 1889, p. 7.) No use shall be made in the reports of the Bureau of the names of individuals, firms, or corporations supplying the information called for by this Act, such information being deemed confidential, and not for the purpose of disclosing any person's affairs; and any agent or employé of said Bureau violating this provision shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars or by imprisonment in the county jail not to exceed six months.

SEC. 9. (As amended, Stats. of Cal., 1889, p. 7.) The Commissioner shall appoint a deputy, who shall have the same powers as the said Commissioner, and such agents or assistants, not exceeding three, as he may from time to time require, at such a rate of wages as he may prescribe, but said rate must not exceed four dollars per day and actual traveling expenses for each person while employed; he shall procure rooms necessary for offices, at a rent not to exceed fifty dollars per month.

SEC. 10. (As amended, Stats. of Cal., 1889, p. 7.) The salary of the Commissioner shall be three thousand dollars per annum, and the salary of the Deputy Commissioner shall be eighteen hundred dollars per annum, to be audited by the Controller and paid by the State Treasurer, in the same manner as other State officers; there shall also be allowed a sum not to exceed forty-five hundred dollars per annum for the salaries of agents or assistants, for traveling expenses, and for other contingent expenses of the Bureau.

SEC. 12. (As amended, Stats. of Cal., 1901, p. 12.) Whenever complaint is made to the Commissioner that the scaffolding, or the slings, hangers, blocks, pulleys, stays, braces, ladders, irons, or ropes of any swinging or stationary scaffolding used in the

construction, alteration, repairing, painting, cleaning, or painting of a building are unsafe or liable to prove dangerous to the life or limb of any person, such Commissioner shall immediately cause an inspection to be made of such scaffolding, or the slings, hangers, blocks, pulleys, stays, braces, ladders, iron, or other parts connected therewith. If after examination such scaffolding or any such parts is found dangerous to life or limb, the Commissioner shall prohibit the use thereof, and require the same to be altered and reconstructed so as to avoid such danger. The Commissioner, Deputy Commissioner, or agent or assistant making the examination shall attach a certificate to the scaffolding, or the slings, hangers, irons, ropes, or other parts thereof, examined by him, stating that he has made such examination and that he found it safe or unsafe as the case may be. If he declared it unsafe, he shall at once, in writing, notify the person responsible for its erection of the fact and warn him against the use thereof. Such notice may be served personally upon the person responsible for its erection or by conspicuously affixing it to the scaffolding or the part thereof declared to be unsafe. After such notice has been so served or affixed the person responsible therefor shall immediately remove such scaffolding or part thereof and alter or strengthen it in such a manner as to render it safe, in the discretion of the officer who has examined it or of his superiors. The Commissioner, his deputy, and any duly authorized representative whose duty it is to examine or test any scaffolding or part thereof as required by this section, shall have free access, at all reasonable hours, to any building or premises containing them or where they may be in use. All swinging and stationary scaffolding shall be so constructed as to bear four times the maximum weight required to be dependent therefrom and placed thereon, when in use, and not more than four men shall be allowed on any swinging scaffolding at one time.

This Act shall take effect immediately.

Stats. of Cal., 1889, p. 3.

An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employes.

[Approved February 6, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every factory, workshop, mercantile or other establishment, in which five or more persons are employed, shall be kept in a cleanly state and free from the effluvia arising from any drain, privy, or other nuisance, and shall be provided, within reasonable access, with a sufficient number of water-closets or privies for the use of the persons employed therein. Whenever the persons employed as aforesaid are of different sexes, a sufficient number of separate and distinct water-closets or privies shall be provided for the use of each sex, which shall be plainly so designated, and no person shall be allowed to use any water-closet or privy assigned to persons of the other sex.

SEC. 2. Every factory or workshop in which five or more persons are employed shall be so ventilated while work is carried on therein that the air shall not become so exhausted as to be injurious to the health of the persons employed therein, and shall also be so ventilated as to render harmless, as far as practicable, all the gases, vapors, dust, or other impurities generated in the course of the manufacturing process or handiwork carried on therein, that may be injurious to health.

SEC. 3. No basement, cellar, underground apartment, or other place which the Commissioner of the Bureau of Labor Statistics shall condemn as unhealthy and unsuitable, shall be used as a workshop, factory, or place of business in which any person or persons shall be employed.

SEC. 4. (As amended, Stats. of Cal., 1901, p. 571.) In any factory, workshop, or other establishment where a work or process is carried on by which dust, filaments, or injurious gases are generated or produced, that are liable to be inhaled by persons employed therein, the person, firm, or corporation by whose authority the said work or process is carried on shall cause to be provided and used in said factory, workshop, or establishment an exhaust fan or blower, with pipes and hoods extending therefrom to each wheel or other apparatus used to grind, polish, or buff metals. The said fan or blower, and the said pipes and hoods, all to be properly fitted and adjusted, and of power and dimensions sufficient to effectually prevent the dust and filaments produced by the

abovesaid metal-polishing, metal-grinding, or metal-buffing from escaping into the atmosphere of the room or rooms of said factory, workshop, or establishment where persons are employed.

SEC. 5. (As amended, Stats. of Cal., 1903, p. 14.) Every person, firm, or corporation employing females in any manufacturing, mechanical, or mercantile establishment shall provide suitable seats for the use of the females so employed, and shall provide such seats to the number of at least one third the number of females so employed; and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

SEC. 6. (As amended, Stats. of Cal., 1901, p. 572.) Any person or corporation violating any of the provisions of this Act is guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than fifty dollars nor more than three hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both such fine and imprisonment, for each offense.

SEC. 7. It shall be the duty of the Commissioner of the Bureau of Labor Statistics to enforce the provisions of this Act.

SEC. 8. This Act shall take effect and be in force from and after its passage.

WOMEN AND CHILDREN WAGE-WORKERS.

The facts on which this report is based were gathered in September, 1904, in a canvass of San Francisco and Oakland. It is evident that any generalizations based on such limited data must be tentative ones. They are valuable chiefly because they suggest lines that might be profitably followed in more exhaustive future investigations.

With so brief a time at our command, the necessity of confining ourselves to a few important points fully covered by State laws was obvious. The schedule of questions covered the following subjects:

1. The total number and the percentages of women and children employed in different industries.

2. The hours of labor. The violations of the law prohibiting the employment of minors under 18 years for "more than nine hours in one day" or for more than fifty-four hours in one week.

3. The ages of the children employed. The violations of the child-labor and compulsory education laws.

4. The sanitary condition of the workrooms and toilets.

5. The extent to which seats are provided for women employes.

In the course of the canvass about two hundred and twenty-five visits were made to over two hundred different manufacturing and mercantile establishments. Of these, twenty-three are run by the proprietor and his family, and are excluded from the tabulation. Where a large number of children are employed, it is difficult to secure complete information about the ages. In compiling the statistics, we have been obliged to omit a number of the largest manufactories, because of incomplete data.

We were able to get information on all the points from one hundred and fifty-three establishments. With but few exceptions, the information was obtained from the managers or superintendents of the business. In the exceptional cases where there were reasons for doubting the correctness of the information given, lack of time prevented verification of the statistics.

Number and Hours of Labor of Women and Minors from 153 Establishments in San Francisco and Vicinity.

Business.	Estab- lishments Repre- sented.	Employés.					Hours of Labor.		
		Total Em- ployed.	Total Fe- males.	Minors, 14 to 16.	Minors, 12 to 14.	Minors, un- der 12.	Min.	Max.	Av.
Dry-goods -----	14	1,852	914	89	43	5	48	57.5	50.8
Department stores	3	1,607	776	80	50	2	48	54	52.2
Hair-dressers -----	3	33	30				54	62	58.1
Millinery -----	36	410	399	4			48	57.5	55.3
Candy stores -----	16	126	83	1			*48	84	60.6
Bakeries -----	17	187	55				*54	95	68.5
Miscellane's stores	24	392	122	28	11		45	72	56.7
Ready-made cloth- ing -----	26	979	792	8			48	58	52.9
Manufactories †	14	933	516	74	1		48	54	53.1
Totals -----	153	6,519	3,687	284	105	7			

* These are the hours of the girls serving in the stores.

† The fruit canneries and some of the largest manufacturing establishments employing children were omitted from this tabulation, because of incomplete returns about the number of employés and hours of employment.

1. PERCENTAGES OF WOMEN AND CHILDREN EMPLOYED.

Owing to the limited extent of this investigation, and the absence of complete records of past investigations, it is impossible to reach any conclusions about the relative increase or decrease in the number of women and children employed in different industries. The United States Census shows an increase for the State of California, but we have no data for determining among what industries this increase is distributed.

2. HOURS OF LABOR.

The lowest average number of hours to the week was found in the dry-goods stores. All the larger stores have reduced their time within the fifty-four-hour limit set by law. Two San Francisco stores, with a payroll of 586, only require forty-eight hours' work, and 1,120 of the employés tabulated work fifty and one half or fifty-one hours per week; thus, 1,706, or 92 per cent of the 1,852 employés reported in dry-goods stores, are working from three to six hours a week less than the legal limit.

The hours of labor in the large department stores in San Francisco are slightly longer than those of the dry-goods houses, averaging fifty-two hours a week. One store, employing 480 people, only requires forty-eight hours per week, and in the other two the time conforms to

the fifty-four-hour limit required for the large number of minors employed as cash girls and boys and wrappers. In one large department store visited in Oakland, a large number of minors were working beyond the limit allowed by law. Many millinery stores are open until late Saturday night, thus going beyond the fifty-four-hour limit. The minors under 18 years are generally employed as apprentices. With one exception, these were excused from returning Saturday night. In this case, the proprietress readily agreed to give the girls who returned for night work shorter hours during the week, thus bringing the time within the legal limit. Cases of the violation of the law were also found in drug stores, candy stores, and bakeries. The worst instances were in butcher shops, where young boys work as much as nine hours over the legal limit.

With the possible exception of those employed in domestic service, no other women wage-earners have such long hours as those who serve as clerks in candy stores and bakeries. The bakeries often open as early as five o'clock in the morning, and the candy and ice-cream trade is brisk until midnight, while both classes of stores are open all day Sunday. Where there are a number of clerks, it is possible to arrange shorter hours, but in the smaller stores the girls were often found working twelve or fifteen hours a day. They were allowed every other Sunday, every third Sunday, or no Sunday at all off. The carelessness of the consumers is largely responsible for the Sunday work in the bakeries, as many of them are under union rules which do not allow any fresh bread or cake to be baked on Sunday. A little thoughtfulness on the part of housewives would do away with the need of Sunday opening.

Another reason for the oppressive conditions in these trades is the fact that they seem to be just emerging from, or are in competition with, the domestic stage of development. Within a few blocks on one street, we found eleven bakery, delicatessen, and candy stores which were run by the proprietor and his family, who lived in the rooms back of the store and were ready for customers at all hours of the day and night. A like devotion to business seems to be expected of the few clerks employed. Obviously the hours of those serving in the neighboring stores competing with these domestic industries would tend to be equally long.

None of the manufacturing establishments visited required more than fifty-four hours a week, and some fell below this limit, bringing the average time down to fifty-three hours a week.

3. THE AGE LIMIT OF CHILDREN EMPLOYED.

The provisions of the law restricting the employment of children under certain ages are much more difficult to enforce than those limiting the hours of work. The law requires age certificates, registration and posting of names, addresses, ages, and hours of labor of all chil-

dren under 16 years of age. We found one place where age certificates were filed, but have yet to discover any employer who has conformed fully with the provisions of the law.

The form prepared for the age certificates called for information about the school last attended that would enable officers of the Bureau to trace a child and verify the age from the school records. While the limited time at our disposal has made it impossible to obtain proof of fraud, we have reasons for believing that both children and parents frequently make false statements about the ages of children applying for work. In one factory at the entrance to which there was a large sign declaring that no one under 14 years of age would be employed, and where age certificates were required, there were several children whom no one could believe to be over 10 years old, and others who could not have been over 12. In one large department store a very youthful-appearing little girl was asked her age. She answered promptly, "Thirteen," and then added with a sly little look, "We are all thirteen." In Oakland, where more attention has been given to the 14-year limit of the compulsory education law, the children show a disposition to adopt 14 as their age. In one large dry-goods store, the returns were as follows:

Cash boys 11 years old.....	2
Cash boys 12 years old.....	2
Cash boys 13 years old.....	5
Cash boys 14 years old.....	13
Cash boys 15 years old.....	4

Even allowing for a tendency to begin work as cash boys, we have an undue proportion of boys 14 years old.

The employers complained of two classes of people who tempted them to violate the 12-year limit. Parents often bring very young children and urge their employment. In some cases the plea of economic necessity is urged in excuse, but in others there is an obvious willingness to exploit the child. Strange to say, the second class of law-breakers are charitably-inclined ladies, often good customers whose wishes must be considered, who are willing to adopt this cheap solution of the problems of some unfortunate, dependent family.

Of the cases inspected by the Labor Bureau, the fruit-canners were found to be by far the most flagrant violators of the child-labor law. An officer of the Bureau, in visits made on August 13th to 16th, discovered no less than 156 children under 12 years of age, working in four San Francisco canneries. Seven of the children working in dry-goods and department stores acknowledged being under 12 years of age.

The authority of the officers of the Labor Bureau was not considered to extend to the enforcement of the 14-year limit of the compulsory education law. The officers of the school department have made vigorous efforts to exclude the children from work in the canneries. Such

work requires merely a temporary absence from school, which would not necessarily constitute a violation of the compulsory education law. The children in the stores have permanently withdrawn from school. That there is great need of a systematic effort to enforce the compulsory education law is shown by the fact that over fifty children less than 14 years of age were found working in three San Francisco stores.

In the majority of cases the child's education ends with his entrance into the ranks of wage-earners. Less than one fourth of the children whose age certificates have been returned, attended the public night schools. In one of the most progressive dry-goods stores in San Francisco, the cash boys are provided, at the expense of the firm, with a special school at the Young Men's Christian Association.

One can not claim, in extenuation of this shortening of the school life of these little workers, that they are getting a valuable business training. On the contrary, the life of a cash or messenger boy, with its alternating periods of idleness about an office or counter and feverish running to and fro with packages or cash, is apt to prove thoroughly demoralizing to any habits of steady application or mental concentration which the child may have acquired.

4. SANITARY CONDITION OF WORKROOMS.

We found but little violation of the laws requiring sanitary workrooms and suitable toilets. The business prosperity of the last few years has enabled many San Francisco firms to enlarge their stores or move into more commodious quarters. It is gratifying to find that the employés have profited even more than the customers by these changes.

In the past, complaints had been made about the wretched basement workrooms of three of the large dealers in ready-made clothing. At these places the proprietors showed, with evident pride, large, well-lighted, airy workrooms now in use. They made little pretense of humanitarian motives for the changes, but declared quite frankly that it was impossible to secure or retain efficient help without comfortable workrooms.

In the ready-made clothing establishments we found but two thoroughly bad workrooms. The proprietor of one of these promised to abandon its use after November 1st. In the other, from twelve to fifteen women work in a basement under the pavement. The small amount of daylight which sifts in is supplemented by electric lights. No woman could work under such conditions without imperiling her health or her eyesight.

The workrooms of the millinery stores are usually back of the shop, in balconies over the stores, or, in some cases, simply behind screens in the salesroom. In places where buildings in the rear are close to the windows, the light is poor, but these cases are rare. As one milliner remarked, "Well-lighted workrooms are indispensable to enable the

trimmer to match or combine the colors properly." In one of the extremely fashionable millinery stores, we found a fine, large, artistically-furnished salesroom, while the workrooms were in the basement under the pavement.

While some of the factories visited were in somewhat grimy and disorderly condition, not one of them was poorly lighted or unsanitary. Here, again, it is gratifying to find the attention given to the comfort of employées in the newer plants.

The law requiring the provision of separate water-closets for women is generally observed. In older buildings, these often adjoin the workrooms and are not properly ventilated. In every place inspected, they were furnished with sanitary plumbing. There were only five places bad enough to justify a complaint.

5. SEATS FOR WOMEN EMPLOYÉES.

Evidently the problem of how to provide women clerks with comfortable seats that will not prove serious obstructions in the narrow spaces behind the counters, has not yet been solved in San Francisco. In one place there were folding seats that looked fairly comfortable, but these must be attached to strong fixtures, and even then have a tendency to sag. Several stores have abandoned them as troublesome and unsuitable. The little stools which are most commonly used are very much in the way when a number of clerks serve behind one counter. In two or three stores the seats consist of a flat board which can be slipped between shelves or drawers when not in use. In some instances the proprietor's ideas as to what constitute "suitable seats" are peculiar. Among those to which they apply the term are little stepladders used to reach the upper shelves, the drawers, which can be drawn out to make little perches, and candy-boxes about six inches deep and two feet long, on which one might balance one's self.

The managers all declared emphatically that they did not object to girls sitting down when no customers were waiting. A number of girls were asked whether they were allowed to use the seats, and in no case did a clerk say that it was not permitted. While we rarely visited a store without finding some clerk seated, yet most of the women seem to stand much more than is necessary. Whether this is due to a careless expenditure of their strength or to a fear of being considered lacking in devotion to business, we are unable to say.

6. THE ENFORCEMENT OF THE LAWS.

It would take the full time of one person to enforce fully the laws for the protection of women and children in the cities about the bay. The child-labor law is worded in a peculiar way: Its penalty is operative when the person or corporation "knowingly violates" its provisions. To enforce these laws, every employer should be visited by an

agent of the Labor Bureau at least once a year, and places where a large number of women and children work should be inspected as often as once in three months. As has been pointed out, one of the chief difficulties met in attempting to enforce the law is the tendency to return false age certificates. This difficulty has been met in the Eastern States by stringent laws. In Massachusetts every child employed must have a sworn certificate, which not only gives the age and description of personal appearance, but also must show evidence of ability to read and write, and of regular attendance at night-school. Any officer who certifies to a false certificate is subject to a fine. The New York laws passed in 1903 are even stricter in their requirements. California lags behind the other progressive States of the Union in her age limit and educational requirements of child laborers.

Among the States which now have the 14-year limit in factories and stores are: Connecticut, Illinois, Indiana, Massachusetts, Michigan, Minnesota, New York, Ohio, Oregon, Idaho, Wisconsin, Colorado, and South Dakota. Kentucky, Maryland, Louisiana, Missouri, New Jersey, and Tennessee have a 14-year limit for factories. In some of these States a child may work during the school vacation. In most of them educational qualifications are required before a child between 14 and 16 years of age is permitted to work.

Fortunately our industries in the past have not been those where the work of little children could be utilized. It would be well to come up to the standards set by the rest of the civilized world before the difficulties of securing legislative protection for child workers have been increased by the investment of a large amount of capital in industries where they can be exploited. If the economic development of the State is to be "promoted," the endeavor to secure a growth that is based on a sound and progressive policy deserves as much attention as the efforts to increase the supply of labor or variety of industries in which it can be utilized.

THE APPRENTICE SYSTEM IN CALIFORNIA.

The different systems which control the several branches of the manual training of young men are not only of much interest to the student of statistics, but they are also of great economic importance. It means much to a country to have a complement of mechanics skilled in all branches of their respective trades, and the rules by which they are governed as apprentices have much to do with their thoroughness and proficiency as journeymen.

Endeavoring to supply information from which one may form his own ideas as to the relative merits of the systems in this State, an investigation was undertaken by this Bureau, and while the results are not complete, still a fair idea may be gained of existing conditions in the several trades considered. For the greater part the method of correspondence was used, although an attempt was made to gather data by interviews and by extracting from the by-laws of several of the unions material relative to the subject at hand.

Letters were sent to one hundred and twenty-eight unions throughout the State and to eighty-five different manufacturers. It was sought in these to gain information relative to the length of time served by apprentices, their number as compared to the total number of journeymen, and the rules generally observed by both employer and employed in this field.

Eighty-two replies were received from the labor unions—64 per cent of the number addressed. The table on pages 19 and 20 was compiled from the data derived from these replies.

Turning our attention to the contents of this table it is seen that 13.41 per cent of the occupations named are those in which the apprentice system does not prevail. Of the total number of organizations reporting apprentices there are 22, or 30.9 per cent, in which the organization provides no rule restricting apprenticeship. Generally, the period of apprenticeship varies from two to five years, three and four years being the more common. All branches of the trade are taught respectively in about 75 per cent of such trades investigated. In a few cases the matter of the number of branches of a vocation taught is optional with the apprentice; in others, the foreman decides, the ability of the young workman being the criterion. As regards the age limit at which apprentices may be indentured considerable variation is shown, but 16 or 18 years seems to be the average. There are but four cases of the total number reporting to the Bureau in which apprentices are required to work a greater number of hours per day than journeymen.

UNION RULES REGARDING APPRENTICES.

Occupation.	Unions Considered.	Apprentices as compared to Journeymen.	Age Limit.	Length of Service as Apprentice.	Do apprentices work same or longer hours?	Is the complete trade taught?	Is apprentice organization independent or auxiliary?
Blacksmiths	1	1 app. to 6.	16 to 21 years.	4 years.	Same	Yes	Auxiliary.
Boilermakers	2	1 app. to 5, and 1 at large.	16 to 21 years.	4 to 5 years.	Same	Yes	No organization.
Bookbinders	2	Usually 1 to 3.	14 to 21 years.	4 to 5 years.	Same	One part	No organization.
Boxmakers	1	No rules regarding apprentices.					
Brass-fitters	1	No restriction.	No restriction.	3 years.	Same	Yes	No organization.
Brass-workers	1	1 app. to 6.	Minimum 16 years.	2 years.	Same	Left to app.	Auxiliary.
Broom-makers	2	2 to a firm of contractors.	Minimum 18 years.	4 years.	Same	Yes	Names on union books and must report twice a year.
Bricklayers	1	1 app. to 5. Often no restriction.	18 to 25 years.	Usually 3 years, depending on ability.	Same	Usually	Auxiliary.
Carpenters	5	No restriction.	16 to 25 years.	3 years.	Same	Yes	No organization.
Carriage-painters	1	No restriction.	16 to 18 years.	3 years.	Same	Yes	Auxiliary.
Carpet-workers	1	No restriction.	16 to 20 years.	4 years.	Same	Yes	Auxiliary.
Cannmakers	1	No rules regarding apprentices.					
Cement-workers	1	No restriction.	16 to 20 years.	4 years.	Same	Yes	Auxiliary.
Cigarmakers	3	Not more than 3 in each factory.	14 to 16 years. Sometimes no restriction.	3 years.	Usually more	Yes	Auxiliary.
Coopers	1	1 app. to 10. Journeyman may teach son.	16 to 19 years.	3 years.	Same	Yes	No organization.
Coppersmiths	1	No restriction.	No restriction.	4 years.	Same	Yes	No organization.
Electrical workers	1	1 app. to 3.	Min. usually 18 years.	3 years.	Same	Yes	Auxiliary.
Engineers (steam)	1	No restriction.	Minimum 18 years.	3 years.	Same	Yes	No organization.
Engineers (stationary)	1	No rules regarding apprentices.					
Garment-workers	2	1 app. to 10, which is restricted.	Minimum 15 years.	3 years.	Same	Usually	Auxiliary when organized.
Gas-fixture hangers	1	No restriction.	Minimum 17 years.	4 years.	Same	Yes	No organization.
Glassblowers	1	1 app. to 15.	No restriction.	5 years.	Same	Yes	Independent.
Glaziers	1	1 app. to 5.	15 to 18 years.	3 to 4 years.	Same	No	No organization.
Glovesmakers	1	Boys hired and paid by employes.	Maximum 21 years.	3 years.	Same	Yes	No organization.
Granite-cutters	3	1 app. to 12.	Maximum 21 years.	3 years.	Same	Yes	No organization.
Hatmakers	1	Apprentices not allowed.					
Horseshoers	2	1 app. to 8.	No restriction.	4 years.	Longer	No	Auxiliary.
Ironmolders	2	1 per year.	16 to 21 years.	4 years.	Same	Yes	No organization.
Leathers	2	1 app. to 10, not more than 2 at one branch.	Minimum 16 years.	1 year.	Same	Yes	No organization.
Leather-workers	2	1 app. to 10, not more than 2 at one branch.	No restriction.	3 to 4 years.	Same	No	No organization.
Machinists	3	1 app. to 5.	16 to 21 years.	4 years.	Same	Yes	Auxiliary.

UNION RULES REGARDING APPRENTICES—Continued.

Occupation.	Unions Considered.	Apprentices as compared to Journeymen.	Age Limit.	Length of Service as Apprentice.	Do apprentices work same or longer hours?	Is the complete trade taught?	Is apprentice organization independent or auxiliary?
Marble-cutters	1	1 app. to 7	Maximum 17 years.	4 years	Same	No	No organization.
Metal-polishers	1	1 app. to 8	No restriction.	3 years	Same	No	Auxiliary.
Miners	1	No rules regarding apprentices.					
Mosaic-workers	2	No restriction	14 to 18 years.	3 years	Same	Yes	No organization.
Paint-burners	1	No restriction	20 years.	2 years	Same	Yes	Auxiliary.
Painters	1	1 app. to 5	Maximum 19 years.	3 years	Same	1 or 2 branches.	No organization.
Paperhangers	1		Maximum 21 years.	3 years	Same	Optional	Auxiliary.
Photo-engravers	1	1 app. to 6	Minimum 15 years.	5 years	Longer	Yes	No organization.
Pipe and tankmakers	1	1 app. to 10	Minimum 18 years.	2 years	Same	No	No organization.
Plumbers	3	1 app. to 10 when restricted.	Minimum 17 years when restricted.	4 and 5 years	Same	Yes	When organized independent.
Pressmen	2	1 app. to 4	Minimum 16 years	4 and 5 years	Same	Yes	No organization.
Riggers	1	No restriction	15 to 21 years.	4 years	Same	Yes	No organization.
Roofers	1	No restriction	No restriction	No restriction	Same	Yes	No organization.
Sheet-metal workers	2	1 app. to 3	Minimum 14 years	5 years	1 hour longer	Optional	Auxiliary.
Shoemakers	1	No apprentice	system.				
Ship-drillers	1	No restriction	No restriction	No restriction	Same	No	No organization.
Ship-joiners	1	No restriction	No restriction	Until 21	Same	Yes.	No organization.
Sign-painters	1	1 app. to 4	Maximum 21 years.	4 years	Same	No	No organization.
Tanners	1	No apprentice	system.				
Tailors	2	No restriction	No restriction	3 yrs., or until qual'd	Same	Yes	No organization.
Tile-layers	1	No restriction	18 to 20 years.	3 to 5 years	Same	Optional	No organization.
Timbers	1	No restriction	Minimum 16 years.	3 years	Same	Yes	No organization.
Typographers	1	1 to 3 on job work; 1 to 2 app. for first 10, and 1 to 10 afterwards.	Minimum 16 years.	4 years	Same	No	No organization.
Upholsterers	1	1 app. to 10	Maximum 20 years.	3 years	Same	Yes	Auxiliary.
Varnishers	1	1 app. to 10	Minimum 17 years.	3 years	Same	Yes	Auxiliary.
Wood, wire, and metal lathers	1	1 app. to 10	No restriction	3 years	Same	Yes	No organization.
Wood sorters and graders	1	1 app. to each shop.		Until competent.	Same	No	No organization.

* Shops employing apprentices shall be entitled to one apprentice for an average yearly employment of five men; two for an average yearly employment of nine men; three for an average yearly employment of thirteen men. No shop to have more than four apprentices at one time, provided said shop shall employ on an average seventeen men or over, the average to be taken from the number of journeymen employed the year previous to application for apprentices.

These are the following: cigarmaking, horseshoeing, photo-engraving, and sheet-metal working.

The apprentices in 47 (more than half of those considered) of the trades have no organization whatever; 20, or about one fourth, have affiliated themselves with the journeymen organizations and are classed as auxiliaries; and 2 are independent—the glassblowers and the plumbers.

Data as to the number of organized apprentices in the several trades throughout the State were not obtainable.

Of 85 employers addressed, but 28, or 32.94 per cent of the number, replied, and of these several reported no apprentices. However, such data as were obtained have been gathered together and embodied in the following table:

THE APPRENTICE SYSTEM.

Data from Employers, Each Line representing the Conditions in some Shop Typical of its Class.

Trade.	Restriction as to Age.	Time of Service.	Is the apprentice taught all branches?	Do apprentices work a greater or less number of hours than jour'n'men?	Restriction by Labor Organizat'n as to No. of Apprentices at one time.
Barrel-maker	No apprentices.				
Blacksmith	18 years	4 years	Yes	Same	
Boot and shoe manufacturer	12 years	Indefinite	No	Less	No
Boilermaker	18 years	4 years	Yes	Same	
Brass foundryman	16 years	Indefinite			No
Canmaker	No apprentices.				
Coppersmith	18 years	4 years	Yes	Same	
Electrician	18 years	4 years	Yes	Same	
Electrician	No apprentices.				
Felt and gravel roofer	Indefinite	Indefinite	Yes	Same	Yes
Gas-fixture maker	18 years	3 years	Yes	Same	Yes
Glass beveller	15 years	5 years	Yes	Same	Yes
Glazier, art glass	15 years	5 years	Yes	Same	Yes
Glovemaker	No apprentices.				
Glovemaker	16 years	Indefinite	No	Same	No
Hatmaker	18 years	3 years	Yes	Same	Yes
Joiner	18 years	4 years	Yes	Same	
Leather belting manufacturer	16 years	4 years	Yes	Same	No
Lithographic pressman	17 years	4 years	Yes	Same	Yes
Lithographic transferrer	17 years	4 years	Yes	Same	Yes
Lithographic artists	15 years	4½ years	No	Same	No
Machinist	18 to 21 yrs.	Indefinite	Yes	Same	No
Machinist	17 years	4 years	Yes	Same	No
Machinist	16 to 18 yrs.	4 years	Yes	Same	Yes
Machinist	18 years	4 years	Yes	Same	
Metal-polisher	18 years	2 years	Yes	Same	Yes
Metal-worker	17 years	3 years	Yes	Same	Yes
Metal-worker	16 to 18 yrs.	4 years	Yes	Same	Yes
Molder	17 years	4 years	Yes	Same	No
Molder	16 to 18 yrs.	4 years	Yes	Same	Yes
Molder	18 years	4 years	Yes	Same	
Painter	17 years	4 years	Yes	Same	Yes
Paper-box manufacturer	16 years	Indefinite	Yes	Same	Yes
Paperhanger	17 years	4 years	Yes	Same	Yes
Patternmaker	16 to 18 yrs.	4 years	Yes	Same	Yes
Patternmaker	18 years	4 years	Yes	Same	
Shipwright	18 years	4 years	Yes	Same	
Shipfitter	18 years	4 years	Yes	Same	
Tailor	No apprentices.				
Tanner	15 years	Indefinite	No	Same	No
Tile and mantel setter	16 years	3 years	Yes	Same	Yes
Tobacco manufacturer	No apprentices.				
Tobacco manufacturer	No apprentices.				

A consideration of this table shows that the average age at which apprentices are indentured is 17 or 18 years, and four years is the average period of service in such capacity. There are but four or five cases in which all branches of the trade are not taught; in every case apprentices work the same number of hours per day as do journeymen. Returns from nine establishments show that there is no restriction placed by labor organizations as to the number of apprentices which a shop may have at any one time.

On comparison of the last two tables it will be seen that the data of one table do not, in every case, agree exactly with that given in the other; some of the shops probably do not closely follow the rules of the union. The one table represents the rules and conditions as they are set down by the several labor organizations, and the other represents such rules and conditions as they are actually carried out in a few shops selected as typical.

The following statements have been extracted from the by-laws of the unions as named:

**Metal Polishers, Buffers, Platers, and Brass-Workers' International Union
of North America.**

SECTION 1. All persons desiring to become apprentices to any branch or branches of our trade shall serve an apprenticeship of three years before being granted a journeyman's card.

SEC. 2. Wages shall be adjusted by the local union in whose jurisdiction the apprentice is employed.

SEC. 3. No one shall be initiated in local unions as an apprentice who shall not have worked three months at the trade.

SEC. 4. No apprentice shall be allowed to cast a vote for or against in any local union where a strike is about to be decided, or on the question of wages, but he shall be entitled to a voice and vote on all other matters that may come before his local.

SEC. 5. Whenever a local initiates an apprentice, said apprentice must fill out an apprenticeship application stating when he began working at the trade and when his apprenticeship expires, a duplicate copy to be filed with the International Secretary.

SEC. 6. No apprentice shall be eligible to hold any office in the International.

Journemen Barbers' International Union of America.

SECTION 1. All apprentices must pay fifty cents for registration and twenty cents per month to be paid to this union in advance for the trouble this union will be put to in looking after the welfare of said apprentices.

SEC. 2. Any apprentice who fails to pay his assessment within sixty days after it was due shall pay a fine of one dollar and back assessments. Any apprentice who fails to pay all fines and assessments within ninety days shall have their names stricken from the books of the union.

SEC. 3. Any apprentice who has had his name stricken from the books and wishes to have it replaced shall pay not less than four dollars for the same.

SEC. 4. Any apprentice quitting the trade with the view of engaging in some other occupation must pay all assessments and other indebtedness charged against him up to date of his quitting the trade. He shall receive from the financial secretary a certificate, to which the seal of the union is attached, showing the time the apprentice has served under this jurisdiction.

Boat-Builders' Union.

SEC. 23. All apprentices under 21 years can become honorary members by paying half dues, and all who join under 19 when becoming full-rate members can come in

for half initiation. Apprentices shall serve four years at the trade before they will be called upon to pay full dues and become entitled to full benefits.

SEC. 24. All boat shops employing first-class journeymen boat-builders are allowed one apprentice to each first-class journeyman employed.

SEC. 25. All apprentices classed as journeymen at the age of 21 years; special permission will be granted to those over the age of 21 who were serving their time sixty days previous to the adoption of this constitution.

Cement-Workers' Union of California.

SECTION 1. All male persons employed at cement work, of good moral character, not less than 18 years of age, can become members of this union. * * *

SEC. 2. Boys between the ages of 16 and 18 years may become apprentices, their number to be regulated by this union.

Journeymen Horseshoers' Union.

No more than one apprentice shall be allowed to work in a union shop at one boss horseshoer or firm at one time, and four years will be allowed for him to serve as apprentice, and he will be allowed to work in a union shop for one week under the same conditions as a man coming from a non-union town.

Amalgamated Woodworkers' International Union of America.

SEC. 68. Apprentices over 16 years of age and under 19 years of age may become honorary members. Apprentices shall serve three years at the trade before they will be called upon to pay full dues and be entitled to full benefits. No additional initiation fee or assessment shall be charged an apprentice on account of becoming a full member.

San Francisco Typographical Union.

ARTICLE 14, SECTION 1. All weekly and evening papers shall be entitled to apprentices as follows: Evening papers, 1 to every 10 journeymen and major fraction thereof holding regular situations; weekly papers, 1 to every 3 journeymen and major fraction thereof holding regular situations; job and book offices, 1 to every 3 journeymen. 2 to every 4, 5, or 6, 3 to every 7, 8, or 9; thereafter, 1 to every additional 5 journeymen.

SEC. 2. Morning papers are entitled to one apprentice to every 15 journeymen and fraction of 10.

SEC. 3. On morning and evening newspapers it is urged that apprentices shall be indentured to learn the trade. It is further urged that no youth under 16 years of age will be accepted for apprenticeship. * * *

SEC. 4. In book and job offices it is urged that apprentices shall be indentured as prescribed in Section 3. A youth must be practically employed not less than three fourths of the time, daily, at the actual learning of the trade (*i. e.*, presswork, composition, distribution, etc.) before the union will consider that a *bona fide* apprenticeship, fitting him for journeyman membership, is being served. But all youths employed in any of the above capacities will be considered part of the office quota of apprentices.

SEC. 5. Apprentices to be admitted to journeyman membership in the union must have served five years at either news, job, or book work, be not less than 20 years of age, and have the indorsement of the employer or foreman with whom last employed, certifying as to their competency, etc.

Hat-Finishers' Trade Association of San Francisco.

ARTICLE 21, SECTION 1. Any boy apprenticing himself to the hatting trade may, with the consent of the association, work by the week or at such terms agreed upon between the local association and the employer, but in no case (when working by the piece) shall he work for less than a journeyman. * * *

SEC. 2. To constitute a journeyman, a boy shall be required to serve a regular apprenticeship of at least three consecutive years, but in all cases until he is 21 years of age.

SEC. 5. If any boy thinks himself misused by his employer, he may apply to the Vigilance Committee, who will consider his case and use their influence with his

employer to adjust the difficulty between them, and failing to do so, the committee may give him a discharge.

SEC. 7. When a boy goes to work for himself he shall be paid by the week until his term of apprenticeship expires and at the following weekly rate—for the remainder of the first year, five dollars; for the second year, six dollars; third year, eight dollars.

SEC. 8. After a boy has served two years at the bench, the employer can put him at any branch of the business in which he may require his services. Where there is hand and machine work carried on in the factory, the latter shall be considered a separate department.

Painters' District Council of San Francisco and Vicinity.

SECTION 1. Four years shall be the period of apprenticeship.

SEC. 2. Applicants for place of apprenticeship must be under 20 years of age at beginning of apprenticeship.

SEC. 3. All apprentices must be registered in the District Council.

SEC. 4. All apprentices shall be under the jurisdiction of the District Council.

SEC. 5. Apprentices serving four years at the trade shall be considered journeymen, and after two years of service are eligible to join the union as apprentices and must comply with this rule.

SEC. 7. Grievances arising between apprentice and employer shall be submitted to District Council for adjustment.

SEC. 8. No apprentice will be allowed to work on a job alone, but must be accompanied and under the direction of a journeyman of the particular branch of the trade at which he is working.

SEC. 9. Shops employing apprentices shall be entitled to one (1) apprentice for an average yearly employment of five (5) men, two (2) for an average yearly employment of nine (9) men, three (3) for an average yearly employment of thirteen (13) men. No shop to have more than four (4) apprentices at one time, providing said shop shall employ on an average seventeen men or over, the average to be taken from the number of journeymen employed the year previous to application for apprentices.

San Francisco District Council of United Brotherhood of Carpenters and Joiners of America.

SEC. 28. Every apprentice of good moral character, over 18 years of age, having served as an apprentice for one year, must become a member of some one of the local unions on the payment of an initiation fee of ten dollars. No apprentice shall be admitted who is over 21 years of age.

SEC. 29. (a) A contractor shall be allowed one apprentice for every five journeymen or under, and one for every five additional journeymen employed.

(b) A contractor or contractors employing an apprentice or apprentices must keep said apprentice or apprentices steadily employed so long as he has work, and in the event of he or they not having sufficient work to keep said apprentice or apprentices steadily employed, must endeavor to find employment at the trade for said apprentice or apprentices until such time as he again has work.

(c) Said contractor or contractors must instruct, or cause to be instructed, said apprentice or apprentices the whole trade of carpentry and joinery.

(d) Any apprentice employed on any job shall have the right to ask any member of the Brotherhood for any information in regard to the work he is required to do, and it shall be the duty of said member to give the proper information if in his power, taking only reasonable time to do so. Should employer of said apprentice assign any other member as instructor of said apprentice, no other member shall be expected to give instructions to said apprentice.

(e) Any apprentice feeling that his instructor is incompetent or unwilling properly to instruct him may appeal to his employer for exchange; failing, he may appeal to the District Council. In such case it shall be the duty of the Council to see that said apprentice gets the proper instruction.

(f) No one can work or join the union as an apprentice who is over the age of twenty-five years.

THE APPRENTICE SYSTEM IN FOREIGN COUNTRIES.

In most of the European countries the apprentice system has received much attention. Elaborate regulations exist and the system holds undisputed sway as far as the training of mechanics is concerned. In Great Britain the system remains as at common law, but, as is the case in California, most of the unions restrict the number that may be employed.

The law of February 22, 1851, provides for apprentice contracts in France, the age and hours of labor being prescribed by the law of February 22, 1892. Apprentices under 14 years of age must not work more than ten hours per day; those between 14 and 16 years, not more than twelve hours. If an apprentice under 16 years of age is illiterate, his employer must give him time (not over two hours per day) to complete his education. Any adult person exercising a trade may have apprentices. As to the number of such apprentices, the law makes no provision.

In Switzerland, the Federal Government has no power to enact special laws concerning apprentices, such legislation being made by the individual cantons. The laws for the different cantons are very similar. Labor unions may supervise apprentices in their trades, providing the membership of such unions is in the majority. The employer and the apprentice must have a written contract. Apprentices between 13 and 15 years of age must not work more than ten hours per day; those more than 15 years, not more than eleven hours per day.

The regulation of apprenticeship in Germany is provided for by the law of 1897. The apprentice must be directed personally by the employer or by some competent person selected by the employer. The number of apprentices is limited by the central government. In general, the term of service is three years, but it is sometimes lengthened to four by chambers of trade.

In Austria, the term of service is not less than two nor more than four years in non-factory trades, and not more than three years in factory trades. Much attention is being given to perfecting the apprentice system in this country.

Males over 14 years of age and females over 12 may be bound out to the age of 18 years in Ontario, Canada. The provisions of contracts are similar to those in England.

There are no apprentice laws in Belgium.

The apprentice laws of England apply generally in New Zealand.

In New South Wales, children 14 years of age may be bound as apprentices for terms not to exceed seven years.

English laws are in force generally in Western Australia.

TRADE SCHOOLS IN FOREIGN COUNTRIES.

Trade schools in many countries are taking the place of the apprentice system. Austria, in 1898, had ninety-six trade schools giving instruction in almost all crafts. The most important of these institutions is the Technological Industrial Museum at Vienna, where over 1,300 pupils receive instruction in metal and wood industries.

Belgium has a fine system of State-aided industrial schools, with merely nominal or no tuition fees.

Canada has fifteen trade schools supported by the government.

France has a well-regulated system, comprising schools of advanced industrial education, schools for decorative and industrial art, practical schools of commerce and industry, national trade schools, trade schools for several trades, trade schools for single trades, general industrial schools, trade and technical continuation schools and courses, and industrial drawing schools.

Germany has a type of school that does not exist in other countries. The pupil is trained to be a skilled artisan, foreman, superintendent or manager, or employer, in some one trade. For example, if a boy decides to be a foreman he is given special instruction in that line in some particular trade. These schools are supported by the State after they are organized. The schools may be classified as follows: technical colleges, schools and museums of industrial art, schools for foremen, schools for the building trades, schools for the textile trades, trade and industrial continuation schools, and industrial drawing schools.

In England there are scarcely any purely trade or apprentice schools that claim to fit a boy for journeyman work. It is held that trades can not be taught in a school nor yet without a school. In Birmingham, an institution known as the Municipal Technical School exists where pattern-making, carpentry, masonry, plumbing, brass-founding, and sheet-metal work are taught. Graduates state that they get good remunerative positions, and employers state that their school-trained men are their best workmen.

TRADE SCHOOLS IN THE UNITED STATES.

In our own country not nearly as complete a system of trade schools exists as in most European nations. Aside from the instruction given in colleges in connection with the different engineering courses, comparatively little has been attempted along this line. Most of the States, however, are giving more attention to industrial education than was formerly the case.

In New Mexico, the College of Agriculture and Mechanical Arts is devoted to practical instruction in agriculture, mechanical arts, and natural sciences connected therewith, as well as a course of instruction in all branches bearing upon agriculture and other industrial pursuits.

It is supported by the proceeds of the sale of college farm products, by students' fees, taxes, special appropriations, etc.

But little has been done as regards industrial training in Hawaii.

There is an industrial department connected with the State University of Louisiana, but no schools of this type exist alone.

New York has the largest and best equipped trade school in the United States—the New York Trade School. Its purpose is to turn out mechanics of the highest skill. Both the theoretical and the practical parts of trades are taught, but speed and experience are left to be acquired at real work after leaving school. Among the trades given are house and sign painting, blacksmithing, steam and hot-water fitting, bricklaying, plastering, carpentry, pattern-making, printing, electrical work, plumbing, sheet-metal and cornice work. There are several other trade schools of minor importance in New York.

While Massachusetts is not as well supplied with trade schools as is New York, the State compares favorably with the average. The principal trades taught in the schools of this State are bricklaying, carpentry, and plumbing.

The Williamson Free School of Mechanical Trades in Pennsylvania is well known. Carpentry, pattern-making, cabinet-making, bricklaying, machine trade, and steam-fitting are taught. Pennsylvania also has a manual-training school for colored boys.

Of the industrial schools for the training of colored youths, the Tuskegee Institute, in Alabama, is the best known.

Many trade schools of less importance are scattered throughout the United States, including schools in specialties, such as dairying, brewing, watch-making, etc.

The length of time required to finish a course of training in this country is considerably less than in Europe, as is also the time served by apprentices. In many instances boys are indentured for as long a term as ten years, and some continental schools require seven or eight years to complete the course.

THE TRADE SCHOOLS OF CALIFORNIA.

As has already been seen, the apprentice system prevails largely in California, although the number of pupils in the industrial schools is increasing and these institutions are growing in importance. The two principal institutions of this nature are the California School of Mechanical Arts and the Wilmerding School of Industrial Arts, both located in San Francisco. The former was provided for in the will of the late James Lick. Any boy or girl of the State who has completed the eighth grade of the grammar school may be admitted free of tuition. The idea in the mind of the founder was: (1) To give the student a knowledge of the details of one industrial pursuit from which

he can earn a living; (2) To make his acquaintance with tools and materials broad enough so as to allow of fullest development in his particular line; (3) To develop intelligence that will prepare him for duties of active citizenship. The course covers a period of four years—two years preliminary and two at the trade. The industrial branches are made up of three elements: tool work, freehand and mechanical drawing, and household art and science. The graduates are taken by employers as fourth-year apprentices and at the end of a year are rated as full-fledged journeymen.

The second of the above-mentioned schools is the gift of J. C. Wilmerding. Here the building trades are taught—carpentry, cabinet-making, bricklaying, blacksmithing, plumbing, wood-carving, clay-modeling, architecture, and electrical work. The course is four years in length and no tuition fee is charged. Any boy who has graduated from the eighth grade of the grammar school, or who has completed the seventh and is 16 years of age, may be admitted. As yet no class has graduated.

As has been mentioned above, these two schools constitute almost the entire system for the State aside from a few private institutions. They are very intimately connected in work and government as well, the same man being at the head of both. For all practical purposes they may be considered one institution, the study of which will give a very nearly correct estimate of the condition of industrial education in California.

The California School of Mechanical Arts (Lick School) has an average enrollment of 400, and the Wilmerding 187, making a total of 587, of whom 487 are boys. These students come from thirty-five different counties. While in the nature of things a large percentage come from the district contiguous to San Francisco, yet a considerable number come from the interior—about 55 per cent, or about 37 per cent of the total intrants per year; but this class of boys comprises but 20 per cent of the total enrollment, showing that the country boys do not, on an average, attend for as long a time as do the boys from San Francisco and vicinity. In other words, a smaller percentage of the boys from the interior graduate. Of the 365 country students who have entered the Lick School since its founding, but 68, or 18.6 per cent, have graduated. The average length of attendance for the remaining 297 is 1.7 years. The management of the school, having in mind this shorter term of the country students, has made an arrangement whereby they may do considerably more work of a practical nature during the first year than is permitted the students from the bay counties, to the end that the country boy may return to the farm as completely master of the rudiments of the trade as is possible for him to become during his brief term. Statistics from the Wilmerding School point in the

same direction, although this school has not been established as long as the Lick School and the enrollment is not so large. The average length of attendance in the Wilmerding School has been 1.4 years.

The number of journeymen in California engaged in the occupations covered by the curriculum of the Lick and Wilmerding Schools is approximately 30,290. The average number of students graduating yearly from these schools is about 30, or less than one to each one thousand journeymen. This may fairly be said to represent the number of journeymen that may be credited to these institutions. The remainder, putting in from one to two years at learning a trade, go back to the farm or the store, and the net result is the ability of the young farmer to attend to the sanitation of his farm buildings in a more creditable manner, to hang his gate, repair his fence, etc.—things that, without this training, would either be done in a very discreditable manner or left entirely undone.

LABOR ORGANIZATIONS OF CALIFORNIA.

A great deal of care and time have been used in obtaining the following list of labor organizations in California, which includes, with perhaps a very few exceptions, every organization in the State.

In a considerable number of instances no replies were received from secretaries who were communicated with, making it incumbent upon the Bureau to obtain the desired information otherwise, when possible.

With a view to keeping a complete and reliable directory of all labor unions, where it can be at all times at their service, it is very desirable that the various secretaries keep this office advised of any changes in the present existing unions or the organization of new ones.

LABOR UNIONS.

No.	Organization.	Location.	Address.
-----	Actors	San Francisco ..	927 Market street.
-----	Allied Metal-Workers	Bakersfield	-----
75.	Allied Metal-Workers	San Bernardino ..	668 Fifth street.
800.	Amalgamated Carpenters	San Francisco ..	927 Mission street.
229.	Amalgamated Meat Cutters and Butchers	San Diego	1220 India street.
618.	Amalgamated Society Electrical En- gineers	San Francisco ..	102 O'Farrell street.
104.	Amalgamated Sheet-Metal Workers ..	San Francisco ..	121 N. Montgomery street.
279.	Amalgamated Sheet-Metal Workers ..	San Francisco ..	927 Mission street.
309.	Amalgamated Sheet-Metal Workers ..	San José	Phelan Hall.
10167.	Baggage, Messenger and Transfer Men	San Francisco ..	915½ Market street.
37.	Bakers	Los Angeles	430 S. Spring street.
48.	Bakers	Fresno	-----
106.	Bakers	San Francisco ..	117 Turk street.
116.	Bakers	San José	Phelan Hall.
119.	Bakers	Oakland	459 Eleventh street.
120.	Bakers	Stockton	1008 E. Flora street.
232.	Bakers	Santa Rosa	----- [sion st.
274.	Bakers	San Francisco ..	Harmony Hall, 1749 Mis-
324.	Bakers (French-Italian)	San Francisco ..	810 Pacific street.
352.	Bakers	San Francisco ..	-----
-----	Bakers (Cracker)	San Francisco ..	120 O'Farrell street.
-----	Bakers	Sacramento	1019 J street.
24.	Bakers and Confectioners	San Francisco ..	1159 Mission street.
90.	Bakers and Confectioners	San Diego	Box 837.
-----	Bakery Wagon Drivers	San Francisco ..	1155 Mission street.
-----	Bakery Wagon Drivers	Sacramento	1019 J street.
112.	Barbers	Sacramento	926 J street.
134.	Barbers	Oakland	871 Washington street.
148.	Barbers	San Francisco ..	9 City Hall square.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
159.	Barbers	Santa Rosa	520 Fourth street.
252.	Barbers	San José	27 W. Market street.
253.	Barbers	San Bernardino	505 Third street.
256.	Barbers	San Diego	2045 J street.
295.	Barbers	Los Angeles	222½ N. Main street.
312.	Barbers	Stockton	14 E. Webber street.
317.	Barbers	Bakersfield	1903 Chester avenue.
333.	Barbers	Fresno	1037 J street.
335.	Barbers	Vallejo	212 Georgia street.
419.	Barbers	Petaluma	921 Main street.
431.	Barbers	Eureka	435 Second street.
459.	Barbers	Palo Alto	Box 113.
465.	Barbers	Marysville	322 Third street.
483.	Barbers	Napa	108 First street.
495.	Barbers	Hanford	225½ Douty street.
560.	Barbers	Santa Barbara	507 State street.
561.	Barbers	Chico	_____
564.	Barbers	Pasadena	140 N. Vernon avenue.
10849.	Barber-shop Porters and Bathhouse Attendants	San Francisco	117 Turk street.
41.	Bartenders	San Francisco	211 Taylor street.
220.	Bartenders	Eureka	_____
577.	Bartenders	San José	A. O. U. W. Hall.
378.	Bartenders	Bakersfield	_____
768.	Bartenders	San Diego	500 Fifth street.
-----	Bay and River Steamboat Men	San Francisco	54 Mission street.
-----	Bay and River Steamboat Men	Sacramento	200 M street.
293.	Branch 1, Beer Bottlers	San Francisco	1159 Mission street.
293.	Branch 2, Beer Bottlers	Sacramento	2113 O street.
293.	Branch 3, Beer Bottlers	San José	Phelan Hall.
293.	Branch 6, Beer Bottlers	Oakland	217 Fifth street.
293.	Branch 7, Beer Bottlers	Eureka	1252 East avenue.
293.	Branch 8, Beer Bottlers	Bakersfield	15th and K streets.
227.	Branch 1, Brewery Wagon Drivers (Keg Beer)	San Francisco	1159 Mission street.
227.	Branch 2, Brewery Wagon Drivers (Keg Beer)	San Francisco	1159 Mission street.
227.	Branch 4, Brewery Wagon Drivers	Sacramento	1414 Ninth street.
227.	Branch 5, Brewery Wagon Drivers	Stockton	1453 S. Hunter street.
227.	Branch 6, Brewery Wagon Drivers (Bottled Beer)	San Francisco	1159 Mission street.
-----	Bicycle and Auto Mechanics	San Francisco	915½ Market street.
99.	Blacksmiths (Carriage)	San Francisco	1133 Mission street.
-----	Blacksmiths	Sacramento	_____
115.	Blacksmiths	San José	Phelan Hall.
168.	Blacksmiths (Ship Mechanics)	San Francisco	120 O'Farrell street.
183.	Blacksmiths	Bakersfield	1013 Ninth street.
221.	Blacksmiths	San Bernardino	293 Third street.
284.	Blacksmiths	Santa Rosa	320 Fourth street.
410.	Blacksmiths	Watsonville	Friermouth's Hall.
425.	Blacksmiths	San Diego	_____
316.	Blacksmiths' Helpers	San Francisco	120 N. Montgomery street.
8922.	Blacksmiths' Helpers	San Francisco	1133 Mission street.
-----	Boat-Builders	San Francisco	Pioneer Hall, 24 Fourth st.
9072.	Boat-Builders	Vallejo	516 Capitol street.
-----	Bottle-Caners	San Francisco	1159 Mission street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
25.	Boilermakers and Iron Shipbuilders	San Francisco	120 O'Farrell street.
103.	Boilermakers and Iron Shipbuilders' Helpers	Vallejo	_____
148.	Boilermakers and Iron Shipbuilders	Vallejo	_____
205.	Boilermakers and Iron Shipbuilders	San Francisco	121 N. Montgomery street.
374.	Boilermakers and Iron Shipbuilders	San Francisco	1133 Mission street.
25.	Boilermakers and Iron Shipbuilders' Helpers	San Francisco	120 O'Farrell street.
76.	Boilermakers' Helpers (Bro. of)	San Bernardino	Labor Hall.
-----	Boilermakers	Sacramento	1019 J street.
295.	Boilermakers	Bakersfield	_____
31.	Bookbinders	San Francisco	120 O'Farrell street.
125.	Bookbinders (Women's Union)	San Francisco	120 O'Farrell street.
35.	Bookbinders	Sacramento	1019 J street.
-----	Bookbinders	Los Angeles	320 W. Fortieth street.
-----	Bootblacks	Sacramento	1019 J street.
-----	Bootblacks	San Francisco	518 Broadway.
9196.	Bootblacks	Stockton	10 N. Sutter street.
339.	Boot and Shoe Cutters	San Francisco	102 O'Farrell street.
-----	Boot and Shoe Repairers	San Francisco	102 O'Farrell street.
216.	Boot and Shoe Workers	San Francisco	120 O'Farrell street.
-----	Boot and Shoe Workers	Sacramento	1019 J street.
145.	Boxmakers	San José	Champion Hall, S. 1st st.
152.	Boxmakers and Sawyers	San Francisco	120 O'Farrell street.
158.	Brass and Chandelier Workers	San Francisco	1133 Mission street.
67.	Brass Workers	Los Angeles	508 S. St. Louis street.
7.	Brewery Workmen (United)	San Francisco	1159 Mission street.
7.	Branch 1, Br'w'y W'rkm'n (Germ'n)	San Francisco	1159 Mission street.
7.	Branch 2, Brewery Workmen	San José	Foresters' Hall.
7.	Branch 3, Brewery Workmen	San Diego	Second and D streets.
7.	Branch 4, Brewery Workmen	Los Angeles	941 Sunbury street.
7.	Branch 5, Brewery Workmen (American)	San Francisco	1159 Mission street.
7.	Branch 6, Brewery Workmen	Sacramento	1019 J street.
7.	Branch 8, Brewery Workmen	Santa Rosa	Box 393.
-----	Bricklayers	Oakland	459 Eleventh street.
-----	Bricklayers	Fresno	118 Clark street.
3.	Bricklayers	Bakersfield	Court-House.
-----	Bricklayers	Sacramento	1019 J street.
7.	Bricklayers	San Francisco	121 Eddy street.
-----	Bricklayers	San José	89 Third street.
33.	Brick, Tile, and Terra Cotta Workers	Oakland	507 Taylor Ave., Alameda.
35.	Brick, Tile, and Terra Cotta Workers	Lincoln	_____
62.	Brick, Tile, and Terra Cotta Workers	San Francisco	South San Francisco.
161.	Brick, Tile, and Terra Cotta Workers	Antioch	_____
-----	Brick, Tile, and Terra Cotta Workers	Sacramento	1019 J street.
162.	Brick, Tile, and Terra Cotta Workers	San José	First and Post streets.
163.	Brick, Tile, and Terra Cotta Workers	Pleasanton	_____
123.	Brick Workers	San Francisco	Twin Peaks Hall.
162.	Brick Workers	San José	Phelan Hall.
31.	Bridge and Structural Iron Work'rs	San Francisco	120 O'Farrell street.
53.	Broommakers	Los Angeles	1229 E. Ninth street.
58.	Broommakers	San Francisco	915½ Market street.
-----	Broommakers	Sacramento	_____
-----	Building Material Team Drivers	Sacramento	1019 J street.
2.	Building Material Team Drivers	Palo Alto	Board of Trade.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
-----	Building Material Team Drivers	San José	Phelan Hall.
216.	Building Material Team Drivers	San Francisco	Teutonia Hall.
10648.	Burlap and Cotton Bag Workers	San Francisco	320 Post street.
115.	Butchers (Meat Cutters and Drivers)	San Francisco	310 O'Farrell street.
115.	Butchers (Sausage-makers)	San Francisco	310 O'Farrell street.
115.	Butchers (Cattle)	San Francisco	310 O'Farrell street.
15.	Butchers (Sheep)	San Francisco	310 O'Farrell street.
15.	Butchers (Hog and Pork Packers)	San Francisco	310 O'Farrell street.
20.	Butchers	Oakland	1022 San Pablo avenue.
126.	Butchers	Fresno	1359 J street.
127.	Butchers	Stockton	419 S. Grant street.
130.	Butchers	San José	K. of P. Hall.
193.	Butchers	Bakersfield	-----
229.	Butchers	San Diego	1220 India street.
266.	Butchers	Los Angeles	1444 Starr street.
284.	Butchers	Pasadena	130 E. California street.
298.	Butchers	Salinas	126 Capitol street.
217.	Butchers and Meat Cutters	Vallejo	-----
265.	Butchers (Mixed)	Los Angeles	533 Ducommon street.
321.	Butchers (Mixed)	S. Bernardino	436 Fifth street.
1.	Canmakers (Ladies' Auxiliary)	San Francisco	1133 Mission street.
22.	Carpenters	San Francisco	927 Mission street.
35.	Carpenters	San Rafael	121 Ross street.
36.	Carpenters	Oakland	665 Fifteenth street.
95.	Carpenters	San Francisco	Garibaldi Hall.
162.	Carpenters	San Mateo	-----
180.	Carpenters	Vallejo	202 Kentucky street.
194.	Carpenters	Alameda	2253 Clinton avenue.
235.	Carpenters	Riverside	173 E. Fourth street.
262.	Carpenters (Mill)	San José	464 Bird avenue.
266.	Carpenters	Stockton	1036 E. Church street.
304.	Carpenters (German)	San Francisco	25 Angelica street.
316.	Carpenters	San José	Phelan Hall.
332.	Carpenters	Los Angeles	1539 W. First street.
354.	Carpenters	Gilroy	Box 97.
422.	Carpenters (Mill)	San Francisco	29½ Park Grove avenue.
423.	Carpenters	San Francisco	2405 Eighteenth street.
426.	Carpenters	Los Angeles	2800 Altura street.
483.	Carpenters	San Francisco	915½ Market street.
550.	Carpenters (Mill)	Oakland	Dimond P. O.
586.	Carpenters	Sacramento	2504 J street.
616.	Carpenters (Stair)	San Francisco	1701 Geary street.
642.	Carpenters	Pt. Richmond	East Yard.
668.	Carpenters	Palo Alto	431 Channing avenue.
701.	Carpenters	Fresno	1130 Q street.
710.	Carpenters	Long Beach	824 W. Twenty-second st.
743.	Carpenters	Bakersfield	630 P street.
751.	Carpenters	Santa Rosa	Box 321.
766.	Carpenters (Mill)	San Francisco	1358 Market st., Oakland.
769.	Carpenters	Pasadena	132 N. Pasadena avenue.
771.	Carpenters	Watsonville	155 W. Third street.
806.	Carpenters	Pacific Grove	-----
810.	Carpenters	San Diego	139 National avenue.
815.	Carpenters	Haywards	-----
828.	Carpenters	Menlo Park	-----

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address
829.	Carpenters	Santa Cruz	Seabright.
844.	Carpenters	Los Gatos	Masonic Hall.
925.	Carpenters	Salinas	_____
944.	Carpenters	S. Bernardino	Labor Hall.
981.	Carpenters	Petaluma	678 Keokuk street.
1040.	Carpenters	Eureka	1223 B street.
1043.	Carpenters	Hanford	316 E. Avy street.
1062.	Carpenters	Santa Barbara	Box 44.
1082.	Carpenters	San Francisco	915½ Market street.
1140.	Carpenters	San Pedro	_____
1158.	Carpenters	Berkeley	Shattuck and Vine streets.
1279.	Carpenters (Mill)	Los Angeles	2006 Bay street.
1295.	Carpenters	Tuolumne	Carters P. O.
1343.	Carpenters	Redlands	317 Stuart avenue.
1347.	Carpenters	Los Angeles	Garvanza P. O., L. Angeles.
1376.	Carpenters	Oroville	_____
1400.	Carpenters	Santa Monica	_____
1414.	Carpenters	Pomona	287 W. Eighth street.
1415.	Carpenters	Santa Ana	301 Garnsey street.
1451.	Carpenters	Monterey	_____
1473.	Carpenters	Fruitvale	General delivery.
1484.	Carpenters	Visalia	_____
1486.	Carpenters	Marysville	915 F street.
1487.	Carpenters	Chico	Box 276.
1496.	Carpenters	Fresno	372 Clark street.
1534.	Carpenters	Martinez	_____
1618.	Carpenters (Mill)	Sacramento	513½ J street.
1641.	Carpenters	Lodi	Box 236.
1667.	Carpenters	Oakland	812 Oak street.
1680.	Carpenters	Livermore	Pleasanton.
1710.	Carpenters	Sausalito	_____
1761.	Carpenters	Loyalton	_____
_____	Carpet Mechanics	San Francisco	7 City Hall square.
_____	Carpet Mechanics	San José	Phelan Hall.
_____	Carpet Workers	Oakland	459 Eleventh street.
66.	Carriage Painters	San Francisco	1133 Mission street.
_____	Carriage and Wagon Workers	Sacramento	1019 J street.
65.	Carriage and Wagon Workers	Los Angeles	1335 E. Eighth street.
69.	Carriage and Wagon Workers	San Francisco	117 Turk street.
1.	Casters and Modelers	San Francisco	927 Mission street.
10634.	Cemetery Employés.	San Francisco	Wolf's Hall, Ocean View.
1.	Cement Workers	San Francisco	927 Mission street.
_____	Cement Workers	Sacramento	1019 J street.
_____	Cement Workers	Los Angeles	503½ W. Sixth street.
_____	Cement Workers	Oakland	459 Eleventh street.
2.	Cement Workers	Mayfield	I. O. O. F. Hall.
5.	Cement Workers	San José	Labor Hall.
11090.	Cement Workers	Colton	Box 112.
_____	Cement Laundry Tray Workers	San Francisco	Twin Peaks Hall.
48.	Ceramic, Mosaic Encoustic and Tile Layers	San Francisco	927 Mission street.
_____	Chorus Girls and Assistants	San Francisco	717 Post street.
225.	Cigarmakers	Los Angeles	109 W. First street.
228.	Cigarmakers	Santa Rosa	_____
_____	Cigarmakers	Sacramento	1019 J street.
238.	Cigarmakers	San Francisco	1265 Mission street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
291.	Cigarmakers	San José	Phelan Hall.
-----	Cigarmakers	Oakland	459 Eleventh street.
332.	Cigarmakers	San Diego	1039 Fourth street.
469.	Cigarmakers	Bakersfield	-----
-----	Cigarette-Paper Workers	San Francisco	117 Sixth street.
-----	Cleaning and Dyeing Drivers	San Francisco	Erie and Mission streets.
8.	Cloakmakers	San Francisco	I. O. O. F. Building.
9.	Cloth Hat and Cap Makers	San Francisco	117 Turk street.
34.	Commercial Telegraphers	San Francisco	32 O'Farrell street.
44.	Cooks' Alliance	San Francisco	102 O'Farrell street.
228.	Cooks' Alliance	Los Angeles	-----
683.	Cooks' Alliance	Sacramento	1019 J street.
110.	Cooks (Helpers)	San Francisco	102 O'Farrell street.
-----	Cooks and Waiters	Bakersfield	-----
-----	Cooks and Waiters	Oakland	459 Eleventh street.
-----	Cooks and Waiters	San José	Phelan Hall.
375.	Cooks and Waitresses	San Diego	Snyder Block.
9539.	Composition Roofers	Los Angeles	471 Commercial street.
111.	Conductors (Order of Railway)	Los Angeles	220½ Main street.
115.	Conductors (Order of Railway)	San Francisco	120 O'Farrell street.
195.	Conductors (Order of Railway)	Sacramento	New Foresters' Hall.
282.	Conductors (Order of Railway)	Needles	K. of P. Hall.
364.	Conductors (Order of Railway)	Oakland	7th and Peralta streets.
392.	Conductors (Order of Railway)	San Bernardino	333 Third street.
404.	Conductors (Order of Railway)	Kern City	K. of P. Hall.
412.	Conductors (Order of Railway)	Fresno	O. R. C. Hall, J street.
440.	Conductors (Order of Railway)	San Luis Obispo	Elks' Hall.
28.	Coopers (Slack Work)	San Francisco	1133 Mission street.
65.	Coopers	San Francisco	121 Eddy street.
131.	Coopers (Machine)	San Francisco	1133 Mission street.
152.	Coopers	Los Angeles	128 N. Main street.
-----	Coopers	Los Angeles	510 E. Fourth street.
189.	Coopers	Santa Cruz	-----
-----	Coopers	Felton	-----
11.	Coppersmiths	San Francisco	117 Turk street.
68.	Coremakers	San Francisco	1133 Mission street.
352.	Cracker Packers	San Francisco	120 O'Farrell street.
-----	Derrickmen and Engineers	San Francisco	1133 Mission street.
472.	Drug Clerks	San Francisco	31 Second street.
-----	Drug Clerks	Sacramento	1019 J street.
6.	Electrical Workers	San Francisco	35 Eddy street.
36.	Electrical Workers	Sacramento	1019 J street.
116.	Electrical Workers	Los Angeles	1006 W. Jefferson street.
151.	Electrical Workers	San Francisco	35 Eddy street.
180.	Electrical Workers	Santa Rosa	-----
180.	Electrical Workers	Vallejo	-----
207.	Electrical Workers, Sub-Local No. 1.	Stockton	320 N. Aurora street.
250.	Electrical Workers	San José	Phelan Hall.
283.	Electrical Workers (Trimmers)	San Francisco	Alcazar Building.
289.	Electrical Workers	Santa Cruz	-----
298.	Electrical Workers	San Francisco	921 Market street.
340.	Electrical Workers	Sacramento	1019 J street.
465.	Electrical Workers	San Diego	A. O. F. Hall.
-----	Electrical Workers	Bakersfield	-----
-----	Elevator Constructors	San Francisco	102 O'Farrell street.
10324.	Elevator Operators	San Francisco	120 O'Farrell street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
5.	Engineers (Bro. of Locomotive).....	Los Angeles	1015 Hawley street.
110.	Engineers (Bro. of Locomotive).....	Sacramento	921 Nineteenth street.
126.	Engineers (Bro. of Locomotive).....	Kern City	Box 36.
161.	Engineers (Bro. of Locomotive).....	San Francisco	3664 Nineteenth street.
283.	Engineers (Bro. of Locomotive).....	West Oakland	2241 Rose street, Berkeley.
383.	Engineers (Bro. of Locomotive).....	Needles	Box 59.
398.	Engineers (Bro. of Locomotive).....	San Bernardino	641 Fifth street.
415.	Engineers (Bro. of Locomotive).....	Rocklin	Masonic Hall.
425.	Engineers (Bro. of Locomotive).....	Dunsmuir	Branstetter's Hall.
553.	Engineers (Bro. of Locomotive).....	Fresno	627 P street.
.....	Engineers, Stationary.....	Oakland	918 Washington street.
171.	Engineers, Stationary.....	San José	Little Champion Hall.
64.	Engineers, Steam.....	San Francisco	120 O'Farrell street.
72.	Engineers, Steam.....	Los Angeles	229 N. Bunker Hill avenue.
147.	Engineers, Steam.....	Santa Rosa	.....
659.	Expressman.....	San Diego	A. O. F. Hall.
.....	Felt and Composition Roofers.....	San Francisco	927 Mission street.
58.	Firemen (Bro. of Locomotive).....	Rocklin	Masonic Hall.
91.	Firemen (Bro. of Locomotive).....	San Francisco	1691 Folsom street.
97.	Firemen (Bro. of Locomotive).....	Los Angeles	116 South Avenue 24th.
139.	Firemen (Bro. of Locomotive).....	Kern	Box 322.
143.	Firemen (Bro. of Locomotive).....	Oakland	1020 Linden street.
260.	Firemen (Bro. of Locomotive).....	Sacramento	610½ I street.
312.	Firemen (Bro. of Locomotive).....	Dunsmuir	K. of P. Hall.
314.	Firemen (Bro. of Locomotive).....	San Bernardino	330 Leland avenue.
327.	Firemen (Bro. of Locomotive).....	Needles	Box 131.
386.	Firemen (Bro. of Locomotive).....	San Diego	957 Columbia street.
566.	Firemen (Bro. of Locomotive).....	Fresno	Box 585.
11353.	Fish-Cleaners.....	San Francisco	423 Broadway.
.....	Fishermen's Protective.....	San Francisco	9 Mission street.
9899.	Fishermen's Protective.....	San Pedro	Box 2287.
10637.	Fishermen's Protective.....	San Diego	325 F street.
11136.	Fishermen's Protective.....	Sacramento	Broderick P. O.
11233.	Fishermen's Protective.....	Monterey	Box 133.
64.	Flour and Cereal Mill Employés.....	San Francisco	1159 Mission street.
.....	Flour and Cereal Mill Employés.....	Sacramento	.....
8.	Foundry Employés.....	San Francisco	1133 Mission street.
59.	Freight-Handlers.....	San Francisco	Alcazar Building.
235.	Freight-Handlers.....	Oakland	California Hall.
.....	French Laundry Workers.....	San Francisco	117 Turk street.
1.	Furniture-Handlers.....	San Francisco	927 Mission street.
.....	Furniture and Piano Drivers and Helpers.....	San Francisco	7 City Hall square.
125.	Garment Workers.....	Los Angeles	1315 Palmer street.
131.	Garment Workers.....	San Francisco	120 O'Farrell street.
.....	Gas and Electric Fixture Hangers.....	San Francisco	927 Mission street.
9840.	Gas Workers.....	San Francisco	Alcazar Building.
10678.	Gas Workers.....	Oakland	162 Seventh street.
11560.	Gas Workers.....	Fresno	626 K street.
11633.	Gas Workers.....	San José	55 Wilson avenue.
.....	Glass Bottle Blowers.....	San Francisco	Twelfth and Folsom sts.
.....	Glass Workers.....	Los Angeles	1400 Magnolia avenue.
.....	Glaziers and Ornamental Glass Workers.....	San Francisco	14 Third street.
10028.	Glovemakers.....	San Francisco	24 Fourth street.
17.	Glovemakers.....	San Francisco	32 O'Farrell street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
537.	Grain and Freight Handlers	Crockett	_____
-----	Granite Cutters	San Francisco	927 Mission street.
-----	Granite Cutters	Sacramento	1019 J street.
-----	Granite Cutters	Los Angeles	319 W. Eighth street.
-----	Granite Cutters	Sacramento	Rocklin, Cal.
-----	Granite Cutters	San Diego	_____
648.	Grocery Clerks	San Francisco	31 Second street.
224.	Hackmen	San Francisco	310 O'Farrell street.
616.	Hackmen	San José	Fountain street.
-----	Hatters	San Francisco	_____
-----	Harnessmakers	San Francisco	1159 Mission street.
59.	Hoisting Engineers	San Francisco	32 O'Farrell street.
-----	Hodcarriers	Sacramento	1019 J street.
-----	Hodcarriers	Bakersfield	_____
139.	Hodcarriers	Santa Rosa	_____
8333.	Hodcarriers	Los Angeles	318 W. Fourth street.
73.	Hodcarriers	Stockton	Arcade Building.
-----	Hodcarriers	Fresno	_____
11164.	Horticultural Supplies and Novelty		
-----	Builders	San José	K. of P. Hall.
25.	Horseshoers	San Francisco	909 Market street.
-----	Horseshoers	Los Angeles	16th and Figueroa streets.
58.	Horseshoers	San José	Phelan Hall.
187.	Horseshoers	San Diego	1227 Fifth street.
10038.	Hospital Employés	Napa	State Hospital.
10492.	Hospital Employés	Stockton	State Hospital.
10768.	Hospital Employés	Glen Ellen	State Hospital.
601.	Hotel and Restaurant Employés	Santa Rosa	_____
-----	Housemovers	San Francisco	Harmony Hall.
-----	Housemovers	Oakland	459 Eleventh street.
-----	House Raisers and Movers	Sacramento	1019 J street.
-----	Housesmiths and Architectural Iron		
-----	Workers	San Francisco	120 O'Farrell street.
-----	Ice Wagon Drivers	Sacramento	1016 N street.
-----	Ice Wagon Drivers and Helpers	San Francisco	7 Marshall square.
164.	Ironmolders	San Francisco	1133 Mission street.
-----	Ironmolders	Sacramento	1019 J street.
-----	Ironmolders	Los Angeles	_____
-----	Janitors	San Francisco	120 O'Farrell street.
-----	Janitors	Sacramento	1019 J street.
-----	Journymen Stone Cutters	San Francisco	121 Eddy street.
8944.	Laborers' Protective (Hodcarriers)	San Francisco	Teutonia Hall.
10182.	Laborers' Protective	Sacramento	1607 K street.
10284.	Laborers' Protective	Stockton	Box 118.
10772.	Laborers' Protective	Oakland	676 Twenty-sixth street.
11417.	Laborers' Protective	Sacramento	1607 K street.
-----	Laborers' Protective	San José	Phelan Hall.
-----	Laborers' Protective (Building)	Los Angeles	Pasadena.
160.	Laborers' Protective (Building)	Santa Cruz	_____
-----	Laborers' Protective	Fresno	Union Hall.
2.	Laborers' Protective	Bakersfield	_____
-----	Ladies' Tailors	San Francisco	115 Turk street.
42.	Lathers	Los Angeles	313 Amelia street.
-----	Lathers	Sacramento	1019 J street.
-----	Lathers	Oakland	459 Eleventh street.
144.	Lathers	San José	Labor Hall.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
-----	Lathers-----	San Francisco	116 Turk street.
-----	Laundry Drivers-----	Oakland	918 Washington street.
-----	Laundry Drivers-----	Los Angeles	430 Beaudry street.
256.	Laundry Drivers-----	San Francisco	3 Tenth street.
-----	Laundry Drivers-----	Sacramento	-----
-----	Laundry Workers-----	Sacramento	-----
23.	Laundry Workers-----	San Francisco	117 Turk street.
26.	Laundry Workers-----	San Francisco	927 Market street.
33.	Laundry Workers-----	San José	Red Star Laundry.
52.	Laundry Workers-----	Los Angeles	240 S. Broadway.
55.	Laundry Workers-----	Oakland	525 Thirteenth street.
72.	Laundry Workers-----	Stockton	128 N. Aurora street.
75.	Laundry Workers-----	Sacramento	2416 P street.
86.	Laundry Workers-----	Fresno	8 Tulare avenue.
113.	Laundry Workers-----	Vallejo	518 Ohio street.
116.	Laundry Workers-----	San Bernardino	Labor Hall.
-----	Laundry Workers-----	Pt. Richmond	-----
141.	Laundry Workers-----	Bakersfield	Box 111.
146.	Laundry Workers-----	Santa Rosa	Box 343.
175.	Laundry Workers-----	Kern	-----
194.	Laundry Workers-----	Santa Barbara	211 W. Haley street.
201.	Laundry Workers-----	San Diego	State and B streets.
202.	Laundry Workers-----	Palo Alto	Box 294.
10848.	Lead Paint and Oil Workers-----	San Francisco	South S. F., Baden.
40.	Leather Workers-----	Santa Rosa	121 Fourth street.
72.	Leather Workers-----	Los Angeles	Labor Hall.
68.	Leather Workers-----	Sacramento	1022 O street.
110.	Leather Workers-----	San José	K. of P. Hall.
57.	Leather Workers (on Horse Goods)-----	San Francisco	102 O'Farrell street.
11050.	Lime Workers-----	Santa Cruz	Box 306.
17.	Lithographers-----	San Francisco	120 O'Farrell street.
10.	Lithographers' Apprentices and Press Feeders-----	San Francisco	1133 Mission street.
207.	Longshoremen-----	San Diego	233 H street.
224.	Longshoremen-----	San Francisco	1133 Mission street.
241.	Longshoremen-----	Stockton	Box 50.
511.	Longshoremen-----	Sacramento	1224 Third street.
541.	Longshoremen-----	San Pedro	Box 2127.
-----	Lumber Clerks-----	San Francisco	927 Mission street.
1.	Lumber Handlers-----	San José	Phelan Hall.
2.	Lumber Handlers-----	Palo Alto	581 Addison avenue.
292.	Lumber Handlers-----	Stockton	330 S. El Dorado street.
417.	Lumber Handlers-----	San Diego	233 H street.
551.	Lumber Handlers-----	Redondo	Box 146.
11474.	Lumber Handlers-----	Sacramento	1309 Fourth street.
225.	Lumber Handlers and Tallymen-----	Oakland	601 Broadway.
550.	Lumber Handlers and Tallymen-----	Los Angeles	1321 Second street.
9325.	Lumbermen-----	Los Angeles	-----
169.	Lumbermen and Freight Handlers-----	Eureka	308 Second street.
631.	Lumbermen and Freight Handlers-----	San Pedro	-----
5.	Machinists-----	Kern	K. of P. Hall.
15.	Machinists-----	San Bernardino	140 S. G street.
28.	Machinists-----	Needles	Box 97.
33.	Machinists-----	Sacramento	Pioneer Hall.
68.	Machinists-----	San Francisco	1159 Mission street.
252.	Machinists-----	Vallejo	Labor Bureau Hall.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
284.	Machinists	Oakland	1015 Clay street.
311.	Machinists	Los Angeles	119½ Spring street.
364.	Machinists	Stockton	Red Men's Hall.
442.	Machinists	Dunsmuir	_____
504.	Machinists	San José	47 North First street.
540.	Machinists	Eureka	Federation Hall.
566.	Machinists	Rocklin	_____
610.	Machinists	Oakland	Sunset Hall, W. Oakland.
655.	Machinists	Fresno	835 I street.
661.	Machinists	Los Angeles	482 Solano street.
675.	Machinists	Richmond	_____
6.	Apprentices (Machinists')	San Francisco	1159 Mission street.
12.	Apprentices (Machinists')	Oakland	California Hall.
27.	Machine Hands	San Francisco	Alcazar Building.
18.	Mailers (Newspapers)	San Francisco	102 O'Farrell street.
-----	Maintenance of Way	Colton	_____
-----	Mantel, Tile, and Grate Setters	San Francisco	1133 Mission street.
44.	Marble Cutters and Finishers	San Francisco	117 Turk street.
-----	Marine Cooks and Stewards	San Francisco	Steuart and Mission streets.
-----	Marine Cooks and Stewards	San Pedro	Box 2155.
35.	Marine Engineers	San Francisco	36 East street.
-----	Marine Firemen	San Francisco	46 Steuart street.
-----	Marine Painters	San Francisco	1159 Mission street.
67.	Metal Polishers (B. W.)	Los Angeles	107½ North Main street.
128.	Metal Polishers	San Francisco	1133 Mission street.
158.	Metal Polishers (B. W.)	San Francisco	1133 Mission street.
-----	Milkers	Sacramento	_____
7595.	Milkers	Los Angeles	1010 Dewey avenue.
8861.	Milkers	San Francisco	431 Pine street.
226.	Milk Drivers	San Francisco	927 Market street.
262.	Millmen	San José	Phelan Hall.
422.	Millmen	San Francisco	Eintracht Hall.
423.	Millmen	San Francisco	927 Mission street
766.	Millwrights	San Francisco	927 Mission street.
12.	Miners	Paloma	Box 3, Fostoria.
25.	Miners	Winston	Box 103.
39.	Miners	Groveland	_____
44.	Miners	Randsburg	Box 398.
51.	Miners	Mojave	Box 1.
55.	Miners	Calaveras	Box 1060, Angels Camp.
61.	Miners	Bodie	_____
73.	Miners	Tuolumne	Box 101, Stent.
87.	Miners	Summerville	Box 155, Carters.
88.	Miners	Placer	Dutch Flat.
90.	Miners	Grass Valley	Box 199.
109.	Miners	Soulsbyville	_____
115.	Miners	Jackson	Box 212.
120.	Miners	El Dorado	_____
127.	Miners	Woods Creek	Box 16, Chinese Camp.
133.	Miners	Sutter	Sutter Creek.
141.	Miners	French Gulch	_____
166.	Miners	Independence	Hobson postoffice.
167.	Miners	Winthrop	_____
173.	Miners (Selby Smelter Union)	Selby	Box 145, Crockett.
176.	Miners	Eureka	Gaston postoffice.
180.	Miners	Hayden Hill	_____

LABOR UNIONS—Continued,

No.	Name of Organization.	Where Located.	Address.
182.	Miners	Columbia	_____
183.	Miners	Scott Valley	Fort Jones.
185.	Miners	Jamestown	_____
188.	Miners	Harrison	Box 27, Knob postoffice.
196.	Miners	Mokelumne	Mokelumne Hill.
197.	Miners	Enterprise	Plymouth.
198.	Miners (Jackson Engineers)	Jackson	_____
202.	Miners	Jacksonville	_____
203.	Miners	Dedrick	_____
204.	Miners	Campo Seco	_____
206.	Miners	Placerville	_____
135.	Miners	Amador	Box 5.
-----	Mineral Wagon Drivers	San Francisco	117 Turk street.
-----	Mosaic Workers	San Francisco	915½ Market street.
-----	Musicians	Fresno	_____
-----	Musicians	Sacramento	_____
6.	Musicians	Oakland	459 Eleventh street.
47.	Musicians	Los Angeles	Caledonia Hall.
153.	Musicians	San José	Champion Hall.
199.	Musicians	Vallejo	_____
292.	Musicians	Santa Rosa	College avenue.
325.	Musicians	San Diego	_____
357.	Musicians	San Bernardino	Rural Delivery No. 1.
377.	Musicians	Napa	147 Union street.
11354.	Newsboys' Protective	San Francisco	127 Mason street.
13.	Newspaper Writers	Stockton	Care of "Independent."
15.	Newspaper Writers	San José	_____
9585.	Ordnance Men	Vallejo	_____
10497.	Oyster Workers	San Francisco	32 O'Farrell street.
-----	Pacific Coast Marine Firemen	San Francisco	46 Steuart street.
19.	Painters	San Francisco	927 Mission street.
267.	Painters	Los Angeles	Caledonia Hall. [Block.
-----	Painters	Los Angeles	Pasadena, Williams College
271.	Painters	Los Gatos	_____
274.	Painters	Stockton	Arcade Building.
294.	Painters	Fresno	Union Hall.
-----	Painters	S. Bernardino	Labor Hall.
314.	Painters	Bakersfield	_____
322.	Painters	Napa	Central Hotel.
333.	Painters	San Diego	Eighth street, bet. D and E.
364.	Painters	Santa Rosa	205 College avenue.
-----	Painters	Oakland	459 Eleventh street.
388.	Painters	Mayfield	_____
396.	Painters	Eureka	_____
507.	Painters	San José	Maccabee Hall.
649.	Painters	Santa Cruz	_____
750.	Painters	Watsonville	Foresters' Hall.
-----	Painters and Decorators	Sacramento	1019 J street.
376.	Painters and Decorators	Vallejo	_____
815.	Painters and Decorators	Redlands	_____
1.	Paint-burners	San Francisco	22d and Potrero streets.
-----	Paperbox-makers	San Francisco	102 O'Farrell street.
10567.	Pastemakers	San Francisco	423 Broadway.
509.	Paperhangers	San Francisco	915½ Market street.
-----	Patent Chimney Builders	San Francisco	927 Mission street.
-----	Patternmakers	San Francisco	305 Larkin street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
-----	Patternmakers	Los Angeles	205½ S. Main street.
-----	Patternmakers	San Francisco	927 Market street.
8895.	Pavers	San Francisco	120 Ninth street.
31.	Paving Cutters	Santa Rosa	Melitta, Sonoma County.
11038.	Photographers	San Francisco	20 Eddy street.
8.	Photo-Engravers	San Francisco	-----
147.	Picture Frame Workers	San Francisco	117 Turk street.
147.	Pile Drivers and Structural Iron Workers	San Francisco	9 Mission street.
374.	Pipe and Tank Makers	San Francisco	1133 Mission street.
-----	Pipe and Tank Makers	Sacramento	1621 F street.
9078.	Pipe and Tank Makers	Los Angeles	245 E. Ann street.
2.	Plasterers	Los Angeles	119½ E. First street.
66.	Plasterers	San Francisco	120 O'Farrell street.
-----	Plasterers	Sacramento	1019 J street.
194.	Plasterers	Los Angeles	California Hall.
-----	Plasterers	Oakland	459 Eleventh street.
222.	Plasterers	Stockton	Yosemite Building.
-----	Plumbers	Sacramento	1019 J street.
-----	Plumbers	Los Angeles	Pasadena.
251.	Plumbers	Santa Rosa	200 Olive street.
269.	Plumbers	Bakersfield	1419 Twentieth street.
-----	Plumbers	Palo Alto	Madison Thoits Building.
-----	Plumbers	San Diego	1031 Sixteenth street.
293.	Plumbers	San José	Phelan Building.
364.	Plumbers	Redlands	-----
365.	Plumbers	Santa Cruz	-----
-----	Plumbers and Gas Fitters	Oakland	459 Eleventh street.
442.	Plumbers, Gas and Steam Fitters	San Francisco	32 O'Farrell street.
-----	Plumbers, Gas and Steam Fitters	Stockton	Arcade Building.
-----	Plumbers, Gas and Steam Fitters	San Bernardino	Labor Hall.
230.	Plumbers, Gas Fitters, Steam Fit- ters, and Steam Fitters' Helpers	San Diego	1244 Seventeenth street.
9050.	Poultry and Game Dressers	San Francisco	102 O'Farrell street.
-----	Powder Workers	Santa Cruz	-----
33.	Pressfeeders	San Francisco	Alcazar Building.
37.	Pressfeeders	Los Angeles	Labor Hall.
60.	Pressmen	Sacramento	1019 J street.
78.	Pressmen	Los Angeles	3112 Eagle street.
125.	Pressmen	Oakland	918 Washington street.
132.	Pressmen	Stockton	630 N. Union street.
140.	Pressmen	San Diego	966 Third street.
146.	Pressmen	San José	400 W. San Carlo street.
159.	Pressmen	Fresno	Porteus Block.
4.	Pressmen, Web	San Francisco	Alcazar Building.
24.	Printing Pressmen	San Francisco	32 O'Farrell street.
-----	Quarrymen	Sacramento	1019 J street.
-----	Quarrymen	San José	89 S. Third street.
-----	Quarrymen	Greystone	-----
11090.	Quarrymen	Colton	Box 112.
9120.	Rammermen	San Francisco	120 Ninth street.
83.	Range Workers	San Francisco	117 Turk street.
242.	Reed and Rattan Workers	San Francisco	117 Turk street.
-----	Retail Clerks	Oakland	Fraternal Hall.
-----	Retail Clerks	Los Angeles	S. Spring street.
55.	Retail Clerks	Sacramento	1019 J street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
113.	Retail Clerks	Santa Rosa	807 Humboldt avenue.
137.	Retail Clerks	Bakersfield	_____
170.	Retail Clerks	Fresno	Union Hall.
383.	Retail Clerks	San Bernardino	502 Fifth street.
353.	Retail Clerks	Vallejo	_____
428.	Retail Clerks	San José	Little Champion Hall.
432.	Retail Clerks	San Francisco	Pioneer Building.
512.	Retail Clerks	Watsonville	Native Sons' Hall.
541.	Retail Clerks	Eureka	_____
715.	Retail Clerks	Napa	Behlow Block.
769.	Retail Clerks	San Diego	1365 First street.
790.	Retail Clerks	Palo Alto	Nortree Hall.
_____	Retail Clerks	Stockton	I. O. O. F. Hall.
_____	Retail Clerks	Santa Cruz	_____
278.	Retail Delivery Drivers	San Francisco	32 O'Farrell street.
_____	Retail Grocery Clerks	Sacramento	1019 J street.
410.	Retail Shoe Clerks	San Francisco	120 O'Farrell street.
10298.	Riggers' Protective	San Francisco	10 Howard street.
222.	Riggers and Stevedores	San Francisco	121 New Montgomery St.
65.	Roofers	San Francisco	121 Eddy street.
10425.	Rope and Cordage Workers	San Francisco	24th and Folsom streets.
_____	Sailors' Union of the Pacific	Eureka	Box 327.
_____	Sailors' Union of the Pacific	San Francisco	Mission and East streets.
_____	Sailors' Union of the Pacific	San Pedro	Box 2380.
610.	Salesladies and Milliners	San Francisco	31 Second street.
444.	Sanitary Wagon Drivers	San Francisco	423 Broadway.
11536.	Sawmillmen's Protective	Loyalton	_____
10330.	Sawmill Workers	Falk	_____
10798.	School Teachers	San José	Alameda & University Ave.
10719.	Sewer Workers	Oakland	373 Forty-ninth street.
104.	Sheet Metal Workers (Cornice)	San Francisco	121 Eddy street.
108.	Sheet Metal Workers	Los Angeles	127 N. Main street.
162.	Sheet Metal Workers	Sacramento	1019 J street.
216.	Sheet Metal Workers	Oakland	459 Eleventh street.
221.	Sheet Metal Workers	Vallejo	_____
249.	Sheet Metal Workers (Canmakers)	San Francisco	Alcazar Building.
252.	Sheet Metal Workers	Fresno	Edgerly Hall.
273.	Sheet Metal Workers	Sacramento	1019 J street.
276.	Sheet Metal Workers	San Diego	A. O. F. Hall.
279.	Sheet Metal Workers (Roofers)	San Francisco	1504 Market street.
293.	Sheet Metal Workers	San José	Phelan Hall.
343.	Sheet Metal Workers	Santa Barbara	_____
1.	Shinglers	San Francisco	117 Turk street.
9253.	Shinglers	Los Angeles	336 Omar avenue.
_____	Shinglers	Oakland	459 Eleventh street.
9036.	Ship Drillers	Vallejo	208 Kentucky street.
9037.	Ship Drillers	San Francisco	1159 Mission street.
9.	Ship Joiners	Vallejo	_____
8970.	Shipkeepers' Protective	Vallejo	1326 Alabama street.
21.	Ship Steamboat Joiners	San Francisco	20 Eddy street.
986.	Ship Steamboat Painters	San Francisco	909 Market street.
_____	Shipwrights	Oakland	618 Broadway.
_____	Shipwrights	San Francisco	320 Post street.
9162.	Shipwrights and Calkers	San Francisco	1054 Kentucky street.
58.	Shipjoiners and Calkers	San Diego	540 Union street.
_____	Shippers' Porters and Packers	San Francisco	117 Turk street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
-----	Shirtwaist and Laundry Workers	Bakersfield	-----
201.	Shirtwaist and Laundry Workers	San Diego	557½ Twelfth street.
-----	Shoemakers	Los Angeles	418 South Spring street.
510.	Sign Writers and Pictorial Artists	San Francisco	927 Mission street.
8.	Slate and Tile Roofers	San Francisco	927 Mission street.
8316.	Soda and Mineral Water Bottlers	Oakland	129 San Pablo avenue.
8510.	Soda and Mineral Water Bottlers	Alameda	1036 Central avenue.
10333.	Soda and Mineral Water Bottlers	San Francisco	Pioneer Building.
-----	Soda and Mineral Water Drivers	San Francisco	117 Turk street.
10385.	Soap, Soda, and Candle Makers	San Francisco	3541 Eighteenth street.
8760.	Stablemen's Protective	San Francisco	310 O'Farrell street.
9026.	Stablemen's Protective	San José	Box 729.
9046.	Stablemen's Protective	Oakland	839 Franklin street.
10075.	Stablemen's Protective	Stockton	28 E. Washington street.
10360.	Stablemen's Protective	Eureka	2035 Fourth street.
10671.	Stablemen's Protective	Los Angeles	124 E. Third street.
9878.	Stablemen's Employés	Sacramento	821 Tenth street.
-----	Stage Hands	Sacramento	-----
-----	Stationary Firemen	San Francisco	120 O'Farrell street.
-----	Stationary Firemen	Sacramento	-----
107.	Stationary Firemen	Vallejo	-----
144.	Steam Engineers	San Diego	1234 Fifth street.
-----	Steam Engineers	Sacramento	-----
46.	Steam Fitters and Helpers	San Francisco	7 City Hall square.
-----	Steam Laundry Workers	San Francisco	1159 Mission street.
-----	Steam Pipe and Boiler Coverers	San Francisco	927 Mission street.
58.	Stereotypers	Los Angeles	964 McGarry street.
29.	Stereotypers and Electrotypers	San Francisco	732 Harrison street.
7.	Stone and Plate Preparers	San Francisco	927 Mission street.
-----	Stone Sawyers	San Francisco	927 Mission street.
-----	Stove Mounters	San Francisco	2730 Twentieth street.
193.	Streetcar Employés	Oakland	1141 Webster st., Alameda.
205.	Streetcar Employés	San Francisco	310 O'Farrell street.
260.	Streetcar Employés	Sacramento	2412 P street.
265.	Streetcar Employés	San José	39 W. Virginia street.
279.	Streetcar Employés	Stockton	416 E. Grove street.
-----	Stevedores	Oakland	California Hall.
10519.	Sugar Workers	San Francisco	1159 Mission street.
11155.	Sugar Workers	Salinas	-----
43.	Switchmen	Los Angeles	547 Towne avenue.
158.	Switchmen	Oakland	1358 Eighth street.
197.	Switchmen	San Francisco	1014 Lombard street.
-----	Tailors	Sacramento	1019 J street.
2.	Tailors	San Francisco	120 O'Farrell street.
108.	Tailors	Stockton	K. of P. Hall.
339.	Tailors	Bakersfield	-----
9.	Tanners	San Francisco	24th and Potrero avenue.
17.	Tanners	Benicia	Masonic Hall.
102.	Tanners	Napa	37 Elm street.
-----	Teamsters	Sacramento	1019 J street.
85.	Teamsters	San Francisco	1159 Mission street.
177.	Teamsters	San Diego	1446 Hawthorne street.
274.	Teamsters	San Diego	727 Ash street.
-----	Teamsters	Bakersfield	-----
285.	Teamsters	Watsonville	Friermuth Building.
589.	Teamsters	Santa Rosa	Cherry street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
590.	Teamsters	Santa Cruz	-----
660.	Teamsters	Fort Bragg	-----
-----	Teamsters	Santa Cruz	-----
35.	Team Drivers	San José	Phelan Hall.
99.	Team Drivers	San Bernardino	Labor Hall.
417.	Team Drivers	Santa Rosa	100½ Main st.
53.	Telegraphers	Oakland	East Oakland.
11326.	Telephone Operators	Fresno	1215 Belmont avenue.
1.	Tent and Awning Makers	San Francisco	102 O'Farrell street.
16.	Theatrical Stage Employés	San Francisco	414 Mason street.
11239.	Tiemakers	Fort Bragg	Franklin street.
24.	Tile Layers	Los Angeles	512 E. Eleventh street.
-----	Tinners	San José	Phelan Hall.
-----	Tin and Sheet Metal Workers	San Diego	729 Seventh street.
74.	Tobacco Workers	San Francisco	3014 Twenty-fifth street.
71.	Trainmen (Bro. of Railway)	Oakland	7th and Peralta streets.
73.	Trainmen (Bro. of Railway)	Kern City	K. of P. Hall.
74.	Trainmen (Bro. of Railway)	Los Angeles	2129 Downey avenue.
198.	Trainmen (Bro. of Railway)	San Francisco	120 O'Farrell street.
278.	Trainmen (Bro. of Railway)	San Bernardino	Masonic Hall.
340.	Trainmen (Bro. of Railway)	Sacramento	I street, bet. 7th and 8th.
420.	Trainmen (Bro. of Railway)	Fresno	Y. M. I. Hall.
430.	Trainmen (Bro. of Railway)	Needles	K. of P. Hall.
458.	Trainmen (Bro. of Railway)	Dunsmuir	K. of P. Hall.
653.	Trainmen (Bro. of Railway)	San Luis Obispo	Elks' Hall.
687.	Trainmen (Bro. of Railway)	San Rafael	A. O. U. W. Hall.
-----	Travelers' Goods and Leather Nov- elty Workers	San Francisco	3543 Eighteenth street.
-----	Truck and Heavy-Wagon Drivers	Sacramento	-----
-----	Trunk and Bag Workers	San Francisco	1749 Mission street.
7.	Type Founders	San Francisco	1133 Mission street.
21.	Typographical	San Francisco	533 Kearny street.
36.	Typographical	Oakland	Box 161, Fruitvale.
46.	Typographical	Sacramento	Box 392.
56.	Typographical	Stockton	Box 140.
84.	Typographical	San Bernardino	Labor Hall.
144.	Typographical	Fresno	121 Jensen avenue.
174.	Typographical	Los Angeles	217 S. Broadway.
207.	Typographical	Eureka	634 Second street.
221.	Typographical	San Diego	206 Cleveland avenue.
223.	Typographical	Marysville	-----
231.	Typographical	San José	Whittier ave., E. San José.
254.	Typographical	Riverside	Box 622.
389.	Typographical	Vallejo	Box 231.
394.	Typographical	Santa Barbara	209 E. Cota street.
439.	Typographical	Bakersfield	2015 O street.
475.	Typographical	Redding	-----
521.	Typographical	Palo Alto	Box 173.
543.	Typographical	{ Watsonville -- } { Salinas ----- }	150 Second st., Watsonville.
576.	Typographical	San Luis Obispo	670 Pismo street.
577.	Typographical	Santa Rosa	923 Sonoma avenue.
583.	Typographical	Pasadena	146 Bruce street.
584.	Typographical	Redlands	Care "Citrograph."
585.	Typographical	Santa Ana	628 Parton street.
589.	Typographical	Santa Cruz	15 Boyce street.

LABOR UNIONS—Continued.

No.	Name of Organization.	Where Located.	Address.
600.	Typographical	Petaluma	Box 371.
601.	Typographical	Grass Valley .....	.....
624.	Typographical	San Mateo .....	.....
9049.	Undertakers' Assistants	San Francisco	121 Eddy street.
.....	United Bro. of Railway Employés	Sacramento .....	.....
350.	United Glass Workers	San Francisco	927 Mission street.
9.	Upholsterers	San Francisco	7 City Hall square.
28.	Upholsterers	San Francisco	7 City Hall square.
62.	Upholsterers and Carpet Mechanics	Stockton	Bersaglieri Hall.
134.	Varnishers and Polishers	San Francisco	909 Market street.
30.	Waiters' Alliance	San Francisco	117 Turk street.
31.	Waiters' Alliance	Oakland	453 Eighth street.
47.	Waiters' Alliance	Stockton	Arcade Building.
62.	Waiters' Alliance	Fresno	821 O street.
375.	Waiters' Alliance	San Diego	835 Sixth street.
393.	Waiters' Alliance	Sacramento	526 Oak avenue.
470.	Waiters' Alliance	Redding .....	.....
601.	Waiters' Alliance	Santa Rosa	Box 71.
11437.	Wellborers	Fresno	1044 I street.
.....	Window Shade Workers	San Francisco	927 Mission street.
11147.	Wine and Liquor Handlers	Sacramento .....	.....
10618.	Wine and Liquor Workers	San Francisco	135 Second street.
10325.	Wireworkers	San Francisco	463 Valencia street.
140.	Women's International Label League	Fort Bragg .....	.....
.....	Wood Carvers and Modelers	San Francisco	927 Mission street.
10348.	Woodmen's Protective	Eureka	439 First street.
65.	Wood, Wire and Metal Lathers	San Francisco	116 Turk street.
298.	Wood, Wire and Metal Lathers	Stockton	Arcade Building.
15.	Woodworkers	San Francisco	29½ Oak Grove avenue.
66.	Woodworkers (Furniture)	San Francisco	1805 Howard street.
69.	Woodworkers	Stockton	1620 E. Market street.
145.	Woodworkers	San José	322 E. San Salvador street.
147.	Woodworkers	San Francisco	117 Turk street.
152.	Woodworkers	San Francisco	1469 Sacramento street.
156.	Woodworkers	San Pedro .....	.....
187.	Woodworkers	Truckee .....	.....
202.	Woodworkers	Sanger .....	.....
211.	Woodworkers	Clovis .....	.....
217.	Woodworkers	Pasadena	Box 566.
225.	Woodworkers	Oakland	760 Eleventh street.
242.	Woodworkers	San Francisco	574 Folsom street.
9025.	Wool Sorters and Graders	San Francisco	1133 Mission street.

CENTRAL LABOR BODIES, DEPARTMENTAL COUNCILS, ETC.

	Bakersfield.	
Labor Council .....	.....	Bakersfield.
	Eureka.	
Federated Trades Council .....	.....	412 Second street.
	Fresno.	
Federated Trades and Labor Council .....	.....	820 O street.
Building Trades Council .....	.....	.....
	Fort Bragg.	
Central Labor Council .....	.....	Box 289.

CENTRAL LABOR BODIES, DEPARTMENTAL COUNCILS, ETC.—Continued.

Los Angeles.	
Allied Printing Trades.....	3112 Eagle street.
Building Trades Council.....	651 S. Main street.
Carpenters' District Council.....	1527 N. Main street.
Central Labor Council.....	124 E. Third street.
International Brotherhood of Oil and Gas Well Workers.....	330 S. Soto street.
Napa.	
Federated Trades Council.....	_____
Oakland.	
Allied Printing Trades.....	513 Bush street.
Central Labor Council.....	926 Seventh street.
Carpenters District Council.....	2019 West street.
Building Trades Council.....	459 Eleventh street.
Federated Trades Council.....	1015 Clay street.
Petaluma.	
Building Trades Council.....	_____
Central Labor Union.....	849 Main street.
Redlands.	
Central Labor Council.....	Box 11.
Sacramento.	
Allied Printing Trades.....	1220 I street.
Building Trades Council.....	1019 J street.
Federated Trades Council.....	1621 F street.
San Bernardino.	
Central Labor Council.....	Box 275.
District Lodge Machinists (Santa Fé System).....	_____
Salinas.	
Labor Council.....	_____
San Diego.	
Allied Printing Trades.....	827 D street.
Federated Trades and Labor Council.....	614 Fifth street.
San Francisco.	
Allied Printing Trades.....	Room 20, 533 Kearny st.
Building Trades Council.....	927 Mission street.
City Front Federation.....	44 East street.
Carpenters and Joiners District Council.....	915 $\frac{1}{2}$ Market street.
Cement Workers (Brotherhood of America).....	401 Haywards Building.
California State Building Trades.....	429 Montgomery street.
District Lodge Machinists (S. P. System).....	1159 Mission street.
District Council Retail Clerks.....	31 Second street.
District Council Sheet Metal Workers.....	429 Montgomery street.
Iron Trades Council.....	1159 Mission street.
Labor Council.....	927 Market street.
Provisions Trades Council.....	102 O'Farrell street.
Packing Trades Council.....	210 O'Farrell street.
Painters District Council.....	927 Mission street.
State Federation of Labor.....	1067 Market street.
Team Drivers' Council.....	117 Turk street.
San Jose.	
Building Trades Council.....	Labor Hall.
Federated Trades Council.....	Box 835.
Iron Trades Council.....	Phelan Hall.
San Mateo.	
Labor Council.....	_____
San Pedro.	
Labor Council.....	_____

CENTRAL LABOR BODIES, DEPARTMENTAL COUNCILS, ETC.—Continued.

	Santa Cruz.	
Building Trades Council		_____
Central Labor Council		_____
	Santa Rosa.	
Central Labor Council		512A Fourth street.
	Stockton.	
Building Trades Council		Arcade Building.
Federated Trades Council		Box 378.
	Vallejo.	
Trades and Labor Council		621 Alabama street.
	Watsonville.	
Central Labor Union		320 Main street.

FEDERAL LABOR UNIONS.

No.	Location.	Address.
8921.	San Pedro	Box 2287.
9403.	San Rafael	710 Fourth street.
9457.	Salinas	Salinas.
9459.	San Bernardino	Box 252.
9611.	Watsonville	320 Main street.
9614.	Los Angeles	124 East Third street.
10086.	Santa Cruz	217 Pacific avenue.
10143.	Riverside	Box 675.
10185.	Santa Rosa	King street.
10359.	Oakland	459 Eleventh street.
10419.	Gilroy	Box 474.
10621.	San Diego	926 Sixth street.
10636.	Petaluma	Rural Route No. 2, Chas. Jessen.
10751.	San Pedro	San Pedro.
10917.	Fort Bragg	Box 289.
11083.	Albion	Albion.
11090.	Colton	Box 374.
11139.	Westport	Westport.
11164.	San José	Box 597.
11240.	Mendocino	Mendocino.
11256.	Fort Bragg (Ladies)	Box 56.
11288.	Wilmington	Wilmington.
11302.	Watsonville	119 First street.
11302.	Watsonville (Ladies)	Foresters' Hall.
11337.	Clovis	Clovis.
11345.	Vallejo	1802 Martin street.
11355.	Chico	818 Salem street.
11386.	Elk	Elk postoffice.
11428.	Gualala	Gualala.
11440.	Sausalito	Sausalito.
11457.	San Mateo	C street.
11549.	Modesto	Modesto.
11564.	Vallejo	Vallejo.
11585.	Los Angeles	662 San Fernando street.
11673.	Bakersfield	Box 67.
11700.	King City	King City.

The foregoing directory of unions, covering all parts of the State, shows a very healthful condition in the labor world, comprising a far greater number than ever before in the history of the State.

In the preceding report of this Bureau (and presuming that to be correct), on page 77, there is shown to have been at that time 495 separate organizations. In the two years elapsed since then, the number has grown to be 805; a gain of 310, or 62.6 per cent. This gain is accounted for in two ways: First, there are, approximately about 125 different crafts represented by unions in 1904 that were not in existence in 1902, a gain of 83.2 per cent; and again, with but very few exceptions, the organizations, as shown in the last report, may have become unwieldy perforce of numbers and others may have been organized to care for the surplus members; also, unions have been organized at points where none before existed. The membership has increased in like ratio, notably the carpenters, whose organizations in 1902 numbered 32, but in 1904 had increased to 66. The machinists increased from 8 to 17, miners from 8 to 34, sheet-metal workers from 4 to 11, typographical from 12 to 27, and woodworkers from 4 to 14.

While this gain has been proportionately great in the country districts, yet it is perhaps more noticeable in the cities, and for purposes of comparison we will note the four cities mentioned in this Bureau's preceding report. In San Francisco there were 162 separate labor organizations in 1902; in 1904 there appear 272; a gain of 110, or 67.9 per cent. In Oakland there were 36 in 1902; in 1904 there were 50; a gain of 14, or 38.8 per cent. In Sacramento, the greatest gain is to be noticed, where, in 1902, the number was 36; it is now 72, or a gain of 100 per cent. Los Angeles shows the same number in 1904 as in 1902, *i. e.*, 68, which may be partly accounted for from the fact that it has been more difficult to obtain information from there than from any other part of the State.

The average increase in unions in San Francisco, Oakland, and Sacramento has been 68.9 per cent, and a gain throughout the State of 111.1 per cent. In the central labor bodies, there has been an increase from 40 in 1902 to 55 in 1904, or 37.5 per cent. The greatest increase, however, is shown in the Federal unions, which went from 6 in 1902 to 36 in 1904, a gain of 500 per cent, showing a closer affiliation among the various crafts throughout the State.

If the deductions of the preceding report are true, *viz.*: that the number of unions in the State was 495, and that there was approximately a membership of 67,500, on the same basis there would now be 110,000 members of the various organizations.

(NOTE.—Since the percentages contained herein were made up several unions have been added, thereby changing slightly the results.)

MARITIME LABOR ORGANIZATIONS OF CALIFORNIA.

All branches of labor employed on American vessels in Pacific waters, both in the coastwise trade and in trade to Australia, China, South and Central America, and the Hawaiian and South Sea islands, are organized, either on the purely trade-union principle, as in the case of sailors, firemen, etc., or in the ostensibly beneficial and fraternal form, as in the case of masters, pilots, mates, etc. Exclusive of ship-masters, the total number of men employed on these vessels, as shown by the report of the Bureau of Navigation ("List of Merchant Vessels of the United States," 1903), is estimated at 16,720. The total membership of the organizations representing the respective classes to which these men belong, as covered by the present report, is 12,122. The remaining 4,000 men may be regarded as comprising deck officers of vessels, who, although organized, are not included in this estimate, and the crews of whalers and of inland-water craft plying exclusively in localities outside the boundaries of California. For all practical purposes, therefore, it may be assumed that the membership of the organizations herein reported upon comprises the total of crews engaged in the coastwise and offshore trade on the Pacific Ocean.

The total number of registered, enrolled, and licensed vessels documented in Pacific Coast ports is 2,575, having a gross tonnage of 775,859, of which 930 vessels of 417,120 gross tons, or considerably more than one half, are documented in California. Of the latter, 850 vessels, of 403,120 gross tons, are documented in San Francisco. ("Report of Commissioner of Navigation," 1903.) The figures of San Francisco tonnage do not include the vessels of the Pacific Mail Steamship Company, registered in New York, numbering 18 vessels of 117,533 gross tons.

In other terms, the shipping of San Francisco carries two thirds of the import and one half of the export trade of the Pacific Coast. ("Report of the U. S. Bureau of Statistics" for the year ending June 30, 1904.)

These figures illustrate the predominant position of California as compared with other Pacific Coast States, and of San Francisco as compared with other ports of California, in all matters affecting the shipping industry.

San Francisco, being the center of Pacific shipping, is also the center of organization among the various branches of labor employed in con-

nection with that industry. These branches include sailors, firemen, cooks, stewards and waiters, bay and river men, fishermen, engineers and masters, mates and pilots.

Practically all the organizations representing these crafts maintain branches in the larger ports on the Coast; but the headquarters in each case is located in San Francisco. It may therefore be said that the report of the conditions of maritime labor in California embraces that question as it exists throughout the entire length of the Pacific Coast, subject, of course, to the few exceptions of purely inland-water trade in the adjoining States.

GENERAL REVIEW OF ORGANIZATIONS.

A general review of the special characteristics and objects of each organization will facilitate an understanding of the details hereafter presented.

The *Sailors' Union of the Pacific* was organized March 6, 1885. Originally this body was known as the "Coast Seamen's Union," and comprised only men employed on deck (that is, men before the mast) on sailing vessels and steam-schooners or other steam craft engaged exclusively, or practically so, in the lumber, coal, and freight trades. In 1886 the men employed in a similar capacity on passenger steamers formed a union, known as the "Steamship Sailors' Protection Union." For a number of years these organizations maintained a separate existence. In 1891, owing to a growing realization of mutual interest on the part of both, an amalgamation was effected, under the present name. Since that time the Sailors' Union of the Pacific has represented all the men employed on deck in sea-going craft, the deckhands on bay, river, and other inland-water craft being organized separately.

The general purposes of this organization are the same as those of all like bodies, namely, to regulate wages, hours, and working conditions, to establish benefit features, etc. Specifically, the efforts of the union have been directed toward the abolition of the crimping system, under which the seamen have been robbed of a large part of their earnings in the form of compulsory "shipping fees," as a condition of securing employment; to establish a system of direct negotiation between seamen and shipowner or shipmaster; to safeguard the interests of its members and of the craft at large in all matters of litigation, and to secure desirable changes in the maritime laws of the United States, in so far as seamen are affected thereby.

The present membership of the union is 4,222. The union maintains branches at Tacoma, Seattle, Port Townsend, and Aberdeen, Wash.; Portland, Or.; Eureka and San Pedro, Cal.; and Honolulu, H. I.

In 1887 the union established an official paper, the "Coast Seamen's

Journal," which has since been issued weekly at San Francisco, as the official publication of all the organizations represented in the International Seamen's Union of America.

The *Pacific Coast Marine Firemen's Union* was organized in 1883 and incorporated under State law in 1885. The membership of this body comprises the principal classes of labor employed in the firerooms of steam vessels (including tugboats and ferryboats), namely, firemen proper and coalpassers. In general purpose the scope of this body is the same as that of the ordinary trade-union; in particular, its objects are largely those noted in the case of the Sailors' Union. The present membership of the Firemen's Union is 1,200. A branch is maintained at Seattle, Wash.

The *Marine Cooks and Stewards' Association of the Pacific* was organized in 1901. In this body are represented all classes of labor employed in the "steward's department" (that is, in the cabin and galley) on vessels of all classes. The special objects of the association are the substitution of white for Chinese and Japanese labor of the respective classes, the abolition of the "tipping" system, and the restriction of the hours of labor within certain definite limits. The membership of the association is 1,300. Branches are maintained at Seattle and Aberdeen, Wash., and at San Pedro, Cal.

The *Bay and River Steamboatmen's Union of California* was organized in 1902. This body represents the deckhands and firemen employed on the steam craft plying on the inland waters of the State, chiefly on San Francisco Bay and the Sacramento and San Joaquin rivers. The principal object of this body consists in the regulation of night, holiday, and overtime work. The present membership is 800. A branch is maintained at Sacramento, Cal.

The *Fishermen's Protective Union of the Pacific Coast and Alaska* was organized in 1902. The scope of this body is designed to extend jurisdiction over all fishermen, in inland waters, on the Coast and in Alaska. As yet, however, the membership of the union consists chiefly of Alaska fishermen, although the organizing work now being carried on among the fishermen on inland waters, particularly on the Columbia River and Puget Sound, gives promise that in the near future the membership will be extended to include the greater part of the estimated total of 15,000 men now engaged in all branches of the fishing industry. As at present compared, the membership of this body is employed for but five or six months in each year, leaving San Francisco, Portland, and Seattle for the Alaskan fishing-grounds about March and returning about September, two months of that period being occupied on the voyage to and from the point of actual fishing operations. Specifically, the union seeks to regulate the amount of compensation, usually fixed

upon the basis of the catch. Efforts are also being directed along legislative lines, with the object of prohibiting the use of fish traps and other stationary fishing gear, thus preventing the waste and final extermination of the fish. The present membership of the union is 3,400. A branch is maintained at Seattle, Wash.

The *Marine Engineers' Beneficial Association, No. 35* (National Association of Marine Engineers) was organized in 1882, and incorporated under State law in the same year. This body is composed exclusively of licensed men, that is, of men licensed under Federal law, the latter requirement being obligatory upon all members of the calling. In respect to its purposes, the association was formed primarily, or at least to a great extent, for fraternal and social ends. In recent years, however, the tendency toward the industrial system and methods of organization has shown a marked development. Much attention has also been given to the laws and departmental regulations governing the issuance and revocation of licenses, with the view of conserving the right of the engineer to quit his employment while in port without being subject to the loss of his license. The present membership of the association is 1,200.

The masters, mates, and pilots are organized under the name of *American Association of Masters, Mates, and Pilots of Steam Vessels*. Two "harbors" representing these branches are located at San Francisco. California Harbor, No. 15, represents the masters, mates, and pilots employed on sea-going steam craft, while Golden Gate Harbor, No. 40, represents the men of similar capacity employed on bay and river steamers in the vicinity of San Francisco. These organizations disclaim any identity with the other bodies of maritime workers or with organized labor in general. The wages of masters vary from \$125 to \$250 per month, according to the class of vessel. The monthly wage rate of mates is more uniform, averaging as follows: First mate, \$90; second mate, \$75; third mate, \$50 to \$55. Organization among ships' officers employed on sailing vessels is still in its incipiency. Monthly wages of these classes average as follows: Master, \$100; first mate, \$60; second mate, \$50.

The following tables show the particulars of the organizations herein named:

TABLE No. 1.
Showing Rates of Wages, Period of Employment, Hours of Labor, etc., of Members of Maritime Labor Organizations in California.

Name.	Wages, per Month. (Including Board and Lodging.)			Overtime, per Hour.	Daily Hours of Labor.	Average Yearly Employment.	Average Yearly Earnings.
	Class of Vessel and Trade.	Class of Labor.	Wages.				
Sailors' Union of the Pacific.	Steam schooner (outside port).....	Able seaman.....	\$50 00	50 cents	9 hours in port; watch and watch at sea.	8 mos.	\$350 00
	Steam schooner (inside port).....	Able seaman.....	45 00	50 cents			
	Steam vessel (passenger and freight).....	Able seaman and quartermaster.....	45 00	40 cents			
	Sailing vessel (outside port).....	Able seaman.....	45 00	50 cents			
	Sailing vessel (inside port).....	Able seaman.....	40 00	40 cents			
	Sailing vessel (Hawaiian Islands and Mexico).....	Able seaman.....	35 00	40 cents			
Pacific Coast Marine Firemen's Union.	Sailing vessel (Eastern Islands, Siberia, Central America).....	Able seaman.....	30 00	-----	9 hours in port; 4 hrs. on and 8 hrs. off at sea.	12 mos.	600 00
	Sailing vessel (China, Japan, S. America, Australia, Africa).....	Able seaman.....	25 00	-----			
	Steam schooner.....	Fireman.....	50 00	50 cents			
	Steam schooner.....	Coalpasser.....	40 00	50 cents			
	Steam vessel (passenger and freight).....	Fireman.....	50 00	40 cents			
	Steam vessel (passenger and freight).....	Coalpasser.....	60 00	40 cents			
Marine Cooks and Stewards' Association of the Pacific.	Tugboat.....	Fireman.....	70 00	40 cents	13½ hours.....	8 mos.	330 00
	Steam vessel (passenger and freight).....	Steward.....	48 75	-----			
	Steam vessel (passenger and freight).....	Cook.....	30 00	-----			
	Steam vessel (passenger and freight).....	Pantryman.....	27 50	-----			
	Steam vessel (passenger and freight).....	Waiter.....	50 00	50 cents			
	Steam schooner.....	Cook and steward.....	31 50	25 cents			
Bay and River Steamboatmen's Union of California.	Steam schooner.....	Cabin boy.....	52 50	-----	12 hours.....	7 mos.	330 00
	Sailing vessel.....	Cook and steward.....	20 00	-----			
	Steam vessel (bay and river).....	Deckhand.....	45 00	40 cents			
	Steam vessel (bay and river).....	Fireman.....	50 00	40 cents			
	Tugboat.....	Linetender.....	50 00	40 cents			
	Alaska salmon fisheries.....	Fisherman.....	-----	-----			
Marine Engineers' Beneficial Association No. 35 (National Ass'n of Marine Engineers).	Steam vessel.....	Chief Engineer.....	120 00	60 cents	9 hours in port; 4 hrs. on and 8 hrs. off at sea.	10 mos.	900 00
	Steam vessel.....	1st Asst. Engineer.....	90 00	60 cents			
	Steam vessel.....	2d Asst. Engineer.....	80 00	60 cents			
	Steam vessel.....	3d Asst. Engineer.....	70 00	60 cents			

Overtime is paid only when crews work cargo after the regular working hours in port or on Sundays and holidays. All work necessary at any time for the safety of vessel, cargo, or passengers, is done without extra compensation.
The term "watch and watch" means four hours on and four hours off duty alternately throughout the twenty-four.
Fishermen's wages are based upon the size of the catch, each man receiving a certain sum per fish and a certain sum for working the vessel to and from the fishing grounds.

TABLE No. 2.

Showing Name, Date of Organization, Membership, Initiation Fee, Dues, Benefits, etc., of Maritime Labor Organizations in California.

Name.	When Organized	Total Membership	Initiation Fee	Dues per Month	Benefits.	Name and Address of Executive Officer.
Sailors' Union of the Pacific.	1885	4,222	\$5 00	75 cts.	Shipwreck, \$50 Funeral, 75 Strike, 3 per week,	Andrew Furuseth, Secretary, S. W. cor. East and Mission Sts., San Francisco.
Pacific Coast Marine Firemen's Union.	1883	1,200	50 00	50 cts.	Shipwreck, 50 Funeral, 75	William McDonald, Secretary and Business Manager, 46 Steuart St., San Francisco.
Marine Cooks and Stewards' Association of the Pacific.	1901	1,300	5 00	75 cts.	Shipwreck, 50 Funeral, 75	Eugene Steidle, Secretary, 54 Mission St., San Francisco.
Bay and River Steamboatmen's Union of California.	1902	800	5 00	75 cts.	Shipwreck, 30 Funeral, 75 Strike, 4 per week,	P. Carroll, Secretary, 54 Mission St., San Francisco.
Fishermen's Protective Union of the Pacific Coast and Alaska.	1902	3,400	5 00	50 cts.	Shipwreck, 35 Funeral, 75	I. N. Hylen, Secretary, 9 Mission St., San Francisco.
Marine Engineers' Beneficial Association No. 35 (National Association of Marine Engineers).	1882	1,200	50 00	50 cts.	Funeral, 75	J. J. Searey, Secretary, 36 East St., San Francisco.

All seamen, when sick, are entitled to free medical attendance in the marine hospitals maintained by the United States Government in the leading seaports of the country; also to medical attendance at the expense of the Government when taken sick in foreign ports.

Members of the Sailors' Union of the Pacific are entitled to a copy of the "Coast Seamen's Journal," issued weekly, in addition to other benefits.

The Pacific Coast Marine Firemen's Union and the Marine Engineers' Beneficial Association are incorporated under the laws of California.

ECONOMIC PHASE OF UNIONS' WORK.

In considering the work of these organizations two distinct phases are noted, one being purely economic and the other legislative in character. Under the former head may be described so much of the unions' work as is concerned mainly in the regulation of wages, hours, and other conditions of labor on board ship; while under the latter term may be included those activities directed toward amending the maritime laws of the country, which bear upon all members of the seafaring calling much more directly than do the general laws upon the workers in land callings. Briefly, the distinction between the maritime and the general laws may be described in these terms: The maritime laws are industrial in nature—that is, they affect the seaman as an industrial class or craft—and are national in scope, being the same in all ports of the country, and, indeed, in all ports of the world in so far as United States authority extends to vessels of that nation in foreign waters. The general laws are political, civil, and criminal, rather than industrial, in nature; they affect the workers on land, not particularly as

workers in any given craft, but as citizens, and they differ materially in the respective states and localities. It is therefore apparent that while the organizations of seamen have directed their efforts very largely to securing reforms in the economic phase of their vocation, being in this respect identical with the common form of trade-union among all classes of labor on land, a very considerable, and in some respects the more important, function of these bodies consists in work of a legislative character.

The period of organization among the seamen on the Pacific Coast may be said to date from 1885. Several attempts to organize the seamen had been made prior to that date, but these had either failed entirely or had proved short-lived. In this connection reference is made especially to the work of organization among sailors, *i. e.*, the deck crews of vessels, because of the peculiar circumstances of that class. The sailor—the man before the mast—is the primary or basic element of labor in the shipping industry; hence, the conditions of all labor in that industry are determined very largely by those of the sailor. It follows, therefore, that although the establishment of organization among certain other classes of maritime workers, such as firemen and engineers, antedates that of the Sailors' Union, the latter event marks the epochal point in the change from the individual to the organized relationship between employer and employé, the point which affords the most comprehensive survey of the conditions, both as they existed prior to that date and as they have subsequently shaped themselves. The significance of the date in question, considered as the starting point of organization among the maritime workers on the Pacific Coast, is further accentuated by the fact that it marks the beginning of organization among the shipowners, the employers in the present instance.

The latter movement has latterly become one of the determining forces in bringing about and maintaining the peaceful and mutually satisfactory conditions that now exist—conditions which operate advantageously, not only as between shipowner and seaman, but also in the business sense as between the respective shipping firms. On the whole, therefore, it is apparent that the events in the history of the Sailors' Union of the Pacific are of importance far exceeding the interests of the particular branch of the maritime calling represented by that organization; that, in fact, these events afford the keynote to the existing conditions, and the proposed improvements therein, affecting all branches of the maritime calling.

Those features embraced in the economic phase of the seamen's conditions which bore with greatest severity upon the classes affected, and which constituted the chief, or at least the most immediate, motive of organization among these classes, may be described in general terms as

the features of the crimping system; that is to say, they included the method of shipment and discharge and the disposition of the wages actually earned.

The nominal rate of coastwise sailors' wages was low, being at times \$20 per month, as compared with the present rate of \$40. Of course, every possible effort was made to increase the rate of wages. But, inasmuch as, under the crimping system then in vogue, the sailors' wages were absolutely controlled by the crimp, being quite commonly paid to and disbursed by the latter, the rate of wages was a matter of secondary importance to the sailor himself. Naturally, the first efforts of the Sailors' Union were directed toward securing control of the wages actually earned, by the establishment of a system of direct payment to the sailor, regardless of all claims, real or alleged, made upon them by the crimper. This step involved the abolition of the existing system of shipment, under which the crimps controlled the avenues of employment to such an extent that no man could get work except upon their terms, the prime condition of which was that the sailor should put up at one or other of certain boarding-houses, which, in turn, implied the surrender of all earnings to the boarding-house keeper. Working conditions—hours, food, living quarters, etc.—on board ship were bad in all respects; but as these features were very largely the corollaries of the system of shipment and discharge, they could not be improved except through improvement in the latter regard.

Inasmuch as the crimp's control of the seaman's wages depended upon his control of the shipping—that is, of the seaman's opportunities of employment—it was natural that the Sailors' Union, in its effort to place the control of wages in the seaman's own hands, should seek that end by means analogous to those in vogue. Accordingly, one of the first steps taken by the Union was the establishment of a shipping-office. The Union elected its own shipping-master and offered every facility for the transaction of business between seaman and shipowner, without cost to either party or interference of any kind from any species of middleman.

After a brief experience the shipping-office was abandoned as a failure. The incidental causes of this result were numerous; but, irrespective of all minor considerations, it may be said that the Union shipping-office failed from the fact that the shipowners refused it their support. In other words, the shipowners continued to employ their crews through the crimps, being actuated in this course by the dual motive of hostility to organization among seamen and a desire to perpetuate existing conditions as to wages, etc.

In the struggle for the control of the engagement of seamen the crimps had a material advantage in the fact that they already controlled the seaman's means of subsistence while ashore through the

boarding-houses conducted either by themselves or by persons closely associated with them. The latter consideration led, in turn, to an effort on the part of the Union to provide a means of subsistence for its members, in order to free them from dependence upon the crimps. A union boarding-house was established; but this, too, proved a failure, due to causes essentially the same as in the case of the shipping-office. Meanwhile the Sailors' Union had engaged in several strikes, the outcome of which afforded no material or permanent change in the prevailing conditions. Indeed, the result could hardly have been otherwise, since in their economic efforts the seamen were hampered by a state of law which, as appears in the following pages, denied them that degree of personal liberty which is necessary to individual initiative in such matters.

The condition of the seamen at this period was clearly demonstrated by an investigation of the subject, made in 1887 by the Bureau of Labor Statistics, under the administration of Commissioner John J. Tobin.

In a letter addressed to Commissioner Tobin by the Coast Seamen's Union (now Sailors' Union of the Pacific), under date of June 21, 1887, the following statements appear:

The Union has a membership of upwards of three thousand men who are constantly working on this coast, and who, under the laws of this country, are the direct wards of the Government, and, therefore, entitled to an attention, which has hitherto been very sparingly, indeed, given to them. The Union has done its utmost to organize all sailors for the purpose only of making them thinking men. Agencies are established, and are in good working order, in Port Townsend, Eureka, San Pedro, and recently in San Diego. The system of official correspondence between the agencies and the head office in San Francisco, together with the system of finances and of mutual assistance in case of shipwreck, etc., have been perfected, and order created out of preëxisting chaos by the men themselves, and often in spite of a violent and bitter opposition from outsiders. These efforts achieved single-handed, should plead the cause of the men with any one who can give them an opportunity to state publicly, and through undeniable evidence, their grievances, their successes, and their defeats, so as to enlist public opinion in their warfare against oppression and the opponents of the progress of the Union and the happiness of its members.

We would respectfully request that an investigation into the affairs of the coast sailors be made in the following three directions, viz.: (1) The manner of shipping the men; (2) The treatment of the men on board, and their accommodations in the vessels; (3) The manner in which the men are paid off.

We believe that these three points will cover all. We feel sure that evidence of the most startling character can be brought to show how the sailor has been kept purposely in his present acknowledged degraded condition, to render him a will-less commodity in the hands of unscrupulous speculators, with which they could "bear" and "bull" the market. We shall adduce evidence to show how large corporations are systematically robbing their sailors, by paying them short wages, the shortings being too small for each separate man to make it profitable for him, under existing circumstances, to go to law about it, but when accumulated forming a large item in the yearly income of these corporations or their officials. We shall show how the "Sailors' Home," an institution formed for a benevolent purpose, has been transformed into a common boarding-house, in which the practice of paying the sailor short wages is as generally adopted as it is among other institutions of that kind. We shall follow the sailor, step for step, and show how his propensity for strong drink is fostered by those who have the liquor trade

in hand on the waterfront, and how his only hope of getting a new berth depends upon the speed with which he hands to the boarding-house master the wages earned on a former voyage. We shall show how, when he occasionally wakes up to a consciousness of the robbery and outrages perpetrated on him, and tries to regain by law what has been taken away from him by force, he is met by unexplainable delays and technicalities which render it absolutely impossible for him to get redress for his wrongs, and this at the hands of a Government which the people appointed his special guardian.

The investigation held by the Bureau lasted two weeks and covered a wide field of inquiry among seamen, boarding-house keepers, and other classes. Subsequently, a special report was issued by the Bureau, in which Commissioner Tobin summed up the testimony and submitted his findings. The following excerpts from the report illustrate the conclusions arrived at :

The evidence herewith submitted clearly demonstrates the fact, already widely known, that the sailor, ashore, is looked upon as the legitimate prey of land sharks. From the day he arrives in port, until the day of his departure, he is never out of the hands of sharpers, who coax, wheedle, debauch, and pander to his worst vices, until his last dollar is gone. Not even then is he a free agent. As the price of release from their clutches, he must submit to have his future earnings mortgaged. He must labor hard for many a day to repay the blood-money and the "advances" given on his account by these Shylocks.

From the testimony of sailors during the investigation (corroborated by personal inquiry) the manner of inveigling and preying upon the sailor may be thus described: A day or two after a ship's arrival, a boarding-house runner goes aboard, professes great friendship and sympathy for the sailor, makes glowing promises about work and wages ashore, and finally induces him to leave his ship. The sailor goes ashore, and by so doing generally forfeits the wages due him. Captains of vessels with the prospect of a long stay in port, often take a hand in this, by abusive treatment of their men, in order that they may desert the ship, and thus make a clear gain to the owners of the sailors' accrued wages. This method of doing business is known among seafaring men as "working off." The boarding-house keeper, into whose clutches the sailor falls, keeps him and supplies him with liquor and other unaccustomed luxuries, until his money is gone and a large bill is charged against him. Then, and not till then, the boarding-house keeper procures him a berth on board a ship, taking care, however, that the captain will secure for him the payment of all charges against the badly fleeced victim.

From the testimony submitted it will be seen that sailors are charged extortionate rates for bringing them off the vessels and taking them on, for discounting their due bills, for commissions on account of getting them berths, and for other services. It has also been put in evidence that when sailors remain only a part of a week in a boarding house they are charged for a full week.

A cordial understanding seems to exist between the boarding-house keeper and a certain class of sailors' supply dealers. Masters of vessels are not ignorant of the cooperative schemes of which the sailor is the victim, and some even share in the spoils.

The sworn testimony of all proves that it is next to impossible for a sailor to get a berth, or what they term a "chance," without the aid and intervention of a boarding-house keeper or "master."

The latter goes to the captain of a coast vessel, and by paying a stipulated sum, induces him to agree to ship all his men through the said boarding master's agency.

Notwithstanding that all the boarding-house keepers who were examined denied that they paid this money, facts have come to the knowledge of the Commissioner, upon personal inquiry, which leaves no room to doubt of its being done. * * *

The present system of paying an advance on sailors' wages is pregnant with evil. It tends to make the sailor improvident by opening an avenue through which he can pay bills he would not otherwise contract. It makes him dependent on the person to whom he owes a debt, and thus he becomes a commercial slave rather than a free man, because his freedom of contract is destroyed.

The best and speediest way to remedy the evils complained of, and reform the corrupt and debasing methods now practiced, is by organization among the sailors. Banded together for protection, seafaring men will make their grievances known and felt, and remedies will be sure to follow. Since this investigation began, an association has been formed for the express purpose of doing away with blood-money.

The statement in the closing sentence of the foregoing, concerning the formation of an association for the purpose of abolishing blood-money, is of merely passing interest. That effort to prevent the robbery of seamen, like many others in the same general direction, failed from causes not difficult to trace. In the first place, there existed no real determination among the seamen's employers to protect the former from illegal practices. Secondly, the state of the law at that time was such that, although designed to protect the seaman, it actually fostered and maintained the devices under which the seaman was continually robbed and deprived of the liberties to which he was entitled and which were necessary to self-protection. No immediate or practical results followed from the investigation here noted, except such as may be assumed from the publicity afforded the circumstances of the case.

Despite these initial failures the work of the seamen's organizations was continued, with results that varied with the changes in the state of the shipping industry. Except in a few instances of extreme depression, the unions continued to retain control of the men engaged in the respective crafts, although they were usually, in these exceptional circumstances, forced to give way in the demand for the maintenance of the stipulated rates of wages. When confronted with the necessity of waiving recognition of the wage schedule, the unions endeavored to restrain their members from seeking employment indiscriminately—that is, from bidding against each other. The effect of this course was to prevent wages from falling as low as they inevitably must have done in the absence of such check. On the whole, it may be said that at no time since 1885 have seamen's wages fallen to the figure that commonly prevailed during periods of industrial depression prior to that date.

The first step toward formal recognition between the respective organizations of seamen and shipowners was taken in 1901, when an agreement was entered into between the Sailors' Union of the Pacific and the Pacific Coast Marine Firemen's Union, on the one hand, and the Pacific Coast Steamship Company, the principal line in the coast-wise passenger service. This agreement provided full recognition of the unions—that is, it provided for employment of members of the unions exclusively, so far as the latter were able to supply the labor needed on the company's vessels. In all other respects the agreement was satisfactory to the parties concerned. However, within a short time after the conclusion of these terms a great strike occurred, involving all the maritime organizations in San Francisco. Under the guidance of the City Front Federation, a body of delegates representing

all the organizations, both maritime and 'longshore, connected directly with the shipping industry of the port, the sailors, firemen, and cooks and stewards, went on a strike in August, 1901, in support of the local branch of the Brotherhood of Teamsters. Although the teamsters alone were directly affected at the outset, experience in a number of similar crises led the organizations affiliated with that craft to apprehend a general attack upon themselves should the movement against the former prove successful. Accordingly, the maritime organizations, in common with the other bodies represented in the City Front Federation, quit work on all vessels. The Pacific Coast Steamship Company declared this action to be a violation of the agreement between it and the two unions in question, and especially of that clause which provided against any disturbance of the then existing relations between the contracting parties and other classes of labor. The strike was called off at the end of nine weeks, by formal action of Governor Henry T. Gage, acting by authorization of the City Front Federation and the Employers' Association. The Pacific Coast Steamship Company thereafter refused to recognize the agreement as in any way binding upon it. On the contrary, the company brought suit against the organizations of sailors and firemen for damages in the sum of \$20,000 in each case, claiming injury to that extent as a result of the tie-up of its vessels during the strike. These suits were not brought to trial, but were withdrawn upon the resumption of mutually satisfactory relations between the company and the unions. These relations still remain in force. Although there has been no formal renewal of the agreement, the terms stipulated therein have been re-established, and in some respects improved upon, so that, as to the three principal classes of labor employed by the company, *i. e.*, sailors, firemen, and cooks and stewards, a practical understanding exists upon all material points.

In 1902 an agreement was entered into between the Sailors' Union of the Pacific and the Shipowners' Association of the Pacific Coast, an organization representing the owners of sailing vessels. This agreement has been renewed periodically since the date of its first expiration and is still in force. In 1903 an agreement was entered into between the Sailors' Union of the Pacific, Pacific Coast Marine Firemen's Union, and Marine Cooks and Stewards' Association of the Pacific, on the one hand, and the Steam-Schooner Managers' Association, representing the owners of steam vessels in the lumber and general freight-carrying business. This agreement has also been renewed at regular intervals. In 1903 an agreement was entered into between the Sailors' Union of the Pacific, Pacific Coast Marine Firemen's Union, and Marine Cooks and Stewards' Association of the Pacific, on the one hand, and the Oceanic Steamship Company, owner of the passenger and mail line between San Francisco and Australasian ports. This agreement has also

been renewed and still remains in force. These agreements are here reproduced in full, as follows:

**Agreement between Shipowners' Association of the Pacific Coast and Sailors'
Union of the Pacific.**

SAN FRANCISCO, CAL., April 21, 1904.

The following agreement is this day entered into between the Shipowners' Association of the Pacific Coast and the Sailors' Union of the Pacific:

1. The following rate of wages and conditions to take effect this date and to remain in force one (1) year, and to be continued thereafter so long as satisfactory, and shall not thereafter be abrogated until after receipt of thirty (30) days' notice by either association:

Sailing vessels, trading to outside ports—	
Per month.....	\$45 00
Overtime, per hour.....	50
Sailing vessels trading to inside ports and bar harbors in the States of California, Oregon, and Washington, British Columbia and Alaska—	
Wages, per month.....	\$40 00
Overtime, per hour.....	40
Sailing vessels trading direct from any port on the Pacific Coast of the United States and British Columbia to the Hawaiian, Marquesas, Society, Samoan, Midway, Fanning and Fiji Islands, and Mexico—	
Wages, per month.....	\$35 00
Overtime, per hour.....	40
Sailing vessels trading direct to the Marshall, Caroline, Ladrone, Gilbert and Philippine Islands, Siberia, and Central America—	
Wages, per month.....	\$30 00
Sailing vessels trading direct to South America, China, Japan, Australia, Africa, New Zealand and New Caledonian Islands—	
Wages, per month.....	\$25 00
Vessels chartered in one port of the Pacific Coast to load in another port of the Pacific Coast of the United States and British Columbia, for off-shore ports, wages to be the same as on the coast until the vessel is loaded and cleared, viz—	
Per month.....	\$40 00

Nine (9) hours to constitute a day's work, viz, from 7 A. M. to 12 M., and from 1 P. M. to 5 P. M.; *provided*, that in the Hawaiian Islands and South Sea Islands, lying in open ports, the working hours may be varied so as to begin not earlier than 6 A. M., and end not later than 7 P. M.; but in no case, unless overtime is paid, shall the working hours exceed nine (9) hours per day.

Coffee to be served in all vessels; time to be limited to ten (10) minutes.

All work performed in port over and above the regular working hours, Sundays and legal holidays, to be charged as overtime. (Legal holidays are defined to mean: United States legal holidays everywhere, at sea included; State holidays in the port of the State of the United States where the vessel may be at the time.)

2. The members of the Sailors' Union of the Pacific agree to sign and to be paid off in a central office conducted by the Shipowners' Association of the Pacific Coast, in San Francisco, Cal.

3. Engagement of seamen (which shall be understood to include sailors and donkeymen throughout this agreement) to be left with the owners or masters of vessels, who are to get their crews in the manner provided as follows: (a) In all ports except San Francisco, all seamen are to be ordered from the offices of the Sailors' Union of the Pacific; (b) In the port of San Francisco all seamen are to be ordered from the office of the Shipowners' Association of the Pacific Coast, said orders to be turned over to the Sailors' Union of the Pacific, which shall furnish the crews; *provided*, that if crews are not furnished by the Sailors' Union of the Pacific within forty-eight (48) hours after

notice has been received, then the owners or masters of vessels may procure seamen elsewhere.

4. The officers of the Sailors' Union of the Pacific will attend to the vessels and see that the crews are on board at the specified time.

5. In all ports outside of San Francisco the agents of the Sailors' Union of the Pacific shall furnish all crews, and see that the crews are furnished on time. If crew is not furnished within forty-eight (48) hours after written notice has been given to Union agent by master, owner, or agent, the master, owner, or agent may get crew elsewhere. Fares to be paid by vessel, and wages to begin when men come on board.

6. The Sailors' Union of the Pacific is not in favor of sympathetic strikes.

7. No demand to be made for a lump sum rate of wages for any single voyage, and crews to sign for round trip, to be employed in loading and discharging vessels, either by themselves or along with stevedores' gang or 'longshoremen. Whenever a crew is signed from a Coast port to San Francisco and return, and vessel's destination is changed, or vessel laid up or detained waiting for a berth, the master may pay the crew off at any time; but shall pay in addition to wages then earned, the fare back to the port of shipment in money, unless the crew shall agree to sign over for a new voyage.

8. When a vessel is bound from a Pacific Coast port to Australia, Africa or West Coast, and proceeds from there direct or via some other loading port to the Hawaiian Islands for discharge, the wages of the crew shall remain the same as stipulated in the articles until the vessel's return to the Pacific Coast.

If the vessel loads cargo in the Hawaiian Islands for a Coast port, the crew shall receive the rate of wages ruling between the Hawaiian Islands and Coast ports from the date the vessel commences loading.

9. Any work required of the crew for the safety of the vessel at any and all times to be done by them without extra pay. Hatches to be put on after working hours, when loading or discharging cargo; but no more than ten (10) minutes shall be used.

10. Vessel's donkey-drivers to be kept for loading and discharging cargoes without any interference from any other unions.

11. Owners agree to furnish crew's mess gear, and the cook shall keep the same clean.

12. Efficient white or colored cooks to be employed when obtainable. Orders for cooks in San Francisco to be placed with the office of the Shipowners' Association of the Pacific Coast.

13. A standing committee from each association to be appointed to adjust grievances that may arise from time to time.

14. It is mutually understood and agreed by both parties to this agreement, that nothing in this agreement shall be so construed as to forfeit any right of either party prescribed by the Maritime Law of the United States.

15. It is further agreed that the President of the Shipowners' Association of the Pacific Coast shall call a meeting of the joint standing committee in the first week in March, 1905, for the purpose of arranging an agreement for the ensuing year.

Shipowners' Association of the Pacific Coast, by its Board of Directors—James Rolph, Jr., H. E. Pennell, W. G. Tibbetts, Geo. E. Billings, W. H. Marston, Geo. E. Plummer, H. Z. Howard.

Sailors' Union of the Pacific, by its Authorized Committee—A. Furuseth, A. E. Erickson, W. Macarthur, Ed. Andersen, N. Jortall, C. Jortall, E. Ellison.

Agreement between Steam-Schooner Managers' Association and Sailors' Union of the Pacific, Pacific Coast Marine Firemen's Union, Marine Cooks and Stewards' Association.

This agreement, made by and between the Sailors' Union of the Pacific, the Pacific Coast Marine Firemen's Union, and the Marine Cooks and Stewards' Association of the Pacific Coast, the parties of the first part, and the Steam-Schooner Managers' Association, the party of the second part;

Witnesseth, That the above parties agree to abide by the following rules and regulations, which are to remain in force until February 1, 1905:

1. (a) The wages of sailors on steam-schooners running to inside ports shall be \$45 per month; running to outside ports, \$50 per month; overtime to be paid for at the rate of 50 cents per hour.

(b) Nine (9) hours shall constitute a day's work, viz., from 7 A. M. to 12 M., and from 1 P. M. to 5 P. M.

In vessels where it is customary to detail part of the crew off to quartermasters, they shall perform regular quartermasters' duties.

All work performed in port over and above the regular working hours on Sundays and legal holidays, at sea included, and State holidays in port of the State where the vessel may be at the time, except when same shall be necessary for the safety of the vessel, her belongings, her cargo, or the life of passengers or crew, shall be paid for at overtime rate.

Coffee shall be served at 9 A. M. and 3 P. M.; ten (10) minutes to be allowed for coffee. When overtime is worked, coffee to be served at 9 P. M. and at 3 A. M., and lunch at 12 M.

(c) It is hereby agreed by the party of the second part, that within three (3) months from the date of this agreement each vessel now or hereafter controlled by the said party, where practical, shall be provided with a mess-room for the accommodation of her crew; such mess-room to be in each case so constructed as to afford sitting room, and so situated as to afford full protection from the weather, and from heat and odor arising from the vessel's engine-room, fireroom, and hold.

(d) It is further agreed and understood that points not covered by this agreement shall be decided in accordance with the Working Rules of the Sailors' Union of the Pacific; said Working Rules shall be part of this agreement.

[Articles 2 and 3 relate exclusively to firemen and cooks, etc.]

4. (a) The patrolmen, agents, and delegates of the parties of the first part shall see that the men employed by the party of the second part are members of the respective unions, and if such men are not obtainable, shall endeavor to procure other men.

Where the men are shipped by the patrolmen, agents or delegates, the latter shall exercise every care and diligence to see that the men are on board at the time agreed for.

(b) The unions are not in favor of sympathetic strikes.

(c) Any work required for the safety of the vessel, her cargo, passengers or crew, to be performed without extra compensation.

(d) A standing grievance committee of six shall be appointed; one from the Sailors' Union of the Pacific, one from the Pacific Coast Marine Firemen's Union, one from the Marine Cooks and Stewards' Association of the Pacific Coast, and three from the Steam-Schooner Managers' Association.

(e) It is agreed by the parties hereto that nothing in this agreement shall be construed to forfeit any rights of either party prescribed by the United States Shipping Articles.

(f) It is agreed by the parties hereto that a committee from each association will meet early in January, not later than the 15th, 1905, this meeting to be called by the President of the Steam-Schooner Managers' Association, to endeavor to enter into an agreement for the ensuing year.

C. Jortall, Secretary pro tem. Sailors' Union of the Pacific; Wm. McDonald, Secretary, Pacific Coast Marine Firemen's Union; Eugene Steidle, Secretary, Marine Cooks and Stewards' Association.

Steam-Schooner Managers' Association, Robert Dollar, President.

WORKING RULES.

1. Working hours shall not exceed nine (9) hours per day, viz., from 7 A. M. to 12 M., and from 1 P. M. to 5 P. M.

2. Work performed on Sundays and legal holidays, and all time worked beyond the regular working hours, shall be paid for at overtime rates, except such work as is necessary for the safety of the vessel, her cargo, passengers and crew. (Work in this case is defined to mean: Loading and discharging of freight and baggage, coaling, cleaning and moving of vessel.)

3. When crew work overtime to finish loading or discharging, in order to go to sea, overtime shall count until one watch is sent below.

4. In outside ports no overtime shall be charged for making fast the vessel's lines; provided, that where a vessel, on a Sunday or legal holiday, makes more than one landing, overtime shall be paid for all the time men are on deck after the first landing (except during runs of two (2) hours or more between landings.)

5. Moving ship in San Francisco harbor between any points lying inside of a line drawn from Alameda Point to Hunter's Point, on the south, including Oakland Creek; and San Pablo Point to Fort Point on the north, including Sausalito and Tiburon, if done outside the regular working hours, shall be paid for at overtime rates. In ports outside of San Francisco all time of two hours or less, occupied in moving ship, when done outside of the regular working hours, shall be paid for at overtime rates.

6. When overtime is worked, ship's delegate shall compare time with the first officer after knocking off.

Caution: Members shall use their best judgment at all times, and if in doubt what should be charged as overtime, should do the work required of them, and then refer the case to the union for a decision.

MEAL HOURS.

(a) Members shall have one hour for dinner while lying in any port or roadstead, and no work shall be performed during such hour.

(b) Dinner hour shall be from 12 M. to 1 P. M., but may be varied not to exceed one hour either way, to perform such work as is hereinafter specified: (1) Work that is absolutely necessary for the safety of the vessel, her cargo, passengers or crew; (2) Landing of passengers or mail; (3) Moving vessel from or to berth, which can not be moved from or to except at high tide; (4) Departure of vessel.

(c) Supper time shall be at 5 P. M., but may be postponed not to exceed one hour. Thirty (30) minutes shall be allowed for supper.

(d) Coffee shall be served at 9 A. M. and 3 P. M. When overtime is worked coffee to be served at 9 P. M. and at 3 A. M., and lunch at 12 M. (Coffee time shall be limited to ten minutes.)

(e) Members violating these rules shall be fined \$2.50 for the first offense, and for any further offense shall be dealt with as the union may direct.

Agreement between Oceanic Steamship Company and Sailors' Union of the Pacific, Pacific Coast Marine Firemen's Union, Marine Cooks and Stewards' Association.

SAN FRANCISCO, CAL., August 6, 1903.

The following agreement has this day been entered into between the Oceanic Steamship Company, the party of the first part, hereinafter designated as the Company, and the Sailors' Union of the Pacific, the Pacific Coast Marine Firemen's Union, and the Marine Cooks and Stewards' Association of the Pacific Coast, the parties of the second part, hereinafter designated as the Unions, said agreement to remain in force until April 15, 1904, and to be continued thereafter so long as satisfactory, and shall not thereafter be abrogated until after receipt of thirty (30) days' notice by either party.

1. The Company agrees to employ on board of its vessels in their respective capacities exclusively men who are members of the Unions; *provided*, that when such men can not be obtained, the Company shall have the right to engage other men.

2. Engagements of men (which shall be understood to include all petty officers) to be left with the master or other authorized officers of the vessels, who shall order their crews from the officers of the Unions; *provided*, that the Company will not be obliged to employ any man who is a member of the Unions and is personally objectionable to the Company. If crew is not furnished within twenty-four hours after written notice has been given to the Union, Company may get men elsewhere.

3. It is distinctly understood between the Company and the Unions that no beer, whisky or other intoxicating liquors shall be brought upon the property controlled by the Company. It is also distinctly understood that no man in an intoxicated condition, or under the influence of liquor, shall be permitted upon the premises of the Company.

4. Crew to be signed for the round trip, and voyage to be considered ended when the vessel is discharged in San Francisco, in accordance with maritime law.

5. The patrolmen and delegates of the Unions will attend to the vessels and see that the crews are on board on time.

6. The Unions are not in favor of sympathetic strikes.

7. Wages and working hours to be as hereinafter specified:

Deck Department: Wages of boatswain, per month, \$40; masters at arms (when such are employed), —: quartermasters and seamen, \$35; overtime to be paid for at the

rate of 40 cents per hour. Working hours shall not exceed nine (9) hours per day, said hours to be between 7 A. M. and 12 M., and between 1 P. M. and 5 P. M. Work performed in port on Sundays and legal holidays, and all time worked beyond the regular working hours shall be paid for at overtime rates. (Work in this case is defined to mean: Loading and discharging of freight and baggage, coaling and cleaning of vessel.) Making vessel ready for sea, taking in lines and clearing up decks, loading and discharging of mail and baggage, and any work necessary for the immediate safety of the vessel, her passengers, cargo and crew, to be done at any time without extra compensation. Time to be kept by the first officer of the vessel and ship's delegate appointed by the Sailors' Union of the Pacific.

Engine Department: Wages of water tenders, per month, —; wages of firemen, per month, \$50; wages of oilers, per month, \$45; wages of coalpassers, per month, \$40; overtime, per hour, 40 cents. Working hours in port shall not exceed nine (9) hours per day, viz., from 7 A. M. to 12 M., and from 1 P. M. to 5 P. M. When in port, vessel's donkeymen to work eight (8) hour watches, with sixteen (16) hours off out of twenty-four (24) hours. Firemen to work customary hours when at sea. All work performed in port on Sundays and legal holidays, and all time worked beyond the regular working hours, except keeping steam on the donkey boilers, and such work as is absolutely necessary for the safety of the vessel, her passengers and crew, to be paid for at overtime rates. Time to be kept by the first assistant engineer and ship's delegate appointed by the Pacific Coast Marine Firemen's Union.

Steward's Department: The rules and regulations governing the Steward's Department, and also the wages paid to the employes of that department, to continue as now in vogue.

8. It is understood that when any unusual work arises in isolated cases not covered by this agreement, the men when called upon shall perform such labor, and the compensation therefor shall be determined and adjusted between the men of the Unions and the Company, and in the event of any disagreement shall be arbitrated as hereinafter provided for the arbitration of differences, controversies and grievances.

9. All items not mentioned in this agreement, or the schedule herein, shall be performed, and all payments shall be made for work done under this agreement in accordance with the usual custom heretofore prevailing.

10. In the event of any controversy arising between the Unions and the Company, or in the event of any of the men of the Unions having any grievances, the men shall continue to work, and any and all such grievances and controversies shall be settled, if possible, by representatives of the Unions and the representative of the Company. If such controversies and grievances can not be settled, then they shall be arbitrated by choosing a third disinterested man, upon whom a representative of the Unions and the representative of the Company shall agree, and the decision of any two shall be final. If the representative of the Unions and the representative of the Company can not agree upon a third man, then each side shall choose a disinterested man, and the two disinterested men thus chosen to choose a third disinterested man, and said three men shall constitute a board of arbitration, and a decision of the majority of the said three men shall be final, and all parties shall abide thereby.

11. It is expressly agreed that said arbitration board shall meet within two days after the occurrence of the difference requiring arbitration.

12. It is further agreed by the parties hereto, that nothing in this agreement shall be construed to forfeit any right of either party prescribed by maritime law.

When men are not boarded on board they shall, in addition to their wages, receive 60 cents per day for board.

Witness the signatures of the parties hereto:

A. Furuseth, Secretary, Sailors' Union; Wm. McDonald, Secretary, Pacific Coast Marine Firemen's Union; Eugene Steidle, Secretary, Marine Cooks and Stewards' Association.

Oceanic Steamship Company, John D. Spreckels, President.

This Agreement is extended for a period of one year from April 15, 1904.

Oceanic Steamship Company, John D. Spreckels, President.

A. Furuseth, Secretary, Sailors' Union; Wm. McDonald, Secretary, Pacific Coast Marine Firemen's Union; Eugene Steidle, Secretary, Marine Cooks and Stewards' Association.

It is to be noted that in negotiating these agreements the aim of the unions has been to establish a standard wage-rate capable of being maintained during a period of comparative depression as well as during periods of prosperity in the shipping industry. Stability, rather than the maximum advantage possible under the most prosperous circumstances, was the object sought. Taking into consideration all the features of the agreements, the aggregate represents an improvement in the working conditions on board ship of greater importance, if possible, than the wage-rate itself. The regulations concerning the length of the workday in port, the provisions for the observance of Sundays and holidays in port and at sea, and for the payment of overtime, and the various "working rules" agreed to by all parties, constitute so many safeguards against the excessive overwork which formerly characterized the condition of all classes employed in coastwise shipping.

LEGISLATIVE WORK OF UNIONS.

The severe nature of the seamen's struggle to gain control over the avenues of employment, and the small and uncertain measure of success attained during the decade 1885-95, was due primarily to the state of the law under which the seaman lived. Although the maritime law of the United States bore heavily upon the seaman in many respects, as was inevitable under a system of legislation which had been handed down through centuries, practically without mitigation of its more onerous features, and, indeed, with increased force in some respects, those features of the law which bore most heavily in restraint of the seaman's liberty may be summed up under three heads: imprisonment for desertion, allotment to original creditor, and attachment of clothing. The purport and effect of the statutes covering these points may be stated briefly, as follows:

The law of imprisonment for desertion provided that a seaman who, having signed articles for a specified voyage, left (*i. e.*, "deserted") the vessel before the expiry of his contract should be subject to arrest and imprisonment for three months. In the case of a seaman engaging for a foreign voyage, the signing of articles was mandatory; in the coastwise trade it was optional with the seaman to sign articles or not. Theoretically the latter feature of the law enabled the coastwise seaman to preserve the right of personal liberty, the right to leave his vessel in any safe port. Practically, however, this right was denied the seaman by the simple fact of agreement among the shipowners to require that all crews should sign articles. Thus the seaman was confronted with the alternative of signing articles, thereby surrendering his right to leave his ship at any time during the voyage, or remaining idle. Of course the seaman's necessities forced him to accept the former of these conditions. Having thus subjected himself to the pen-

alty of imprisonment for desertion, the seaman was forced to submit to whatever exactions might be imposed upon him. The ordinary recourse of the land worker when conditions become unbearable, namely, the strike, was beyond the seaman's power, since to strike meant arrest and imprisonment, either during the period specified by law or until the vessel was ready for sea, in which latter case the deserter was placed on board by the port authorities and forced to return to work.

Allotment to original creditor was designed as a convenience to the seaman, enabling him, if he so desired, to allot a certain part of the wages to be earned during a voyage to an original creditor in payment of any just debt for board, lodging, or clothing. In design this law was a salutary measure of protection against those vicissitudes to which most men dependent upon a meager wage are subject and to which the seaman, by reason of frequent periods of enforced idleness, is commonly exposed. In practice, however, allotment to original creditor is everywhere recognized as the chief source and support of the crimping system and as an institution to be, not supported, but merely tolerated as a necessary evil, much as other obvious evils are tolerated as ineradicable features of society on land. In the everyday operation of the allotment system the "original creditor" is commonly a crimp, while the "just debt for board, lodging, or clothing" is mainly a levy upon the seaman in payment of "shipping fees" and other illegal charges. While in the intention of the law it rests with the seaman to say whether or not he shall allot any part of his wages to an original creditor, in practice he is forced to do so as a condition of securing employment, the original creditor having, as previously noted, secured control in the latter regard. By compelling the seaman to sign away a substantial part (commonly one half) of the wages to be earned during a given voyage, the crimp maintained himself at the seaman's expense, but yet quite independently of the latter's will or pleasure in the matter.

The evils arising from the allotment system were due to violations of the law in the case; but a long and uniform experience has shown that such violations are inevitable so long as allotment itself is permitted. In a word, so long as the seaman is permitted to allot any part of his wages to the crimp, no matter under what euphemism the latter may pose, it is inevitable that such permission will develop into the power of compulsion. In reality it was the law, not the crimp, that compelled the seaman to sign away his wages. And while the law laid specific pains and penalties upon crimping, in other matters, as in the matter of compelling the payment of allotment to an original creditor, it actually made crimping inevitable. Again, while allotment was designed as a convenience to the improvident seaman, making it possible

for him to secure board, lodging, and clothing, it encouraged improvidence on the part of the seaman who was disposed to harbor his resources and maintain his independence, since the latter speedily learned that these virtues were discounted by the crimp, and that the avenues of employment lay through the barroom, with its concomitants of vice and dissipation.

The custom of attaching the seaman's clothing was the final resort of the crimps in the process of reducing the seaman to a state of complete subserviency. If, as sometimes happened, a seaman refused to agree to the crimp's terms of shipment, allotment, etc., he was ejected from his boarding-house, and his clothing was held for debt.

This custom was supported, so far as it did not prevail of its own force, by the commonly existing local laws giving the lodging-house keeper a lien upon the baggage of his guests. But, while the attachment of the seaman's clothing, regarded merely as such, was in keeping with general law, it was in direct violation of another and equally prevalent law, namely, that which exempts from attachment tools and all other necessaries of subsistence. The seaman's clothing is analogous to the land worker's tool-kit, rather than to the traveler's baggage; hence, the attachment of the former was equivalent to the denial of the means of livelihood. Such, at any rate, was the effect, as, indeed, it was the design, of the attachment levied upon the seaman's clothing. Without clothing the seaman could neither go to sea (even had other circumstances permitted the opportunity of employment) nor secure another boarding-house, for the reason that, having no clothing, he had nothing upon which another boarding-house keeper might seize as security. The power to hold the seaman's clothing was effective for all practical purposes of the crimp.

Here, again, as in the case of allotment to original creditor, we note an instance in which the Federal law, while recognizing an evil in the circumstances, has fallen short of the measures necessary to correct the evil in question. The United States statutes had long prohibited the attachment of seamen's wages upon any ground. Obviously, the intent of the law was to safeguard the seaman against those who would place him under duress by securing control of his means of subsistence while on shore.

It has been noted in the foregoing pages that notwithstanding the theoretical safeguards placed around the allotment system, safeguards enacted avowedly against the crimp, the latter had so contrived in the practice of the law that he became the sole beneficiary thereunder. Thus it developed that the law against the attachment of the seaman's wages after they were earned became nugatory by virtue of the fact that they were attached—that is, allotted—before they were earned. The power to attach the seaman's clothing, although supported only

by local laws, effectually offset whatever power remained to the seaman over that part of his wages which, having been saved from compulsory allotment, was paid to him at the end of the voyage.

The organized seamen, recognizing their helplessness under these conditions for all purposes of material reform, determined upon an effort to change the maritime law, particularly in the respects here noted. In 1892 the Sailors' Union of the Pacific elected a legislative committee, which, with the aid of the necessary legal counsel, drafted a bill for the repeal of the obnoxious features in question. This bill, which was introduced in Congress by Representative Maguire, of the Fourth Congressional District of California, became law in 1895. The measure abolished imprisonment for desertion in the coastwise trade and in the trade between ports of the United States and ports in nearby foreign countries (Canada, Mexico, Newfoundland, Bahamas, Bermudas, and West Indies). It also prohibited allotment to original creditor by seamen in the coastwise trade and made illegal the attachment of seamen's clothing.

The enactment of this measure effected a revolution in the legal status of the seaman, while its effect upon the economic conditions of the latter was hardly less remarkable, if not in actual, at least in potential results. The practical results of the law were immediately apparent in the greater independence of the seaman and a proportionate decrease in the power of the crimps. For some time following the passage of the law complaint was freely made that seamen commonly took advantage of the liberty granted them under the abolition of imprisonment for desertion to "back out"—that is, to refuse to join a vessel after having signed articles—and at other times to leave the vessel at a port of call during the voyage, thus putting the shipowner to inconvenience and probable loss in filling the vacancies thus created. It is to be noted, however, that these complaints emanated chiefly from shipowners on the Atlantic Coast. The shipowners on the Pacific Coast made little or no complaint on this score; on the contrary, they quite generally commended the new law as a salutary measure calculated to elevate the moral tone of the seaman's calling and, consequently, to dignify all interests associated with the seaman. As to the complaints of the shipowners in other sections, it developed that these were largely inspired by fear of what might happen, rather than by experience of any actual grievances under the law. Reports made by the United States Shipping Commissioners at different seaports agreed that in practice the law had worked no hardship upon any legitimate interest concerned in the shipping industry; whereas, on the other hand, it had made possible a great improvement in the administration of the general features of the law in the seaman's case by relieving him from those influences which had formerly proved a serious obstacle to the attainment of that result.

Shortly after the passage of the Maguire Act it was found that the most important feature of that measure, *i. e.*, the abolition of imprisonment for desertion, applied only to seamen engaged on coastwise voyages. That is to say, a seaman engaged on a foreign voyage was still liable to imprisonment for desertion notwithstanding the act of desertion might have taken place in a coastwise port. This point was decided by the United States Supreme Court in 1897, in the "Arago" case. (*Robert Robertson et al. vs. Barry Baldwin*, 165 U. S. Reporter.) In that case the crew of the American barkentine "Arago" had signed articles in San Francisco for a voyage to Valparaiso, via the Columbia River, Or. Upon arrival in the latter locality the crew, owing to dissatisfaction with the treatment received, left the vessel. They were arrested, imprisoned, and afterward placed on board and taken to sea against their will. The seamen refused to work the vessel, and the "Arago" put into San Francisco, where the crew were charged with refusing duty. These men being members of the Sailors' Union of the Pacific, were defended at the instance of that body. The main ground of the defense was that the statute imposing a penalty for desertion was in contravention of the Thirteenth Amendment to the Constitution of the United States, prohibiting slavery and involuntary servitude except as a punishment for crime. It was also contended by the seamen's counsel that the statute in question had been repealed by the Maguire Act, so far as concerned seamen leaving their vessels in coastwise ports. The Supreme Court decided against these contentions, on the grounds, first, that the Thirteenth Amendment was intended to, and did, apply only to slavery such as had existed in the Southern States prior to the Civil War and to the Mexican peon and Chinese coolie trades; secondly, that the abolition of imprisonment for desertion extended only to seamen engaged on coastwise voyages, whereas the "Arago" was engaged on a foreign voyage, the fact that the vessel happened to be lying in a coastwise port at the time of the seamen's desertion being immaterial.

This defect in the Maguire Act was afterward remedied by the passage, in 1898, of the White Act. The latter measure extended the right to leave a vessel in a coastwise port to all seamen, irrespective of the nature of the voyage on which they are engaged. The White Act effected other improvements in the maritime law, among these being a reduction of the maximum penalty for desertion in a foreign port from three months' to one month's imprisonment, and an increase in the food scale. In the process of enforcing these laws it has been found that the penalties provided in the matter of allotment and attachment of clothing were inadequate. Accordingly, the Fifty-eighth Congress amended the law in these regards, increasing the penalties and providing a more expeditious and effective method of enforcement. As the

law now stands, the charging of "shipping fees" (for which purpose a large part of the seaman's allotment was previously expended) and the attachment of seaman's clothing are misdemeanors punishable by imprisonment for not more than six months or by fine of not more than \$500.

Comparing the present maritime law, as applied to seamen, with that of ten years ago, we find that the seaman now enjoys a degree of personal liberty sufficient to enable him to work out an indefinite measure of improvement in his conditions. The measures declared by former Commissioner Tobin, of this Bureau, in 1887, to be necessary to the welfare of the seaman, have been to a great extent realized. While the crimping evil has not been entirely removed, it has been greatly mitigated, so that it may be said to exist to-day rather by sufferance of the seaman and shipowner than by support of the law. The crimp must still be reckoned with, but it remains to be said that, so far as regards his relations to the unorganized seamen in the foreign-going trade, his power to levy upon the prospective earnings of the latter through the medium of allotment has been greatly curtailed. As regards the seamen in the coastwise trade, the entire abolition of allotment in that trade has forced the crimp to depend upon fair dealing, on a cash basis, if he would continue in business at all.

Other projected improvements now pending in Congress will go far to free the seaman from the remaining hardships of the law, and to make the calling not only more tolerable to those at present engaged therein, but also to make it inviting to the best class of American youth and manhood. The importance of the latter consideration may be deduced from the fact that the average period of service of sailors on the Pacific Coast is but little over two and one half years. The constant change in the personnel of the service is ascribed as much to the unsatisfactory state of the law as to the extremely laborious nature of the work required of the seaman in the Pacific Coast trade. This condition operates to prevent the attainment of the highest degree of efficiency on the part of ships' crews. Among the proposed improvements in the existing law the most important from the public standpoint is that providing for a manning and efficiency scale. By this means it is proposed to increase the numbers and efficiency of ships' crews, thus greatly adding to the safety of life and property at sea.

NATIONAL AFFILIATIONS.

With the exception of the organizations of licensed men—masters, pilots, mates, and engineers—all the bodies included in this report are affiliated with the International Seamen's Union of America, the national organization of the maritime unions located in different parts of the United States and Canada, with headquarters at Boston, Mass.

The latter body, in turn, is affiliated with the American Federation of Labor, thus maintaining a direct relationship between the local organizations of the seafaring craft on the Pacific Coast and the organized workers in all crafts throughout the country. In addition, the Sailors' Union of the Pacific is affiliated, through its agencies, with the central city and State bodies of organized labor in the various ports on the Coast and in the Territory of Hawaii.

The local harbors of the American Association of Masters and Pilots of Steam Vessels and the Marine Engineers' Beneficial Association are affiliated with the national bodies of the same names respectively, but beyond that they maintain no relations with other classes of labor.

NUMBER AND CONDITION OF CHINESE AND JAPANESE IN CALIFORNIA.

The law requires that the number and condition of Chinese in the State be investigated. Information along this line is admittedly the most difficult to obtain. The census figures furnish the last authentic data in the case of the Chinese, but from records of the Immigration Bureau and the steamship companies it has been possible to get more recent information in regard to the number of Japanese in California.

The table on the opposite page gives the number of Chinese and Japanese in California by counties in 1880, 1890, and 1900.

The number of Chinese has been constantly on the wane. This has been true especially in the mining counties. Since 1880 there has been a decrease for the whole State of 39,379, or 39 per cent; while for the twenty-one counties in which mining is the principal occupation there has been a falling off from 24,669 to 4,911, or a decrease of 80 per cent. The Chinese were employed very largely in the more rudimentary forms of mining, but with the advent of more improved methods they have been largely supplanted.

In 1880, according to census returns, there were but 86 Japanese in this State. In 1900 this number had increased to 10,151.

Number of Chinese and Japanese, by Counties—1880, 1890, 1900.

Counties.	Chinese.			Japanese.		
	1900.	1890.	1880.	1900.	1890.	1880.
Alameda	2,211	3,311	4,386	1,149	184	16
Alpine	5	5	17			
Anador	153	324	1,115		3	
Butte	712	1,530	3,793	365	3	
Calaveras	148	326	1,037	4	3	
Colusa	274	924	970	53	5	
Contra Costa	627	465	732	276	11	1
Del Norte	0	7	434		2	
El Dorado	206	518	1,484	30	2	5
Fresno	1,775	2,736	753	598	12	
Glenn	227			14		
Humboldt	5	19	241		1	
Inyo	67	89	90			
Kern	906	1,124	702	48	3	
Kings	417			156		
Lake	82	210	469	3		
Lassen	28	41	50	2		
Los Angeles	3,209	4,424	1,169	204	36	1
Madera	229			19		
Marin	489	915	1,327	52	24	7
Mariposa	102	181	697			
Mendocino	218	359	346	23	1	
Merced	357	746	575	43		
Modoc	6	22	17			
Mono	120	146	363	1		
Monterey	857	1,667	372	710	1	
Napa	541	875	905	6	6	2
Nevada	632	1,053	3,003	15	5	2
Orange	136	162		3		
Placer	1,050	1,429	2,190	13	6	
Plumas	192	307	871			1
Riverside	316			97		
Sacramento	3,254	4,371	4,802	1,209	51	1
San Benito	69	85	242	15		
San Bernardino	388	682	123	148	2	
San Diego	414	909	229	25	13	
San Francisco	13,954	25,833	21,745	1,781	590	45
San Joaquin	1,875	1,676	1,997	313	10	
San Luis Obispo	154	386	183	16	2	
San Mateo	306	448	596	46	9	
Santa Barbara	459	581	227	114	5	
Santa Clara	1,738	2,723	2,695	284	27	
Santa Cruz	614	785	523	235	19	
Shasta	102	342	1,334	20	2	1
Sierra	309	488	1,252	1		
Siskiyou	790	1,151	1,568	8		
Solano	903	1,522	993	870	26	2
Sonoma	599	1,145	904	148	74	
Stanislaus	236	421	518	5		
Sutter	226	327	266	155		
Tehama	729	892	774	143		
Trinity	336	554	1,951	1		
Tulare	370	954	324	48	2	2
Tuolumne	158	253	805	2		
Ventura	408	451	129	94	1	
Yolo	346	604	608	410	5	
Yuba	719	974	2,146	56	1	
Totals	45,753	72,472	75,132	10,151	1,147	86

In the following tables the number of Japanese who have come to California since 1900 is given. Those coming from Hawaiian ports are not recorded by the immigration authorities, and in order to ascertain this number the records of the American steamship companies were

Of course, this in nowise exhausts the list of occupations in which Chinese are engaged. Large numbers are engaged in domestic and personal pursuits; for the whole United States, 61.7 per cent are so employed. In the occupations enumerated above only one, viz., laundries, would come under this classification.

The United States Census Report on Occupations for 1900 has been published just recently. By consulting this report it is possible to get at the approximate number of Chinese and Japanese engaged in each of the five main divisions of occupations. In most cases the Census Bureau has classed Negroes, Chinese, Japanese, and Indians together under the designation colored persons.

It is possible, by assuming that the percentages for continental United States hold good for California, to get an approximation that will give a general idea of the distribution of this class of laborers. Nothing more is claimed for the following results:

Total Male and Female Colored Persons, 10 Years of Age and Over, Engaged in Selected Groups of Occupations, for California.

Sex and Occupation.	Colored.	Negroes	Colored, Exclusive of Negroes.
<i>Males.</i>			
Agricultural pursuits.....	17,157	473	16,684
Professional services.....	626	132	494
Domestic and personal.....	25,490	2,285	23,205
Trade and transportation.....	6,263	603	5,660
Manufacture and mechanical pursuits.....	7,423	410	7,013
<i>Females.</i>			
Agricultural pursuits.....	155	17	138
Professional services.....	27	22	5
Domestic and personal.....	1,863	1,161	702
Trade and transportation.....	43	19	24
Manufacture and mechanical pursuits.....	575	130	445
Totals.....	59,622	5,252	54,370

From this table it is seen that 54,370 Chinese, Japanese, and Indians, over 10 years of age, are engaged in gainful occupations in California. For the whole United States, 28.2 per cent of the Indian population is under 10 years of age. Assuming that this percentage is true for California, we have 11,050 as the total number of Indians over 10 years of age in the State. Again, assuming that the percentage of the entire number of Indians over 10 years of age engaged in gainful occupation is the same for California as for continental United States (36.7 per cent), the number of Indians in California over 10 years of age who are gainfully employed is 4,052. The number of Chinese and Japanese over 10 years of age who are gainfully employed thus is found to be 50,318.

The entire Chinese population of this State at the last census was

45,753, and Japanese, 10,151. The number of Chinese in continental United States who are under 10 years of age is 2.5 per cent of the entire Chinese population. This percentage is likely too small for California, but, assuming that it is correct, the number of Chinese in California over 10 years of age is 44,609; likewise, the number of Japanese (which is likely more nearly correct, since the Japanese colony is not so old here as the Chinese) is 10,039.

In continental United States 93.8 per cent of the Chinese over 10 years of age are engaged in gainful occupations, and 93.8 per cent of the Japanese are likewise employed. Applying these percentages to California we have 41,843 as the total number of Chinese over 10 years of age who are gainfully employed, and 9,416 the number of Japanese. The total number of Chinese and Japanese gainfully employed is by this method found to be 51,259, slightly in excess of the number already found, viz., 50,318.

It is believed that the results obtained up to this point are reasonably correct, since the conditions are practically the same for California as for the entire nation. An attempt to follow out the same method in arriving at the number of Chinese and Japanese in the different occupations may not be productive of results as nearly correct, yet no great error can enter, since 50.8 per cent of the entire Chinese population of continental United States and 41.7 per cent of the Japanese are found in California.

Number of Chinese and Japanese in California, 10 Years of Age and Over, Who Are Gainfully Employed, Distributed According to the Five Main Occupation Groups.

Occupation Group.	Chinese.		Japanese.		Total.
	Per Cent for Con. U. S.	Number in California	Per Cent for Con. U. S.	Number in California	
Agricultural pursuits	14.6	6,109	23.9	2,150	8,259
Professional services	0.8	335	0.6	56	391
Domestic and personal	61.7	25,817	40.5	3,813	29,630
Trade and transportation	11.1	4,644	30.5	2,771	7,515
Manufacture and mechanical pursuits	11.8	4,957	4.5	423	5,380

The figures in the foregoing table are most likely to be erroneous in agricultural pursuits, since Chinese and Japanese are engaged in this form of occupation in the western section of the United States alone. A comparison with the figures given by the census for Chinese, Japanese, and Indians, taken together, would seem to bear out this assumption. The number of Japanese and Chinese engaged in agricultural pursuits in California is too small, while the number engaged in domestic and personal services is correspondingly too large.

Since, as has already been pointed out, so large a per cent of the entire Chinese and Japanese population of continental United States is

in California, a comparison of the employed and unemployed of these races with those of the other elements of the population for the entire United States will be instructive. In the article on Occupations in California and continental United States one feature of this inquiry has been covered for California, but in that article Chinese, Japanese, and Indians are classed together.

Percentage of the Total Number of Persons Over 10 Years of Age who are Employed at Gainful Occupations, and Percentage of the Employed who are Unemployed during Some Part of the Year, in the Different Elements of the Population, Classified as White, Negro, Indian, Chinese, and Japanese.

Element of the Population.	Percentage Employed.			Percentage of Employed, Unemployed During Some Part of the Year.		
	Both Sexes.	Males.	Females.	Both Sexes.	Males.	Females.
Aggregate	50.2	80.0	18.8	22.3	22.0	23.3
White	48.6	79.5	16.0	21.2	21.2	21.1
Negro	62.2	84.1	40.7	29.1	28.5	30.2
Indian	36.7	59.2	13.8	29.2	30.3	24.4
Chinese	93.8	97.0	19.3	16.7	16.6	25.5
Japanese.....	93.8	96.2	30.3	24.2	24.4	12.4

The table shows that in no race is the proportion of the unemployed to the total number 10 years of age or over so high as among the Chinese and Japanese, while the percentage of those engaged in gainful occupations who are out of work during a part of the year is lowest among the Chinese and very high among the Japanese, being exceeded only by the Indians and the Negroes. It would seem that the Chinese, having the largest per cent of the total population at work, are also most persistent in their labor, while the Japanese, having an equal per cent at work, are among the least persistent and are most often out of employment.

COMPARATIVE STATISTICS OF OCCUPATIONS IN CALIFORNIA AND CONTINENTAL UNITED STATES.

The statistics of occupations at the last Federal census were finally published in complete form no earlier than in 1904, and the figures relating to California are therefore fresh enough for discussion in this report to the State Legislature. The inquiry in 1900, as at preceding censuses, called for a statement of the occupation, trade, or profession of each person at least 10 years of age who was at work, that is, occupied in gainful labor. Comparatively few persons under 10 years of age are gainfully employed, and when, contrary to instructions, such persons were returned by the enumerator they were excluded from the tabulation. The inquiry was confined to a simple statement of the kind of work done or character of service rendered. No attempt was made, by specific returns on the schedule, to distinguish employers from employés, although this distinction would often be indicated by the designation of the occupation required by the printed instructions; nor was any attempt made to ascertain whether the work was done at home or in a shop or factory. The aim of the inquiry was to secure a definite statement of the profession, trade, or branch of work upon which each person at least 10 years of age depended chiefly for support or in which he was ordinarily engaged, even though he had been unable to secure work part of the time.

A brief name for persons at least 10 years of age engaged in gainful occupations being almost essential, the word breadwinner has been applied to this class throughout the following discussion. The term breadwinner as used here in a somewhat unusual sense includes "every person 10 years of age and over who is at work, that is, occupied in gainful labor." It does not include a person "who has retired from practice or business; or a wife or daughter living at home and assisting only in the household duties without pay," nor does it include a person who does domestic errands or family chores out of school hours, but regularly attends school. On the other hand, "if a boy or girl, above 10 years of age, is earning money regularly by labor, contributing to the family support, or appreciably assisting in mechanical or agricultural industry," he or she should be considered a breadwinner, according to the instructions to enumerators for the Federal census.

GENERAL SUMMARY.

The number of breadwinners may be compared with the total population of all ages or with only the population at least 10 years of age. In one case the comparison is with the total number of persons to be supported by the earnings of labor, and in the other it is with the number of persons from whom the ranks of the workers may be recruited. Each means of comparison is used in the following general summary of the statistics of occupations for continental United States (that is, that part of the United States lying on the continent of North America south of the Canadian boundary) and for California at the last three censuses.

Number and Per Cent of Breadwinners in Population of All Ages and at Least 10 Years of Age, Classified by Sex, for Continental United States and California: 1900, 1890, and 1880.

Sex and Census.	Population.		Number of Breadwinners.	Per Cent of Breadwinners in Population.	
	All Ages.	At least 10 Years of Age.		All Ages.	At least 10 years of Age.
<i>Continental United States.</i>					
Both sexes—1900.....	75,994,575	57,949,824	29,073,233	38.3	50.2
1890.....	62,622,250	47,413,559	23,318,183	37.2	49.2
1880.....	50,155,783	36,761,607	17,392,099	34.7	47.3
Males— 1900.....	38,816,448	29,703,440	23,753,836	61.2	80.0
1890.....	32,067,880	24,352,659	19,312,651	60.2	79.3
1880.....	25,518,820	18,735,980	14,744,942	57.8	78.7
Females— 1900.....	37,178,127	28,246,384	5,319,397	14.3	18.8
1890.....	30,554,370	23,060,900	4,005,532	13.1	17.4
1880.....	24,636,963	18,025,627	2,647,157	10.7	14.7
<i>California.</i>					
Both sexes—1900.....	1,485,053	1,222,111	644,267	43.4	52.7
1890.....	1,208,130	989,896	544,630	45.1	55.0
1880.....	864,694	681,062	376,505	43.5	55.3
Males— 1900.....	820,531	687,793	556,345	67.8	80.9
1890.....	700,059	589,252	484,087	69.1	82.2
1880.....	518,176	425,170	384,303	74.2	81.9
Females— 1900.....	664,522	534,318	87,922	13.2	16.5
1890.....	508,071	400,644	60,543	11.9	15.1
1880.....	346,518	255,892	28,202	8.1	11.0

The table shows that at each census the proportion of breadwinners of both sexes to population was greater in California than in continental United States, though the difference is diminishing. Thus, in 1880 the per cent of breadwinners in the total population of all ages was 43.5 for California, but only 34.7 for continental United States, a difference of 8.8; in 1900, the corresponding per cents were 43.4 and 38.3, a difference of only 5.1 in the per cents. The same holds where breadwinners are compared with the population at least 10 years of age. Here, the difference in the per cents for California and continental

United States fell from 8.0 (55.3 against 47.3 per cent) in 1880 to 2.5 (52.7 against 50.2 per cent) in 1900.

The per cent of male breadwinners in the male population of all ages or at least 10 years of age was greater in California than in the entire country at each census, while for females the per cent is less in every case in the Golden State than in the country as a whole. For each sex the differences between the State and the country at large are diminishing. The proportion of males at work has fallen slightly in California, perhaps because of the growth of family life and the rise of a leisure class, while increasing steadily in the whole country, probably on account of the continuous flood of immigration pouring into the land. The proportion of females occupied in gainful labor has risen more rapidly in California than in continental United States, though the per cents for the former are still much less than for the latter.

The breadwinners in California in 1900 numbered 644,267, and comprised over two fifths (43.4 per cent) of the total population of all ages and more than half (52.7 per cent) of the population at least 10 years of age, the proportion in each case being above that for the entire country. The 556,345 male breadwinners constitute more than two thirds (67.8 per cent) of all males in the State and a little over four fifths (80.9 per cent) of those old enough to be workers, each per cent here being also greater than that for the country as a whole. There are 87,922 female breadwinners in the State, forming about one eighth (13.2 per cent) of the female population and one sixth (16.5 per cent) of the females at least 10 years of age, these proportions being considerably less than those for continental United States. The fact that California has an unusually great proportion of breadwinners of both sexes in its population of all ages and of working age, is therefore explained wholly by the large proportion of male breadwinners in the State.

RACE.

The following table presents a race classification of the breadwinners in continental United States and California in 1900:

Breadwinners Classified by Race, and Per Cent Distribution, for Continental United States and California: 1900.

Race.	Breadwinners of Specified Race: 1900.			
	Continental U. S.		California.	
	Number.	Per Cent.	Number.	Per Cent.
Total	29,073,233	100.0	644,267	100.0
Native white—native parents.....	13,875,329	47.7	237,406	36.9
Native white—foreign parents.....	5,300,924	18.3	154,445	24.0
Foreign white.....	5,736,818	19.7	192,794	29.9
Negro.....	3,902,337	13.7	5,252	0.8
Chinese, Japanese, and Indian.....	167,825	0.6	54,370	8.4

It appears from this table that while nearly one half (47.7 per cent) of the breadwinners in the entire country are native whites with native parents, these form less than three eighths (36.9 per cent) of the breadwinners in California. On the other hand, while the whites comprise only six sevenths (85.7 per cent) of all breadwinners in the country as a whole, they constitute nine tenths (90.8 per cent) of the total number in the State. There are practically no negro breadwinners in California, but the per cents for Chinese, Japanese, and Indians, foreign whites, and native whites with native parents are unusually great. However, this may be due mainly to the large proportion that these three elements form of the total population of California. Accordingly, it is best to compare the breadwinners of each class with the total population, or better, with the population of working age belonging to that class in the State. This is done in the following table for male and female breadwinners, separately, in continental United States and California in 1900:

Number and Per Cent of Breadwinners in Population at Least 10 Years of Age, Classified by Sex and Race, for Continental United States and California: 1900.

Race.	Population at Least 10 Years of Age: 1900.					
	Male.	Female.	Number of Breadwinners.		Per Cent of Breadwinners.	
			Male.	Female.	Male.	Female.
<i>Contin'tal United States.</i>	29,703,440	28,246,384	23,753,836	5,319,397	80.0	18.8
Native white—native parents	15,452,855	14,857,406	11,948,692	1,926,637	77.3	13.0
Native white—foreign parents	5,460,085	5,466,316	4,117,387	1,183,537	75.4	21.7
Foreign white	5,414,991	4,599,265	4,857,099	879,719	89.7	19.1
Negro	3,181,650	3,233,931	2,675,497	1,316,840	84.1	40.7
Chinese, Japanese, and Indian	193,859	89,466	155,161	12,664	80.0	14.2
<i>California.</i>	687,793	534,318	556,345	87,922	80.9	16.5
Native white—native parents	270,291	234,818	203,877	33,529	75.4	14.3
Native white—foreign parents	165,586	162,948	123,689	30,756	74.7	18.9
Foreign white	190,259	123,111	171,820	20,974	90.3	17.0
Negro	4,750	4,290	3,903	1,349	82.2	31.4
Chinese, Japanese, and Indian	56,907	9,151	53,056	1,314	93.2	14.4

This table shows that the per cent of breadwinners in the male population at least 10 years of age is less in California than in continental United States, not only for native whites with native parents, but also for those with foreign parents, the per cent for California being greater than that for the entire country only in the case of foreign whites and Chinese, Japanese, and Indians. Among each of the last named classes, however, the per cent of male breadwinners in California is very great, 90.3 per cent for foreign whites and 93.2 for Chinese, Japanese, and Indians, against only 80.9 for all males in the State. Only about three

fourths of the native white males, whether of native or foreign parentage, are breadwinners either in the whole country or in California alone.

Among females the per cent of breadwinners in the population of working age is greater in California than in continental United States only for native whites with native parents. However, the per cent of female breadwinners is lower for this element than for any other, both in California and in the entire country. The per cent is a trifle higher for Chinese, Japanese, and Indians, next for foreign whites, then for native whites with native parents, and highest of all for negroes. Among no class of white women in California are as many as one fifth occupied in gainful labor other than the doing of housework for their own families.

MAIN CLASSES OF OCCUPATIONS.

The scheme of classification adopted for the Twelfth Federal Census distinguished 303 specified occupations or 140 occupation groups. These were classified under five main heads: agricultural pursuits, professional service, domestic and personal service, trade and transportation, and manufacturing and mechanical pursuits. Occupations connected with mining and fishing were included under the last of these five heads. The following table shows for continental United States and California at the last three censuses the number and per cent of breadwinners in each of the five main classes and also in the three sub-classes under the last:

Number and Per Cent of Breadwinners in Main Classes of Occupations, for Continental United States and California: 1900, 1890, and 1880.

Class of Occupations.	Breadwinners in Specified Class of Occupations.					
	Number.			Per Cent.		
	1900.	1890.	1880.	1900.	1890.	1880.
<i>Continental United States.</i>						
All occupations.....	29,073,233	23,318,183	17,392,069	100.0	100.0	100.0
Agricultural pursuits.....	10,381,765	9,148,448	7,713,875	35.7	39.2	44.3
Professional service.....	1,258,538	944,333	603,202	4.3	4.0	3.5
Domestic and personal service.....	5,580,657	4,220,812	3,418,793	19.2	18.1	19.6
Trade and transportation.....	4,766,964	3,326,122	1,871,503	16.4	14.3	10.8
Manufacturing and mechanical pursuits.....	7,085,309	5,678,468	3,784,726	24.4	24.4	21.8
Manufacturing and mechanical pursuits proper.....	6,435,608	5,231,058	3,493,977	22.1	22.4	20.1
Mining and quarrying *.....	580,761	387,248	249,397	2.0	1.7	1.4
Fishing.....	68,940	60,162	41,352	0.3	0.3	0.3
<i>California.</i>						
All occupations.....	644,267	544,630	376,505	100.0	100.0	100.0
Agricultural pursuits.....	152,371	136,981	83,829	23.7	25.1	22.3
Professional service.....	41,847	29,816	15,998	6.5	5.5	4.2
Domestic and personal service.....	146,324	132,946	105,037	22.7	24.4	27.9
Trade and transportation.....	140,612	100,786	58,084	21.8	18.5	15.4
Manufacturing and mechanical pursuits.....	163,113	144,101	113,557	25.3	26.5	30.2
Manufacturing and mechanical pursuits proper.....	134,253	119,575	73,310	20.8	22.0	19.5
Mining and quarrying *.....	26,891	22,580	37,237	4.2	4.1	9.9
Fishing.....	1,969	1,946	3,010	0.3	0.4	0.8

* Includes in 1900 officials of mining and quarrying companies, not separately returned in 1890 and 1880.

It appears from this table that the uniform increases in the per cent of all breadwinners engaged in professional service and in trade and transportation shown for continental United States are found also in California in a somewhat more marked degree. While the proportion engaged in personal and domestic service is practically unchanged for the entire country, it has fallen sharply in California. On the other hand, the proportion following agricultural pursuits has varied little in the State, though declining steadily in the country as a whole. For continental United States there has been an increase since 1880 in the proportion following manufacturing and mechanical pursuits, while a marked decrease appears for California, on account of the decline in the proportion of breadwinners engaged in mining and quarrying and in fishing. If these sub-classes be eliminated and attention be directed only to manufacturing and mechanical pursuits proper, it appears that the movement in California was the same as in continental United States; that is, there was an increase between 1880 and 1890 in the proportion of breadwinners in this class of occupations, followed by a slight decrease between 1890 and 1900. These decreases in the proportions are, of course, only relative, the absolute number of breadwinners having increased in practically all cases. The numerical increases for some classes of occupations, as, in California, domestic and personal service and at the last decade alone agricultural pursuits and manufacturing and mechanical pursuits proper, have merely been less rapid than the increases in the other classes, professional service and trade and transportation.

In 1900 agricultural pursuits was the only main class of occupations followed by a larger proportion of the breadwinners in continental United States than in California, though the proportion in the sub-class, manufacturing and mechanical pursuits proper, was also somewhat greater for the entire country than for the State alone. The figures indicate that occupations are more diversified in California than in the country as a whole. More than one third (35.7 per cent) of the breadwinners in continental United States are engaged in a single class of occupations, agricultural pursuits, while in California only one fourth (25.3 per cent) follow the leading main class, manufacturing and mechanical pursuits, and only one fifth (20.8 per cent) are engaged in manufacturing and mechanical pursuits proper. The per cent of California breadwinners engaged in agricultural pursuits is 23.7, in domestic and personal service 22.7, and in trade and transportation 21.8, the proportion being a little over one fifth for each of these three main classes. About one sixteenth (6.5 per cent) of all breadwinners in the State are engaged in professional service, and about one twenty-fifth (4.2 per cent) are occupied in mining and quarrying.

SEX.

The following table gives the per cent distribution by sex of breadwinners in the main classes of occupations and the sub-classes under the last, for continental United States and California, at the three most recent censuses:

Per Cent Distribution by Sex of Breadwinners in Main Classes of Occupations, for Continental United States and California: 1900, 1890, and 1880.

Class of Occupations.	Breadwinners.					
	Per Cent, Male.			Per Cent, Female.		
	1900.	1890.	1880.	1900.	1890.	1880.
<i>Continental United States.</i>						
All occupations.....	81.7	82.8	84.8	18.3	17.2	15.2
Agricultural pursuits.....	90.6	91.6	92.3	9.4	8.4	7.7
Professional service.....	65.8	67.0	70.6	34.2	33.0	29.4
Domestic and personal service.....	62.5	60.5	65.4	37.5	39.5	34.6
Trade and transportation.....	89.4	93.1	96.6	10.6	6.9	3.4
Manufacturing and mechanical pursuits.....	81.5	81.9	83.3	18.5	18.1	16.7
Manufacturing and mechanical pursuits proper.....	79.6	80.4	81.9	20.4	19.6	18.1
Mining and quarrying*.....	99.8	99.9	100.0	0.2	0.1	†
Fishing.....	99.3	99.6	99.8	0.7	0.4	0.2
<i>California.</i>						
All occupations.....	86.4	88.9	92.5	13.6	11.1	7.5
Agricultural pursuits.....	96.8	97.8	99.3	3.2	2.2	0.7
Professional service.....	67.6	70.2	74.4	32.4	29.8	25.6
Domestic and personal service.....	75.6	79.7	86.6	24.4	20.3	13.4
Trade and transportation.....	90.7	95.1	98.6	9.3	4.9	1.4
Manufacturing and mechanical pursuits.....	87.3	88.4	92.4	12.7	11.6	7.6
Manufacturing and mechanical pursuits proper.....	84.6	86.0	88.3	15.4	14.0	11.7
Mining and quarrying*.....	99.9	99.9	100.0	0.1	0.1	†
Fishing.....	99.3	98.7	99.9	0.7	1.3	0.1

* Includes in 1900 officials of mining and quarrying companies, not separately returned in 1890 and 1880.

† Less than one tenth of 1 per cent.

The table shows that the per cent male among breadwinners has decreased, or that the per cent female has increased, for all occupations and for each class and sub-class considered both in continental United States and in California. The increase in the proportion of females among all breadwinners is particularly great in trade and transportation, the per cent for the entire country having risen from 3.4 in 1880 to 10.6 in 1900, and for California from 1.4 to 9.3 in the twenty years. This increase is due to the exceptionally large increase in the employment of women as saleswomen, stenographers and typewriters, and bookkeepers and accountants.

The table also shows that in 1900 the proportion of females among all breadwinners was less in California than in the country as a whole, not only for all occupations but likewise for each class and sub-class considered. The per cent for the country and for the State are most nearly the same in professional service (34.2 against 32.4 per cent) and

in trade and transportation (10.6 against 9.3 per cent). This indicates that in California the growing employment of females has thus far made the proportion of female workers notably great only in the main classes, including such occupations as teachers, saleswomen, stenographers, clerks, etc.

MEN, WOMEN, AND CHILDREN.

For the censuses of 1900 and 1880 it is possible to classify breadwinners as men, women, and children, the last including those 10 to 15 years of age. The figures for continental United States and California are given in the table which follows:

Breadwinners Classified as Men, Women, and Children, and Per Cent Distribution, for Continental United States and California: 1900 and 1880.

Class.	Breadwinners of Specified Class.			
	Number.		Per Cent.	
	1900.	1880.	1900.	1880.
<i>Continental United States</i>	29,073,233	17,392,069	100.0	100.0
Men.....	22,489,425	13,319,755	77.3	80.0
Women.....	4,833,630	2,353,988	16.6	13.5
Children.....	1,750,178	1,118,356	6.1	6.5
Boys.....	1,264,411	825,187	4.4	4.8
Girls.....	485,767	293,169	1.7	1.7
<i>California</i>	644,267	376,505	100.0	100.0
Men.....	549,158	344,873	85.3	91.6
Women.....	85,790	27,159	13.3	7.2
Children.....	9,319	4,473	1.4	1.2
Boys.....	7,187	3,430	1.1	0.9
Girls.....	2,132	1,043	0.3	0.3

It appears from the table that in the twenty years 1880-1900 the per cent of men among breadwinners decreased and of women increased, both in the entire country and in California alone. The per cent of children among breadwinners decreased slightly in continental United States, while increasing somewhat in California. In 1900, however, the per cent of children as well as of women among all breadwinners was much less in the State than in the entire country. Men comprise six sevenths (85.3 per cent) of all breadwinners in California, against only seven ninths (77.3 per cent) for the country as a whole.

YOUNG PERSONS AND ADULTS.

For 1900 alone one may further classify men and women breadwinners as young persons (16 to 20 years) and adults (at least 21 years of age). The following table shows the number belonging to each class and the per cent they form of the total number of breadwinners in continental United States and California respectively:

Men and Women Breadwinners Classified as Young Persons and Adults, and Per Cent of Each in Total Breadwinners, for Continental United States and California: 1900.

Class.	Breadwinners of Specified Class: 1900.			
	Continental U. S.		California.	
	Number.	Per Cent of Total.	Number.	Per Cent of Total.
<i>Men</i>	22,489,425	77.3	549,158	85.3
Young persons.....	2,855,425	9.8	48,041	7.5
Adults	19,634,000	67.5	501,117	77.8
<i>Women</i>	4,833,630	16.6	85,790	13.3
Young persons.....	1,237,967	4.2	15,610	2.4
Adults	3,595,663	12.4	70,180	10.9

The table shows that the per cent of all breadwinners in California is less than in continental United States, both for young persons and adults among women, and for young persons alone among men. In other words, California surpasses the entire country only in the proportion of all its workers who are adult males, the per cent for the country being 67.5 against 77.8 for the State. California is thus a State in which hardly any children or even young persons of either sex have to work and comparatively few women have to support themselves by gainful labor, the great bulk (nearly four fifths) of all the breadwinners being men who have attained their majority.

ADULT MALE BREADWINNERS.

The following table gives for continental United States and California in 1900 the number of adult male breadwinners in each of the five main classes of occupations, no figures being available for the sub-classes heretofore distinguished under the last:

Number and Per Cent of Adult Male Breadwinners in Main Classes of Occupations, for Continental United States and California: 1900.

Class of Occupations.	Adult Male Breadwinners: 1900.			
	Continental U. S.		California.	
	Number.	Per Cent.	Number.	Per Cent.
All occupations	19,634,000	100.0	501,177	100.0
Agricultural pursuits	7,268,000	37.0	132,206	26.4
Professional service	790,071	4.0	27,275	5.4
Domestic and personal service	2,893,417	14.7	98,475	19.7
Trade and transportation	3,704,988	18.9	113,882	22.7
Manufacturing and mechanical pursuits.....	4,977,524	25.4	129,279	25.8

As for total breadwinners, it is only in agricultural pursuits that the per cent of adult male breadwinners is less in California than in continental United States (26.4 against 37.0 per cent). Agricultural pur-

suits in California are followed by nearly 3,000 more adult males than manufacturing and mechanical pursuits, although the proportion of the total number is about one fourth for each of these classes of occupations (26.4 per cent for the former and 25.8 per cent for the latter). More than one fifth (22.7 per cent) are engaged in trade and transportation, and somewhat less than this proportion (19.7 per cent) in domestic and personal service. Professional service commands the attention of a little over one twentieth (5.4 per cent) of the adult male breadwinners in California.

CHILD BREADWINNERS.

Though comparatively few children in California are breadwinners, the proportion is rising as elsewhere in the country.

The per cent of population of school age attending school is considerably higher in California than in continental United States, the difference being particularly great at the age period (10 to 14 years) which covers the usual time for grammar school education. More than nine tenths (91.1 per cent) of the children of this age in California in 1900 attended school, against less than four fifths (79.8 per cent) for the entire country. Since so large a proportion of the children attended school, the per cent who were breadwinners was necessarily much smaller for the State than for the country as a whole. This is shown clearly in the table which follows, presenting the figures for both State and country in 1900 and 1880:

Number and Per Cent of Breadwinners among Children 10 to 15 Years of Age, Classified by Sex, for Continental United States and California: 1900 and 1880.

Sex.	Children 10 to 15 Years of Age.					
	1900.	1880.	Number of Breadwinners.		Per Cent of Breadwinners.	
			1900.	1880.	1900.	1880.
<i>Continental United States</i>	9,613,252	6,649,483	1,750,178	1,118,356	18.2	16.8
Boys.....	4,852,427	3,376,114	1,264,411	825,187	26.1	24.4
Girls.....	4,760,825	3,273,369	485,767	293,169	10.2	9.0
<i>California</i>	152,006	95,470	9,319	4,473	6.1	4.7
Boys.....	76,703	48,219	7,187	3,430	9.4	7.1
Girls.....	75,303	47,251	2,132	1,043	2.8	2.2

The table shows that the 9,319 child breadwinners in California in 1900 formed only one sixteenth (6.1 per cent) of the population 10 to 15 years of age, while in continental United States the corresponding proportion was little less than one fifth (18.2 per cent). Even among the boys of the age specified, under one tenth in the State as compared with over one fourth in the entire country were engaged in gainful labor. Though one tenth of the girls 10 to 15 years old in the country

as a whole were at work, only 2.8 per cent, or less than one thirty-fifth, were so occupied in California. The number of child breadwinners in the State more than doubled in the twenty years 1880-1900, but the proportions at work among children of either sex, especially girls, were still much less in 1900 than for continental United States.

In the table following, child breadwinners of each sex 10 to 15 years old are distributed by single years of age, for continental United States and California in 1900:

Number and Per Cent of Child Breadwinners 10 to 15 Years of Age, Classified by Sex, in Each Year of Age, for Continental United States and California: 1900.

Year of Age.	Child Breadwinners 10 to 15 Years of Age: 1900.					
	Number.			Per Cent.		
	Total.	Boys.	Girls.	Total.	Boys.	Girls.
<i>Continental United States</i> ..	1,750,178	1,264,411	485,767	100.0	100.0	100.0
10 years	142,105	105,580	36,525	8.1	8.3	7.5
11 years	158,778	119,628	39,150	9.1	9.5	8.1
12 years	221,313	163,649	57,664	12.6	12.9	11.9
13 years	268,427	196,830	71,597	15.3	15.6	14.7
14 years	406,701	289,655	117,046	23.3	22.9	24.1
15 years	552,854	389,069	163,785	31.6	30.8	33.7
<i>California</i>	9,319	7,187	2,132	100.0	100.0	100.0
10 years	115	90	25	1.2	1.3	1.2
11 years	205	171	34	2.2	2.4	1.6
12 years	481	383	98	5.2	5.3	4.6
13 years	1,020	801	219	10.9	11.1	10.3
14 years	2,536	1,970	566	27.2	27.4	26.5
15 years	4,962	3,772	1,190	53.3	52.5	55.8

This table brings out the striking fact that in California in 1900 considerably more than half the child breadwinners 10 to 15 years old were at least 15 years of age, the proportion who had reached this age being somewhat greater among girls than boys. In continental United States only about three tenths of the children at work were at least 15 years old. California surpasses the entire country also in the proportion of its child breadwinners aged 14. The per cent was greater for the country as a whole than for the State only at the ages 10, 11, 12, and 13, the excess being particularly marked at the lowest ages. Thus, about one sixth (17.2 per cent) of the children at work in continental United States were under 12 years of age, but in California only 3.4 per cent, or one thirtieth of all, had begun to labor so very early in life. It may be noted that in 1901, the year after the Federal census was taken, the State Legislature raised the age under which no child should be employed in any factory, workshop, or mercantile establishment from 10 to 12 years (Stats. of Cal. 1901, p. 631). With the enforcement of this law the small proportion of child breadwinners less than 12 years old may become almost *nil* at the next census.

The following table gives the number and per cent of child breadwinners 10 to 15 years of age in each of the five main classes of occupations, for continental United States and California in 1900:

Number and Per Cent of Child Breadwinners 10 to 15 Years of Age, Classified by Sex, in Main Classes of Occupations, for Continental United States and California: 1900.

Class of Occupations.	Child Breadwinners 10 to 15 Years of Age: 1900.					
	Number.			Per Cent.		
	Total.	Boys.	Girls.	Total.	Boys.	Girls.
<i>Continental United States.</i>						
All occupations -----	1,750,178	1,264,411	485,767	100.0	100.0	100.0
Agricultural pursuits ----	1,061,971	854,690	207,281	60.7	67.6	42.7
Professional service -----	2,945	1,845	1,100	0.2	0.2	0.2
Domestic and personal service -----	279,031	137,049	141,982	15.9	10.8	29.2
Trade and transportation ----	122,362	100,174	22,188	7.0	7.9	4.6
Manufacturing and me- chanical pursuits-----	283,869	170,653	113,216	16.2	13.5	23.3
<i>California.</i>						
All occupations -----	9,319	7,187	2,132	100.0	100.0	100.0
Agricultural pursuits ----	1,606	1,563	43	17.2	21.7	2.0
Professional service -----	85	58	27	0.9	0.8	1.2
Domestic and personal service -----	2,652	1,495	1,157	28.5	20.8	54.3
Trade and transportation ----	2,440	2,204	236	26.2	30.7	11.1
Manufacturing and me- chanical pursuits-----	2,536	1,867	669	27.2	26.0	31.4

In continental United States the bulk of the child breadwinners of either sex were engaged in agricultural pursuits, but in California practically no girls and comparatively few boys followed this class of occupations. More than half the girls at work in the State were engaged in domestic and personal service, and over three tenths were occupied in manufacturing and mechanical pursuits. Three tenths of the boy breadwinners were engaged in trade and transportation, over one fourth in manufacturing and mechanical pursuits, and about one fifth each in agricultural pursuits and in domestic and personal service respectively. For child breadwinners of both sexes together the leading class of occupations was domestic and personal service, followed closely by manufacturing and mechanical pursuits and trade and transportation.

In the table on page 91 a presentation is made for California of the leading occupation groups in which children were reported as having been engaged during any portion of the census year beginning June 1, 1899, and ending May 31, 1900. The per cent distribution by sex and years of age of the children engaged in each of the selected occupations is also shown. The published figures from which this table has been compiled were carefully verified by reference to the original returns on the population schedules, especially where children in the earlier years of life were reported to be at work. The statistics, therefore, represent, as far as the returns of the

Number and Per Cent Distribution of Child Breadwinners 10 to 15 years of Age, Classified by Sex and Years of Age, Engaged in Selected Occupations, for California: 1900.

Selected Occupations.	Number of Child Breadwinners 10 to 15 Years of Age: 1900.						Per Cent of Child Breadwinners 10 to 15 years of Age: 1900.									
	Boys.			Girls.			Boys.			Girls.						
	Total.	10 and 11 yrs.	12 to 14 yrs.	15 yrs.	Total.	10 and 11 yrs.	12 to 14 yrs.	15 yrs.	Total.	10 and 11 yrs.	12 to 14 yrs.	15 yrs.				
<i>California.</i>																
All occupations.....	9,319	7,187	3,154	3,772	2,132	59	883	1,190	77.1	2.8	33.8	40.5	22.9	0.6	9.5	12.8
Agricultural laborers.....	1,493	1,453	79	611	40	3	20	17	97.3	5.3	40.9	51.1	2.7	0.2	1.4	1.1
Bookkeepers, clerks, stenographers, etc.....	377	327	7	100	50		14	36	86.7	1.9	26.5	58.3	13.3		3.7	9.6
Draymen, hackmen, teamsters, etc.....	181	181	1	75	105				100.0	0.6	41.4	58.0	5.2		5.2	
Hucksters and peddlers.....	58	55	9	24	22		3		94.8	15.5	41.4	37.9	5.2		5.2	
Laborers (not specified).....	1,069	1,067	47	445	32	3	14	15	97.1	4.3	40.5	52.3	2.9	0.3	1.3	1.3
Laundries and laundresses.....	131	46	4	21	85	1	27	57	35.1	3.1	16.0	16.0	64.9	0.8	20.6	43.5
Meat, fish, and fruit canners and packers.....	121	58	6	31	63	6	34	23	47.9	5.0	25.6	17.3	52.1	5.0	28.1	19.0
Messengers and office and errand boys.....	985	968	40	585	17		12	5	98.3	4.1	59.4	34.8	1.7		1.2	0.5
Metal workers.....	405	380	4	151	25		11	14	93.8	1.0	37.3	55.5	6.2		2.7	3.5
Miners and quarrymen.....	66	66	5	25	36				100.0	7.6	37.9	54.5				
Newspaper carriers and newsboys.....	57	57	5	33	19				100.0	8.8	57.9	33.3	38.8	0.8	15.7	22.3
Packers and porters.....	121	74	2	34	38	1	19	27	61.2	1.7	28.1	31.4	1.9		1.9	
Painters, glaziers, varnishers.....	52	51		22	29			1	98.1		42.3	55.8				
Plumbers and gas and steam fitters.....	56	56	1	12	43				100.0	1.8	21.4	76.8				
Printers and bookbinders.....	161	139	1	62	76		6	16	86.3	0.6	38.5	47.2	13.7		3.7	10.0
Salesmen and saleswomen.....	423	342	7	133	202	1	34	46	80.9	1.7	31.4	47.8	19.1	0.2	8.0	10.9
Servants and waiters.....	1,333	308	16	140	152	35	448	542	23.1	1.2	10.5	11.4	76.9	2.6	33.6	40.7
Telegraph and telephone operators.....	55	23		10	13		7	25	41.8		18.2	23.6	58.2		12.7	45.5
Textile mill operatives.....	113	61	1	33	27		24	27	54.0	0.9	29.2	23.9	46.0	0.9	21.2	23.9
Dressmakers.....	125				125		34	91	100.0				100.0		27.2	72.8
All other textile workers.....	244	53		21	32	1	77	113	21.7		8.6	13.1	78.3	0.4	31.6	46.3
Woodworkers.....	112	102	2	38	62		3	7	91.1	1.8	33.9	55.4	8.9		2.7	6.2
All other occupations.....	1,551	1,320	24	548	748	7	96	128	85.1	1.6	35.3	48.2	14.9	0.4	6.2	8.3

census enumerators can be relied upon, the conditions with respect to the employment of children as they existed during the period covered by the last Federal census.

Though agricultural pursuits as a class were followed by comparatively few of the child breadwinners in California, the leading occupation group in 1900 was agricultural laborers, of whom there were 1,493 in the State. There were also 1,099 children returned simply as laborers without further specification. These two groups combined formed only about one fourth of the children at work in California, though in several other States, especially in the South, the proportion is nearly three fourths for agricultural laborers alone. Practically, none of the children returned as laborers in California were girls or young boys, more than half of all being boys 15 years old and over nine tenths boys at least 12 years of age.

The servants and waiters 10 to 15 years old numbered 1,333, three fourths being girls. The bulk of these were aged 15, though one third of all were girls from 12 to 14 years old. The additional occupations in which a majority of the child breadwinners were girls were the following: dressmakers and other textile workers; laundry workers; telegraph and telephone operators; and canners and packers of meat, fish, and fruit. Only among fruit-canners were the girls at least 15 years old less numerous than those of all lower ages.

None but male children were employed in the following occupations: draymen, hackmen, teamsters, etc.; miners and quarrymen; newspaper carriers and newsboys; and plumbers and gas and steam fitters. Only one third of the newspaper carriers and newsboys were at least 15 years old, the proportion at this age being about as small also among messengers and office and errand boys. The younger boys likewise outnumbered those at least 15 years of age among hucksters and peddlers, canners and packers of meat, fish, and fruit, and textile mill operatives. In other occupations, however, a majority of the breadwinners were not only boys, but boys all at least 15 years old. This holds true particularly of plumbers and gas and steam fitters, and in less marked degree also of bookkeepers, clerks, stenographers, etc.; draymen, hackmen, teamsters, etc.; metal workers; miners and quarrymen; painters, glaziers, and varnishers, and woodworkers. The boys at least 15 years old likewise decidedly outnumbered those under this age among packers and porters, printers and bookbinders, salesmen, and telegraph and telephone operators.

In California it was only among children of both sexes working in the fruit canneries and textile mills and among newsboys and messengers that the proportion less than 15 years of age was notably large in 1900. In the other occupations employing children in considerable numbers the bulk of the child breadwinners of either sex were at least 15 years old, or of sufficient age to have probably passed through the grammar grades in school.

NUMBER AND CONDITION OF THE UNEMPLOYED.

It has not been possible to get detailed statements as to the number of persons unemployed and the length of time during which they were idle, but according to reports of the various unions throughout the State comparatively few persons are at present out of work.

In the volume on Occupations, just published by the Census Bureau, this subject has been worked out exhaustively. It has been possible from these figures to compare California with continental United States, with reference to the unemployed.

The tables on page 94 show that the proportion of the unemployed is smaller for California for the aggregate and for each occupation group except trade and transportation. In continental United States 49.2 per cent of the unemployed are out of work from one to three months, as against 42.8 per cent for California; 39.5 per cent from four to six months, as against 37.1 per cent for California; and 11.3 per cent from seven to twelve months, as against 20.1 per cent for California.

Of course it is impossible to get at the causes of idleness among workmen. How much is enforced and how much voluntary will be of prime importance in determining the industrial condition of a country. Many causes aside from lack of work keep men from employment for a part of each year. Sickness, vacations, moving from one part of the country to another, etc., are causes of idleness.

In the different trades represented in this State there is little idleness. Just at present there is less activity in the iron trades than formerly, while the building trades are especially active. There seems to be a sufficient number of unskilled laborers to meet the demand and even a surplus of this kind of labor in some localities, particularly San Francisco.

Considerable comment has been occasioned among laboring men generally by the recent order of certain railway and other corporations limiting the age at which an employé may begin work. This age limit is usually set at 35, beyond which age no new man may be employed, nor can any man over 45 be re-employed. While it is not the practice of this Bureau to make comments that could in any way be considered partisan, still it seems that while dealing with this subject of the unemployed, a word concerning this practice could not be considered out of place. No doubt every man at 45 years of age should be settled in his

Total number of Persons 10 Years of Age and Over Engaged in Gainful Occupations and in Each Class of Occupations and in Each Class of Occupations who were Unemployed During Some Part of the Year, Classified by Sex and Length of Time Unemployed, for Continental United States and California.

Place and Occupation Group.	Aggregate.			Unemployed 1 to 3 Months.			Unemployed 4 to 6 Months.			Unemployed 7 to 12 Mos.		
	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.
<i>Continental United States.</i>												
All occupations	6,468,964	5,227,472	1,241,492	3,177,753	2,593,136	584,617	2,554,925	2,069,546	485,379	736,286	504,790	171,496
Agriculture	2,144,689	1,830,803	313,886	1,109,686	956,554	153,132	871,585	729,476	142,109	163,418	144,773	18,645
Professional service	330,566	111,547	219,019	158,606	47,679	110,927	114,689	44,294	70,395	57,271	19,574	37,697
Domestic and personal	1,568,121	1,209,787	358,334	714,314	562,981	151,333	659,708	510,424	149,284	194,099	136,382	57,717
Trade and transportation	500,155	444,278	55,907	237,038	215,082	21,956	178,123	158,006	19,517	85,024	70,590	14,434
Manufacturing and mechanical pursuits	1,925,403	1,631,057	294,346	958,109	810,840	147,269	730,820	626,746	104,074	236,474	193,471	43,003
<i>California.</i>												
All occupations	127,441	109,009	18,432	54,540	47,799	6,741	47,297	40,515	6,782	25,604	20,695	4,909
Agriculture	25,264	25,053	211	12,804	12,751	53	9,020	8,986	34	3,440	3,366	74
Professional service	7,916	3,092	4,824	3,709	1,253	2,456	2,255	947	1,308	1,952	892	1,060
Domestic and personal	38,054	31,531	6,523	15,231	13,018	2,213	15,624	13,064	2,560	7,199	5,449	1,750
Trade and transportation	16,257	14,174	2,083	6,777	6,188	589	5,496	4,633	803	3,984	3,293	691
Manufacturing and mechanical pursuits	39,950	35,159	4,791	16,019	14,589	1,430	14,902	12,875	2,027	9,029	7,695	1,334

Per Cent of the Total Number of Persons 10 Years of Age and Over who are Unemployed Part of the Year in the Five Main Occupation Groups for Continental United States and California.

Place.	Aggregate.			Agriculture.			Professional Service.			Domestic and Personal.			Trade and Transportation.			Manufacturing and Mechanical Pursuits.		
	Number Unemployed.	Per Cent of No. so Occupied.	Per Cent of No. so Occupied.	Number Unemployed.	Per Cent of No. so Occupied.	Per Cent of No. so Occupied.	Number Unemployed.	Per Cent of No. so Occupied.	Per Cent of No. so Occupied.	Number Unemployed.	Per Cent of No. so Occupied.	Per Cent of No. so Occupied.	Number Unemployed.	Per Cent of No. so Occupied.	Number Unemployed.	Per Cent of No. so Occupied.		
Continental United States	6,468,964	22.2	20.7	330,566	26.3	28.1	1,568,121	28.1	10.5	500,185	10.5	27.2	1,925,403	29.8	39,950	27.2		
California	127,441	19.8	16.6	7,916	18.9	26.0	38,054	26.0	11.6	16,257	11.6	24.5	39,950	24.5				

life work and should have a permanent position. In many vocations, however, changes are absolutely necessary from the very nature of the work. In any vocation changes should be possible at any time. No one may question the right of any corporation to make any rule concerning the age of its employes it sees fit, yet, what one corporation does all may do, and should every corporation fix the greatest age at which a man might enter its employ at 45, it is difficult to determine just what would be the result to employes in general. Many causes may conspire to throw a skilled mechanic or clerk out of employment. The corporation employing him may become bankrupt, or lose half its business through competition or depression, or conditions may be imposed upon him impossible for him to bear. If he severs his connection with his firm, he can find employment nowhere else. Thus, should all employers refuse to hire a man who has passed the forty-fifth year mark, every man beyond that age must hold his job at all hazards, or else suffer under the most vicious blacklist that ever existed. An absurd feature of the whole condition is that the rule applies to the rank and file and does not affect the officials; especially comic is the fact that the officials taking the position that a man over 45 years of age has ceased to be of mental and physical value, are mostly over the 45-year limit, and so, under their own ruling, unfit for positions of trust. It is scarcely reasonable to assert that a dogmatic line can be drawn at which point all men, regardless of individuality, habit, or character, can be declared fitted or unfitted, as the case may be, for any position whatsoever. It would seem somewhat paradoxical that the maximum age at which a man can enter railroad service, for instance, is the minimum age provided by the Constitution at which a man may become President of these United States.

SHORTENING HOURS OF LABOR.

On June 25, 1904, the following communication was mailed to employers throughout the State:

For statistical purposes in connection with the work of this Bureau, I would like to have information regarding the lessening of hours of labor per diem during the last several years of persons employed in the various vocations in this State, and hence ask if you have, within the time named, either on your own initiative, or as the result of agreement with your employés, lessened hours of labor in the way named? And if so,

(1) Did you, in shortening the said hours, act voluntarily or as the result of agreement with employés?

(2) The date on which the change in hours of labor was made?

(3) The number of hours per diem required prior to the change?

(4) The number of hours per diem required after the change was made?

(5) What, if any, reduction in pay per diem in connection with the change?

(6) What is your view as to the benefit to yourself as employer resulting from the change?

(7) Having in view the producing capacity of labor, has the change increased or decreased the cost of your labor?

(8) If there has been increase, what is the percentage of increase? If there has been decrease, what has been the percentage of decrease?

As usual in such cases, a very small proportion of those addressed made any reply. Answers were received from Eureka, Sacramento, San Francisco, Fresno, Los Angeles, and San Diego. The information contained, though not sufficient to furnish conclusive evidence, nevertheless is valuable as showing the general tendency. Of the entire number of establishments from which replies were received, 68.7 per cent show a decrease in the number of hours per day, and in no case was there a decrease in pay; while 37.5 per cent, or more than one half the establishments showing any change, record an increase in pay as well as a decrease in the number of hours worked. Of the entire number, 31.3 per cent show no change whatever.

In San Francisco, every reply showed a decrease in the number of hours and 25 per cent showed an increase in pay as well.

In Sacramento, 75 per cent showed a decrease in the number of hours, 25 per cent showed no change either in hours or pay, and 25 per cent showed both a decrease in hours and an increase in pay.

In Eureka, 50 per cent showed a shortening of hours with no increase in pay, and the remainder showed no change.

In Fresno, 75 per cent showed a decrease in the number of hours, 25 per cent showed no change either in hours or wages, while 50 per cent showed a decrease in hours and an increase in pay.

In Los Angeles, 35 per cent showed a decrease in number of hours with no increase in pay, while the remainder showed no change whatsoever.

In San Diego, 50 per cent showed a decrease in number of hours with an advance in pay, while the remainder showed no change.

Fifty-five per cent of the changes in the length of the working day show a cut from nine to eight hours, while in the remainder, with one exception, the reduction is from ten to nine hours. This one exception shows no change except on Saturday, when seven hours are worked instead of the usual eight.

In 60 per cent of the changes recorded the reduction was brought about by agreement with the employés or on union demand. In 8 per cent change was made after a strike, and 10 per cent voluntarily. In the remainder no explanation for the change was attempted.

Only three employers admitted that the change benefited them. One stated that the men worked more willingly and took more interest in their work, and a benefit to all concerned resulted. Another, after maintaining that he was damaged and humiliated by giving his men shorter hours, makes the following statement: "If the employers would hold together as firmly as the employés and not compete so keenly, the answer to that question (No. 6) would be 'beneficial.'"

It is readily seen from the results here laid down that the general tendency throughout the State is toward a shorter day. Fewer hours of labor seem to be more desired by those who work than is more pay. One of two explanations must account for this: Either it is easier to persuade an employer to cut an hour from the day's work than to get a corresponding increase in pay; or a man values a little more leisure for rest and recreation more highly than he does more money for his day's work. It is quite likely that both factors enter into the result.

CHILDREN OF THE WAGE-EARNER, AND HIGHER EDUCATION.

Under this caption an article occurred in the last report of this Bureau. It was felt that this inquiry should be prosecuted further, and this investigation continues and supplements the one begun there.

The difficulties confronting the wage-earner who wishes to send his son or daughter to college are brought out very clearly in the former report. Whether or not these difficulties are insurmountable it is only possible to learn by a first-hand study of the complexion of the student body at our California institutions. If we find that the sons and daughters of wage-earners represent as large a proportion of the entire body of students as their fathers represent of the entire population of the State, we must conclude that means have been found to overcome the difficulties declared to exist.

In 1900, the Recorder at the University of California required each student filing an application for admission to give the occupation of his father. The total number entering with regular and limited status was 570. Of these same students, 226 graduated with their class in May, 1904. To be sure, a larger number than 226 graduated in 1904, but we must bear in mind that many students drop back one class and some two or even three classes. But the figures given here represent the actual number of the Freshmen (exclusive of special students) entering in 1900 who received their degrees four years later.

One great difficulty was encountered because of the lack of exactness in the answers. Many of the students gave such indefinite terms as merchant, mechanic, retired, etc., but exact information was acquired in many cases at first hand, and in the others the general character was easily inferred. As nearly as possible the answers actually put down are adopted. For example, fourteen students gave their fathers' occupation as "carpenter," while twenty-seven gave "mechanic." These, of course, could have been all put under mechanic, but we have preferred to give the original classification, as conveying the maximum information.

Of the total number who entered, 39.6 per cent graduated. The smallest percentage graduated among the students whose fathers were engineers. The number here, however, is too small to make the result

Table showing the Parentage of the Students of the Class of 1904 at the University of California.

The first column shows the number entering in 1900, the next the number of these same students graduating in 1904.

	Entered, 1900.	Graduated, 1904.	Percentage of No. Entering who Gradu- ated with their Class.
1. Fathers: engineers—			
Mining	2	0	0.0
Civil	10	2	20.0
Marine	3	2	66.6
Total	15	4	26.6
2. Fathers: professional men—			
Lawyers	26	12	46.1
Ministers	17	6	35.3
Physicians	17	6	35.3
Newspapermen	4	2	50.0
Druggists	4	2	50.0
Teachers	17	8	47.0
Dentists	2	1	50.0
Artists and photographers	2	1	50.0
Total	89	38	42.7
3. Fathers: mercantile and kindred pursuits—			
Merchants	90	42	46.6
Grocers	8	5	62.5
Bankers and capitalists	32	6	18.7
Real estate and insurance	14	4	28.5
Manufacturers	11	4	36.3
Livery men and hotel-keepers	10	4	40.0
Contractors	4	1	25.0
Total	169	66	39.0
4. Fathers: wage-earners proper—			
Boilermakers	1	1	100.0
Clerks	30	15	50.0
Bookkeepers	11	5	45.4
Carpenters	14	6	42.8
Miners	16	5	31.2
Plumbers	2	1	50.0
Railroad employés	10	4	40.0
Laundrymen	1	1	100.0
Engineers (locomotive and stationary) ..	4	3	75.0
Mechanics	27	18	66.6
Commercial travelers	3	1	33.3
Total	119	60	50.4
5. Fathers: agricultural pursuits	90	32	32.3
6. Miscellaneous—			
Government and municipal employ	18	6	33.3
Retired	8	3	37.5
Indeterminate	4	1	25.0
Not given	22	10	45.4
Total	52	20	38.4
7. Fathers: dead	27	6	22.2
All occupations, grand total	570	226	39.6

of much value. The wage-earners rank first, and as such a large number is represented the figures are very significant. Of the 119 who entered, 60, or 50.4 per cent, graduated. Of the different occupations embraced under this general class, those who gave their fathers' occupation as mechanic rank first with 66.6 per cent. Among professional men, teachers rank high with 47 per cent and lawyers with 46.1 per cent. Newspapermen, druggists, dentists, and artists each have 50 per cent, but the number here, also, is too small to be very significant. In mercantile pursuits, grocers with 62.5 per cent and merchants with 46.6 per cent head the list; among the latter, 90 entered and 42 graduated. The number here is large enough to give conclusive evidence. The sons of bankers and capitalists enjoy the distinction of making the poorest showing of any. Of the 32 who entered, but 6, or 18.7 per cent, graduated. This is just 31.7 per cent less than the proportion graduating from all the wage-earners taken as a class, and 12.5 per cent less than the craft ranking last.

Of the 99 students who came from the farm, 32, or 32.3 per cent, graduated. The fact that the farmer must maintain his son or daughter away from home, while the son of the mechanic or merchant, in many cases, resides under his father's roof in San Francisco, Oakland, or Berkeley, will in all likelihood account for the smaller percentage; but this in nowise changes the result or affects the significance of the comparison instituted above.

Desiring to learn whether or not the extra work that is likely to fall upon the student of small means affected his scholarship, an investigation of the honor students was made, with the following result: Of the 34 students receiving honorable mention for exceptionally good scholarship, 7 came from the homes of merchants, bankers, etc., 4 from the farm, 3 from the professions, 11 from the wage-earners, 1 from government and municipal employ, the father of one was dead, and the occupation of the parents of 7 could not be ascertained. Of the 570 who entered in 1900, 119, or 20.8 per cent, came from the home of the workman; while of the 226 who graduated, 60, or 26.5 per cent, were of this same class; and 11 of this 60 graduated with honors. Starting with 20.8 per cent of the class, wage-earners graduated 26.5 per cent, and among the honor men had 11 out of 34, or 32.3 per cent.

According to the census of 1900 there were in this State 1,222,111 men, women, and children over 10 years of age. Of these, 134,253, or 10.9 per cent, were engaged in manufacturing and mechanical pursuits proper. To get upon the same basis of classification we will eliminate from our class of wage-earners the clerks, bookkeepers, and commercial travelers, and add engineers, manufacturers, and contractors, thus mak-

ing a total of 195 engaged in manufacturing and mechanical pursuits proper out of the total of 570 who entered the University in 1900, or 18.4 per cent of the whole class. Even should we leave out the 30 students who come from the homes of the manufacturer, engineer, and contractor, we still have a total of 75, or 13.1 per cent, who come from among the wage-earners in manufacturing and mechanical pursuits, while the proportion of the entire population of the State engaged in these occupations, even including the employing manufacturer, contractor, and the skilled engineer, is but 10.9 per cent, and could we eliminate these latter from both the Census and University figures the proportion of laborers' and mechanics' sons and daughters getting a university education would, of course, be much higher than 13.1 per cent.

Summarizing the results obtained by a very careful study of this one class, we find that in every respect the laboring man's son has acquitted himself in an extremely creditable manner. His representation at the University is found to exceed his representation in the State at large, by at least 3.1 per cent; having 20.8 per cent of the class at matriculation, he had 26.5 per cent at graduation. His proportion of graduates to intrants was higher than any other by a wide margin, and exceeded the average per cent of graduation of the whole class by 11. He graduated 60 in a class of 226, and 11 of these with honors; having 26.5 per cent of the graduates, he had 32.3 per cent of the honor men.

Twenty per cent of the intrants, 26 per cent of the graduates, 32 per cent of the honor men, and 3 per cent more than his proportion to population!

Some one may object, however, on the ground that many of our California young men and women are students in Eastern universities and, inasmuch as the expense of an education at these institutions must necessarily be considerable, only the family of at least moderate means will be represented in this number. This is undoubtedly true, but with the laborer's representation in California institutions over 70 per cent higher than his proportion in the population would allow, considerable margin is given for a smaller representation elsewhere. However this may be, it could in nowise affect the scholarship or persistence of the California student.

It is regretted that an exhaustive study of Stanford University and the smaller colleges throughout the State could not be made. But this has been impossible, partly from lack of time and partly from failure of the other institutions to send definite information. In the inquiry at the State University the agents of this Bureau were able to consult directly the records of the Recorder.

It is believed that the results herein contained, although not based

on as complete data as could be desired, still show conclusively that the man who works for his living has nothing to fear from the University. Rather it is his best friend, whither his son or his daughter may go and demonstrate to the world that he or she comes of stock in no wise inferior to the best.

PUNITIVE, CORRECTIVE, AND CHARITABLE INSTITUTIONS.

The law directs this Bureau to investigate the "number, condition, and nature of employment of the inmates of the state prisons, county jails, and reformatory institutions, and to what extent their employment comes in competition with the labor of mechanics, artisans, and laborers outside these institutions."

Quite full information has been obtained relative to the state prisons and corrective institutions, but the shortness of the time during which the inquiry has been prosecuted has rendered any full investigation of county jails impossible. These latter institutions, however, come very little into competition with free labor, owing to the comparative shortness of the terms of the inmates and the absence of any attempt to provide productive forms of employment. At most, such labor is utilized on the rock-pile or in road work, and when so directed, punishment rather than profit to the county is the end sought.

STATE PRISON AT SAN QUENTIN.

The most important work performed at San Quentin State Prison is the making of jute bags. The profit to the State from this industry for the last four years has been as follows:

52d fiscal year, ending June 30, 1901.....	\$43,611 57
53d fiscal year, ending June 30, 1902.....	56,207 36
54th fiscal year, ending June 30, 1903.....	57,488 04
55th fiscal year, ending June 30, 1904.....	31,957 68
Total for four years	\$189,264 65

This represents the profit realized by charging not more than one cent per bag more than the actual cost of the product, exclusive of the prison labor.

The following is a table showing the number and nature of employment of the inmates of San Quentin Prison on September 21, 1904:

NON-PRODUCTIVE CLASS.	Number Employed.	PRODUCTIVE CLASS.	Number Employed.
Warden's office.....	2	Jute department.....	782
Captain of Yard's office.....	7	Engineer's department.....	1
Clerk's office.....	2	Foundry department.....	37
Captain of Guard's office.....	2	Stock department and stable.....	19
Commissary department.....	8	Female department.....	30
Laundry department.....	46	Wheelwright's shop.....	1
Library department.....	8	Upholsterer's shop.....	2
Barber shop.....	15	Locksmith's shop.....	1
Shoe shop.....	19	Carpenter shop.....	22
Tailor shop.....	27	Plumber shop.....	3
Lamp-lighters.....	2	Cooper shop.....	1
Bath-tank tender.....	1	Paint shop.....	7
Cell and room tenders.....	33	Tin shop.....	6
Gate and door tenders.....	11	Coal yard.....	1
Hospital nurses.....	7	Vegetable gardens.....	17
Sweepers.....	10	Flower gardens.....	25
Scavengers.....	26	Improvements.....	4
Whitewashers.....	18	Stevedores.....	14
General kitchen and dining-room.....	83	Road gang.....	19
Outside kitchen.....	22	Chicken ranch.....	3
Hospital kitchen.....	2	Hog ranch.....	2
House servants.....	20	Blacksmith shop.....	2
Electricians.....	4		
Photographers.....	2		
Messengers.....	2		
Guards' department.....	4		
Total.....	383	Total.....	999

LOST LABOR.	No.	SUMMARY.	No.
Cripples and insane.....	17	Productive class.....	999
Doctor's daily excuses, dungeon, etc.....	15	Non-productive class.....	383
Patients in hospital.....	20	Lost labor.....	96
To be executed.....	6		
Unemployed.....	38		
Total.....	96	Total.....	1,478

STATE PRISON AT FOLSOM.

At the State Prison at Folsom the chief industry, aside from work in connection with the prison itself, is the crushing of rock for road purposes; 299 men are engaged in this work. There are 127 men engaged in quarrying, but all of the rock taken out is used on the prison buildings.

During the year ending June 30, 1904, 2,135 cars, or 60,065 tons, of macadam was shipped from Folsom to various points in the State. All produced up to March 19th was sold at 30 cents per ton and the remainder at 35 cents per ton. The approximate value would be \$18,770.31, an amount so small that it could play no appreciable part in the sum total of labor products of the State, amounting as it does to only a little over 2 cents for each person engaged in work.

Aside from the occupations mentioned none of the inmates of this institution can be said to compete with free labor.

The following is a table showing the number and occupation of the inmates of Folsom Prison on June 30, 1903, and June 30, 1904:

Department.	Number Assigned.		Department.	Number Assigned.	
	1904.	1903.		1904.	1903.
Captain of Guard's Departm't—			Stock Department—		
Barbers	5	4	Stable	6	11
Clerks	5	3	Prison Mess Department—		
Gate-tenders	10	9	Cooks	8	8
House servants	8	11	Dish washers	18	3
Riggers	4	5	Waiters	27	37
Trackmen	6	11	Totals	53	48
Trainmen	2	2	Quarry Department—		
Totals	40	45	Barbers	2	2
Commissary Department—			Blacksmiths	26	21
Commissary	9	7	Drillers	14	10
Harness shop	1	1	Engineers	4	3
Shoe shop	8	6	Laborers	44	32
Tailor shop	12	12	Stone yard	37	50
Totals	30	26	Totals	127	118
Engineer's Department—			Rock-Crusher Department—		
Electricians	5	5	Barbers	2	2
General utility	6	5	Blasters	5	5
Machinists	5	8	Blacksmiths	7	8
Plumbers	2	2	Carpenters	1	1
Sewage-disposal plant	2	2	Drillers	33	30
Totals	20	22	Engineers	17	15
Turnkey's Department—			General utility	32	21
Cell-tenders	30	27	Laborers	202	182
Library	2	1	Totals	299	264
Scavengers	10	10	Clerk's office	3	3
Whitewashers	6	4	Hospital help	4	4
Totals	48	42	Officers and Guards' Mess—		
Farm Department—			Cooks	5	5
Brush-cutters	0	6	Waiters	4	3
Chicken ranch	1	1	Dish washers	2	2
Dairy	2	1	Totals	11	10
Ranch	15	7	Prison improvement	64	60
Vegetable garden	11	8	Warden's help	8	10
Woodchoppers	0	6	Specials	2	3
Totals	29	29	Lost Labor—		
General Overseer's Departm't—			Condemned	4	3
Bedmakers	5	6	Doctor's excuses	19	1
Bookbinders	1	0	Hospital	4	4
Clerks	5	5	Incapables	17	2
Carpenters	2	10	Solitary	25	14
Flower garden	24	21	Unassigned	4	1
Horsesboers	2	2	Wet holidays	0	0
Lamp-tenders	1	1	Totals	73	25
Laundries	27	23	Gross total	900	804
Painters	3	3			
Photographers	1	1			
Sawmill	2	3			
Scavengers	7	7			
Tinshop	3	2			
Totals	83	84			

In the two prisons under consideration there are 1,425 men engaged in labor that would to some extent come in competition with free labor. If we leave out of consideration 127 who are engaged in quarrying, the product of whose labor is utilized at the prison itself, we have but 1,298 so employed. This is less than one fifth of one per cent of the total number gainfully employed in California. But the law provides that even this small number shall be engaged in labor least likely to come in competition with the free labor of the State. The material from which jute bags are manufactured is produced in countries supplied with coolie labor in abundance, and under any other than prison conditions it is very unlikely that any jute bags would be manufactured here at all. Then, too, no one can buy this prison-made article except for his own use (and even then not in quantities greater than 5,000 per year), thus doing away with any temptation to speculate. (Stats. of Cal. 1893, p. 54.)

The output of crushed rock at Folsom is so very limited and the industry of such a character that no very great harm could possibly result to labor interests.

The Legislature enacted a statute at its last session, directing that at least twenty convicts be employed on the roads near San Quentin and a like number on the roads near Folsom, but in no case was this work to be performed to a distance exceeding six miles from the said prisons. (Stats. of Cal. 1903, p. 127.)

CORRECTIVE INSTITUTIONS.

The corrective work of the State is carried on at two institutions: the Preston School of Industry, for boys, at Ione, and the Whittier State School, for both sexes, at Whittier.

Preston School of Industry.—At this institution there are at present 149 boys, ranging in age from ten to twenty-one years. They have no employment that could in any way be deemed competitive. They are engaged in systematic industrial training, to the end that they may leave the institution master of some trade. One half of each working day is devoted to such industrial training, and the other half to school proper. The school is organized precisely as the regular public schools of the State, and embraces the studies of the elementary grades. There are no vacations in either the industrial or the common school departments.

Whittier State School.—At Whittier, on September 1, 1904, there were 307 boys and 45 girls. Besides these, there were 152 boys and girls out on parole, making a total of 504 under the jurisdiction of the school. Here, as at Ione, the inmates work one half of the day and attend school the other half. In the industrial department, tailoring, printing, shoemaking, carpentering, laundry work, electrical engineering, blacksmithing, painting, flower and vegetable gardening, farming, and cooking are taught.

As the law requires that the general condition of the inmates of State institutions be studied, it was thought a somewhat more detailed study

should be made of some one institution, and the Whittier School has been selected for this purpose.

The ages of the inmates of this school range from eight to eighteen years. The term of commitment is from three to eleven years. The State pays one half the expense and the several counties from which the pupils are sent bear the remainder. Care is exercised that the prison aspect of the school be little in evidence, while the educational features are emphasized.

Several tables taken from the last biennial report of the Superintendent are given. Although these tables are two years old, they will show the general conditions that prevail as to age, term of commitment, parentage of the inmates, etc.:

Pupils Admitted and Dismissed during the Fifty-third Fiscal Year—1901-02.

Abbreviations: M. = Males; F. = Females; T. = Total.

Month.	ADMITTED.														
	By Commitment.			Captured.			Returned Parole.			Returned from Parole to be Honorably Discharged.			Total.		
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
1901—July	3	3	6	0	0	0	5	0	5	2	1	3	10	4	14
August	4	1	5	0	0	0	1	0	1	2	0	2	7	1	8
Septemb'r	6	2	8	0	0	0	0	0	0	2	0	2	8	2	10
October	6	0	6	0	0	0	0	1	1	0	0	0	6	1	7
November	10	3	13	0	0	0	3	0	3	0	1	1	13	4	17
December	6	2	8	0	0	0	1	1	2	3	0	3	10	3	13
1902—January	6	1	7	0	0	0	0	0	0	5	3	8	11	4	15
February	2	2	4	0	0	0	0	0	0	3	0	3	5	2	7
March	10	0	10	0	0	0	3	0	3	7	1	8	20	1	21
April	4	1	5	0	0	0	2	0	2	5	0	5	11	1	12
May	5	2	7	0	0	0	0	0	0	4	0	4	9	2	11
June	3	2	5	0	0	0	2	0	2	5	1	6	10	3	13
Totals	65	19	84	0	0	0	17	2	19	38	7	45	120	28	148

Month.	DISMISSED.														
	Expiration of Term.			Escaped.			Died.			By Trustees and Order of Court and Paroled.			Total.		
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
1901—July	2	2	4	0	0	0	0	0	0	3	2	5	5	4	9
August	3	0	3	0	0	0	0	0	0	12	0	12	15	0	15
Septemb'r	2	0	2	0	0	0	0	0	0	2	1	3	4	1	5
October	0	0	0	2	0	2	0	0	0	7	1	8	9	1	10
November	0	1	1	0	0	0	0	1	1	3	0	3	3	2	5
December	3	0	3	0	0	0	0	0	0	4	3	7	7	3	10
1902—January	5	3	8	1	0	1	0	0	0	6	2	8	12	5	17
February	3	0	3	1	0	1	0	0	0	3	0	3	7	0	7
March	7	3	10	2	0	2	0	0	0	9	0	9	18	3	21
April	5	0	5	2	0	2	1	0	1	3	0	3	11	0	11
May	5	0	5	0	0	0	1	0	1	16	1	17	22	1	23
June	6	1	7	1	0	1	0	0	0	7	2	9	14	3	17
Totals	41	10	51	9	0	9	2	1	3	75	12	87	127	23	150

Nativity of Pupils.

State or Country.	Males.	Females.	Total.	Per Cent of Total.
<i>United States.</i>				
Alabama	1	1	2	.46
Arizona	5	1	6	1.39
Arkansas	2	0	2	.46
California	215	24	239	55.46
Colorado	4	0	4	.93
Connecticut	1	0	1	.23
Dakota	2	0	2	.46
Georgia	2	0	2	.46
Idaho	2	0	2	.46
Illinois	9	2	11	2.55
Indiana	3	1	4	.93
Indian Territory	1	0	1	.23
Iowa	5	1	6	1.39
Kansas	9	0	9	2.09
Kentucky	0	1	1	.23
Louisiana	1	0	1	.23
Maine	2	0	2	.46
Maryland	0	1	1	.23
Massachusetts	3	1	4	.93
Michigan	5	0	5	1.16
Minnesota	4	0	4	.93
Missouri	15	1	16	3.74
Montana	2	0	2	.46
Nebraska	8	0	8	1.86
Nevada	2	0	2	.46
New Hampshire	1	0	1	.23
New Jersey	0	1	1	.23
New Mexico	1	0	1	.23
New York	12	1	13	3.03
North Carolina	1	0	1	.23
Ohio	6	1	7	1.62
Oregon	6	0	6	1.39
Pennsylvania	2	1	3	.70
Puerto Rico	1	0	1	.23
Tennessee	0	1	1	.23
Texas	10	2	12	2.78
Virginia	3	0	3	.70
Washington	3	0	3	.70
Wisconsin	6	0	6	1.39
Unknown	5	2	7	1.62
Totals	360	43	403	93.50
<i>Foreign.</i>				
Australia	2	0	2	.46
Austria	1	0	1	.23
Canada	4	0	4	.93
England	2	0	2	.46
Germany	3	0	3	.70
Italy	5	0	5	1.17
Mexico	5	1	6	1.40
Norway	2	0	2	.46
Nova Scotia	2	0	2	.46
Unknown	2	0	2	.46
Totals	27	1	28	6.50

62.18 per cent of the fathers of the inmates are American born and 68.45 per cent of the mothers. Of the foreign-born fathers, the largest per cent are Irish, 6.08 per cent; next, Italian, 5.85 per cent; third, German, 3.99 per cent; fourth, English, 2.8 per cent. Of the mothers, the largest per cent are also Irish, 5.8 per cent, with Italy second, 3.9 per cent; Germany third, 3.7 per cent; Mexico fourth, 3.2 per cent.

The total number of foreign-born persons in California in 1900 was 367,240, or 24.7 per cent of the entire population of the State. Of these, 19.7 per cent were Germans, 12.1 per cent were Irish, 9.7 per cent were English, 6.2 per cent were Italians, and the remainder divided among the other nationalities. Compared to the total population of the State, 4.9 per cent are Germans, 2.9 per cent are Irish, 2.4 per cent are English, and 1.5 per cent are Italian.

Ages of Pupils Present and on Parole.

Age.	Males.	Females.	Total.	Per Cent.
Eight years	8	1	9	2.09
Nine years	10	0	10	2.32
Ten years	18	0	18	4.18
Eleven years	28	3	31	7.20
Twelve years	49	3	52	12.06
Thirteen years	55	7	62	14.38
Fourteen years	68	12	80	18.57
Fifteen years	61	3	64	14.85
Fifteen and one half years	0	7	7	1.62
Sixteen years	58	7	65	15.08
Seventeen years	31	1	32	7.42
Eighteen years	1	0	1	.23

Terms of Commitment.

Time.	Males.	Females.	Total.	Per Cent.
Three years	5	0	5	1.16
Four years	3	2	5	1.16
Five years	3	0	3	.70
Seven years	3	0	3	.70
Eight years	2	0	2	.46
Nine years	3	0	3	.70
Eleven years	1	0	1	.23
During minority	367	42	409	94.89

Causes of Commitment.

Cause.	Males.	Females.	Total.	Per Cent.
Administering poison with intent to kill	1	0	1	.23
Arson	2	0	2	.46
Assault with intent to commit rape	2	0	2	.46
Attempt to commit robbery	1	0	1	.23
Burglary	78	0	78	18.10
Crime against nature	1	0	1	.23
Embezzlement	3	1	4	.93
Felony	1	0	1	.23
Forgery	4	0	4	.93
Grand larceny	29	1	30	6.97
Incorrigible	251	42	293	67.99
Obtaining goods under false pretenses	1	0	1	.23
Petit larceny	10	0	10	2.32
Robbery	2	0	2	.46
Vagrancy	1	0	1	.23

CHARITABLE INSTITUTIONS.

The charitable institutions maintained by the State are: the State Hospitals for the Insane at Stockton, Napa, Agnews, Mendocino, and Highland; the Home for Feeble-Minded Children, at Eldridge, Sonoma County; the Industrial Home for Adult Blind, at Oakland; and the Institution for the Deaf and the Blind, at Berkeley.

The following table shows the number, by sexes, at these institutions on July 1st of this year. The figures for the Institution for the Deaf and the Blind at Berkeley are for September 23d, and for the Industrial Home for Adult Blind, August 11th:

	Males.	Females.	Total.	On Parole.
Institution for the Deaf and the Blind—				
Deaf	81	64	145	
Blind	47	29	76	
Total in Institution			221	
Industrial Home for Adult Blind	88	23	111	
State Hospital—Stockton	1,057	558	1,615	57
State Hospital—Napa	836	625	1,461	45
State Hospital—Agnews	624	402	1,026	32
State Hospital—Mendocino	427	188	615	14
State Hospital—Southern California	495	285	780	100
Home for Feeble-Minded Children	288	226	514	26
Total in all institutions	3,943	2,400	6,343	274

No competitive labor is performed except at the Home for Adult Blind in Oakland. Here about seventy of the inmates are employed in the shops. They are engaged in the manufacture of brooms, brushes, hammocks, mattresses, bags, and chairs. They receive about \$5,000 per annum in wages. The institution is maintained at a yearly cost of \$25,000. The services of 24 officers and employés are required.

At the Institution for the Deaf and the Blind at Berkeley the inmates are employed in much the same manner as at the corrective institutions at Ione and Whittier. The hours from 8 A. M. to 1 P. M. are devoted to class-room work. The curriculum follows closely that of the public schools, and in addition high school instruction is given. About 2½ per cent of the pupils matriculate at the University. Two hours per day, from 2 to 4 P. M., are spent in manual training. The boys are taught printing and woodworking in various forms; the girls are taught cooking, domestic management, and sewing. Their purpose here, too, is to fit the boys and girls for some trade after they have left the institution.

VALUE OF PROPERTY, AND PRODUCTS OF CALIFORNIA.

In Section 3 of the Act creating this Bureau, the Commissioner is directed to report on the amount of capital invested in lands, machinery, material, and means of production generally.

The inquiry was begun at so late a date that it has been practically impossible to get everything required, but an attempt has been made to get as complete information as possible along the various lines. The results have been fairly satisfactory for the products, but, owing to the variation of the Assessors' figures from year to year and the general diversity of opinion as to the real value of property, the remainder of the task has been difficult and the results unsatisfactory.

The following is a table showing the assessed valuation of property, both personal and real, for 1903:

VALUES OF PROPERTY IN EACH COUNTY IN 1903.

Counties.	Value of Real Estate.	Value of Improvements on Real Estate.	Value of Personal Property.	Money and Solvent Credits.	Total Value of Property as Returned by Auditors.	Value of Railroads as Assessed by State Board of Equalization.	Grand Total Value of all Property.
Alameda	\$65,967,860	\$38,737,986	\$20,997,658	\$774,977	\$126,477,981	\$2,203,785	\$128,681,766
Alpine	193,959	159,218	65,285	3,601	422,063	-----	422,063
Amador	2,771,230	1,377,620	626,505	23,553	4,798,908	120,000	4,918,908
Butte	9,570,836	2,781,091	2,414,999	171,366	14,938,292	1,119,474	16,057,766
Calaveras	3,371,105	1,694,865	873,075	33,080	5,972,125	205,150	6,177,275
Colusa	8,895,522	1,091,271	1,475,588	211,738	11,674,119	513,977	12,188,096
Contra Costa	10,991,613	3,929,519	4,722,988	379,740	20,023,860	1,730,096	21,753,956
Del Norte	2,280,153	292,400	301,356	8,536	2,882,445	-----	2,882,445
El Dorado	2,337,735	1,105,320	748,995	18,540	4,210,590	458,250	4,668,840
Fresno	19,995,072	6,595,487	4,183,708	141,885	30,916,152	3,386,053	34,302,205
Glenn	7,836,797	765,086	1,179,140	174,461	9,955,484	690,040	10,645,524
Humboldt	18,274,227	3,214,519	2,874,746	548,000	24,911,492	-----	24,911,492
Inyo	1,060,544	563,790	551,492	37,094	2,212,830	103,489	2,316,319
Kern	13,441,304	2,833,329	5,024,028	74,427	21,373,088	2,677,783	24,050,871
Kings	4,819,165	1,130,192	1,256,402	86,699	7,292,458	590,551	7,883,009
Lake	1,985,775	715,800	522,908	33,537	3,258,020	-----	3,258,020
Lassen	2,375,665	548,163	1,298,246	145,061	4,367,135	223,613	4,590,748
Los Angeles	96,401,189	40,185,600	27,863,030	884,733	165,334,552	3,933,614	169,268,166
Madera	3,795,075	625,795	1,144,540	33,845	5,599,255	1,133,240	6,732,495
Marin	8,711,140	3,584,665	1,368,960	52,980	13,717,745	771,837	14,489,582
Mariposa	1,393,807	441,954	433,410	975	2,270,146	-----	2,270,146
Mendocino	8,195,798	2,105,967	2,380,540	120,143	12,802,448	329,547	13,131,995
Merced	9,717,992	1,281,191	1,954,783	35,283	12,989,249	1,887,837	14,877,086
Modoc	1,817,951	619,049	1,554,594	85,086	4,076,680	-----	4,076,680
Mono	477,534	307,024	310,205	9,835	1,104,598	46,511	1,151,109
Monterey	12,045,370	2,771,315	1,908,355	74,435	16,799,475	2,163,079	18,962,554
Napa	6,373,592	4,174,220	2,271,999	309,030	13,128,841	711,450	13,840,291
Nevada	2,725,480	2,671,450	1,028,900	52,280	6,478,110	725,239	7,203,349
Orange	7,846,250	3,006,727	1,774,829	78,730	12,706,536	1,106,030	13,812,566
Placer	4,249,265	2,085,280	879,090	116,410	7,330,045	2,347,679	9,677,724
Plumas	1,914,666	470,907	323,312	1,900	2,710,785	81,306	2,792,091
Riverside	7,544,584	4,709,652	1,395,736	81,650	13,824,622	2,548,674	16,373,296
Sacramento	22,345,891	11,041,609	5,982,713	398,590	39,763,803	1,569,534	41,333,337

VALUES OF PROPERTY IN EACH COUNTY IN 1903—Continued.

Counties.	Value of Real Estate.	Value of Improvements on Real Estate.	Value of Personal Property.	Money and Solvent Credits.	Total Value of Property as Returned by Auditors.	Value of Railroads as Assessed by State Board of Equalization.	Grand Total Value of all Property.
San Benito	\$4,154,785	\$984,255	\$1,030,370	\$64,555	\$6,233,965	\$265,103	\$6,499,068
S. Ber'dino	9,974,405	5,281,729	1,768,135	143,635	17,167,904	4,224,324	21,392,228
San Diego	11,259,530	4,211,614	2,679,841	107,105	18,258,090	2,549,504	20,807,594
San Frisco	261,960,506	128,159,408	122,147,473	33,599,059	545,866,446	18,203,855	564,070,301
S. Joaquin	20,564,606	6,706,216	3,991,764	771,132	27,033,718	2,706,817	34,740,535
S. L. Obispo	8,342,270	1,774,627	2,141,269	191,901	12,450,067	1,230,168	13,680,235
San Mateo	9,970,344	3,954,890	2,429,308	299,780	16,654,322	2,345,242	18,999,564
S. Barbara	11,324,895	3,435,894	2,257,908	51,795	17,070,492	1,779,484	18,849,976
Santa Clara	37,849,145	16,239,990	5,351,825	375,165	59,816,125	1,574,692	61,390,817
Santa Cruz	7,010,768	3,326,205	1,421,422	98,540	11,856,935	703,136	12,560,071
Shasta	5,061,516	2,254,094	1,843,867	80,943	9,240,420	1,661,616	10,902,036
Sierra	1,973,995	402,180	205,325	3,400	1,684,900	159,660	1,844,560
Siskiyou	5,522,757	1,707,769	1,447,433	198,806	8,876,765	1,683,885	10,560,650
Solano	12,089,607	4,699,801	2,187,021	110,469	19,086,898	1,108,583	20,195,481
Sonoma	16,890,946	7,118,953	3,932,379	441,725	28,384,003	1,996,416	30,380,419
Stanislaus	7,881,235	1,419,590	1,750,985	185,875	11,237,685	1,596,523	12,834,208
Sutter	4,268,926	805,106	892,181	52,945	6,019,158	601,889	6,621,047
Tehama	6,522,225	1,802,990	2,139,595	127,000	10,591,810	1,082,752	11,674,562
Trinity	870,841	464,887	297,289	18,345	1,651,362	-----	1,651,362
Tulare	10,038,783	2,497,748	2,311,285	154,673	15,002,489	2,444,553	17,447,042
Tuolumne	3,927,360	1,993,125	902,950	32,590	6,856,025	233,700	7,089,725
Ventura	6,502,907	1,831,048	1,888,141	123,062	10,345,158	826,061	11,171,219
Yolo	11,920,613	2,537,064	1,621,473	237,619	16,316,769	1,323,637	17,640,406
Yuba	2,783,655	1,318,165	1,157,640	130,570	5,390,030	508,320	5,898,350
Totals	\$849,490,266	\$352,635,409	\$269,488,904	\$42,800,889	\$1,514,415,468	\$4,187,758	\$1,598,603,226

PRODUCTS OF CALIFORNIA.

It is impossible to get absolutely complete data relative to the products of a State of as varied resources as California; embracing as it does every variation of climate and soil, and producing everything common to both the temperate and torrid zones. We can only hope to get detailed information about the products of most importance, adding whatever is available concerning the less common industries.

Agriculture, including horticulture, stock-raising, etc., must long be of vast importance to California's people. The growing tendency is to break up the large holdings into modest farms. The effect of this can be noticed in the decrease in the production of certain articles—notably, cereals—and a corresponding increase along other lines.

Where more detailed figures are not available, the exports from year to year will tend to show the general condition of an industry.

Cereals.—In recent years many of the large grain ranches in the San Joaquin and Sacramento valleys have been broken up into smaller farms for the growing of fruit and vegetables, and much land has been given over to alfalfa, hence there has been a corresponding decrease in the production of wheat, barley, etc., but the cereal crop must for many years to come be of great importance, and a large acreage, impossible of irrigation, must always be given over to this industry. The follow-

ing table gives the wheat crop for the last five years, and the clearance by sea from San Francisco of all cereals for the last five years:

Wheat Crop during the Last Five Years, and the Total Clearance by Sea from San Francisco of all Cereals.

Year.	Wheat Produced.	Clearances by Sea.					
		Flour.	Wheat.	Oats.	Corn.	Barley.	Rye.
	<i>tons.</i>	<i>barrels.</i>	<i>centals.</i>	<i>centals.</i>	<i>centals.</i>	<i>centals.</i>	<i>centals.</i>
1899-----	367,061	1,009,416	2,285,862	23,905	23,339	461,333	-----
1900-----	973,102	1,195,783	6,519,771	220,795	20,220	4,251,236	54,215
1901-----	601,536	1,091,684	7,990,189	125,449	4,266	2,119,292	117,710
1902-----	931,013	1,178,235	9,671,107	145,827	14,718	4,281,182	258,963
1903-----	562,785	988,864	5,252,851	56,626	51,139	3,544,859	120,852

In 1899 there was a very poor yield, and in 1901 and 1903 but fair crops. The yield quite naturally fluctuates from year to year, since everything depends upon the winter and spring rains, but a general decrease is noticeable. This is more apparent if we go back farther. From 1885 to 1895, in a good year the production always exceeded the million-cental mark and fell in a poor year only to 700,000 centals, while since that time the maximum is in the neighborhood of 900,000 centals and the minimum 500,000.

Hay.—The annual value of this crop is about \$20,000,000, with an acreage of 2,239,601.

Horticultural Products and Vegetables.—There follows a table showing the shipments of horticultural products and vegetables from the State during the years from 1899 to 1903 inclusive:

Carloads of Horticultural Products and Vegetables Shipped from California by Land and Sea during the Years from 1899 to 1903 inclusive.

(Each carload represents 10 tons.)

Kind.	1899.	1900.	1901.	1902.	1903.
Green deciduous fruits-----	9,693.4	9,117.6	9,367.3	10,039.0	10,419.8
Citrus fruits-----	13,191.6	22,654.6	32,387.1	22,566.8	29,962.3
Dried fruits-----	8,632.5	9,005.2	10,698.7	15,194.4	14,953.1
Raisins-----	3,600.8	3,604.7	4,331.4	4,757.5	3,006.3
Nuts-----	660.8	651.8	846.2	1,091.8	937.7
Canned fruits-----	7,524.0	7,555.6	8,322.9	8,063.4	9,420.4
Total carloads of fruits-----	43,364.3	52,901.5	65,953.8	61,713.3	69,689.8
Vegetables by rail-----	2,613.6	4,367.8	8,371.7	6,130.2	7,839.2
Vegetables by sea-----	790.7	772.9	801.1	826.4	822.6
Wine and brandy by rail and sea-----	8,713.9	9,067.3	8,605.3	8,868.2	9,733.2
Total shipments of fruit, vegetables, wine, and brandy, by rail and sea-----	55,482.5	66,797.8	83,731.9	77,538.1	88,084.8

Quite a uniform increase is noted here. Nineteen hundred and one was an especially good year in almost every branch of agriculture, the

citrus fruit output that year reaching its maximum, 32,387.1 carloads, and the output of vegetables was 9,172.8 carloads. In 1902, however, there was the maximum output of dried fruits, raisins and nuts, while the citrus fruits had fallen the lowest since 1899.

The total production of wine for 1902 was about 40,000,000 gallons, and of brandy, 3,564,173 gallons, or a total of 43,564,173 gallons. The 8,868.2 carloads of wine and brandy sent out of the State during that year is equivalent to 18,485,800 gallons; showing that considerably over half the production of that year was either consumed or stored in the State. Of few commodities is this true to so great an extent.

A great quantity of canned and green fruits is consumed yearly, but by far the larger proportion of raisins, dried and citrus fruits is exported. Of the citrus fruits, lemons make up about one seventh and oranges the remainder, although small quantities of grape-fruit, citrons, etc., are produced, mostly for home consumption. In 1902 there were 52,030 acres of oranges and 14,429 acres planted to lemons, while Florida, the nearest competitor, had 27,997 acres of oranges and 491 acres of lemons, with an output about one tenth as great as that of California.

Of deciduous fruits, prunes rank first, peaches second, and apricots third, with reference to the number of trees. In fact, prunes and peaches rank first and second and apricots fourth of all fruit trees growing in the State, citrus fruits having third place.

The total number of prune trees in 1901 was 8,183,784, and the product of cured prunes was 81,600,000 pounds, while in 1902 the output had reached the enormous amount of 160,000,000 pounds, supplying the markets of the entire country and many foreign markets as well.

Peaches, apricots, pears, and apples are grown in large quantities, apricots being produced in considerable quantities nowhere else in the United States except Arizona, and there only in a few valleys of limited acreage. Pajaro Valley produces most of the apples for market, consignments being made from there direct to London and other foreign markets.

Of the vegetables raised in the State the bean crop is one of the most valuable. Practically all the lima beans grown in the world are found in Ventura, Santa Barbara, and Orange counties. The other varieties come principally from Santa Barbara, San Luis Obispo, Sacramento, and San Joaquin counties. The entire crop averages about 1,500,000 bags of eighty pounds each, and about one third of these are lima beans. About one eighth of the entire crop is consumed in the State.

Of the other vegetables, potatoes, sweet potatoes, onions, asparagus, tomatoes, cabbage, and celery are of the greatest commercial value.

Dairy Products.—The following table gives the amount and value of the dairy products of California for 1901, 1902, and 1903:

Dairy Products of California for Three Successive Years.

Products.	1901.		1902.		1903.	
	Amount.	Value.	Amount.	Value.	Amount.	Value.
Butter, lbs. -----	29,730,882	\$7,256,010	31,528,763	\$7,541,792	34,676,311	\$8,069,077
Cheese, lbs. -----	5,681,366	613,487	6,503,441	702,371	7,141,637	856,906
Condensed milk, cases -----			146,680	564,758	161,210	621,233
Cream and milk con- sumed -----				6,236,555		6,682,738

Live Stock.—The following table shows the number and value of the different kinds of live stock in California in 1903:

Number and Value of the Different Kinds of Live Stock in 1903.

*	Kind.	Number.	Average Price per Head.	Value.
12	Horses -----	370,716	\$60 66	\$22,485,881
13	Mules -----	67,908	72 02	4,876,600
14	Milch cows -----	337,482	40 43	13,644,397
14	Other cattle -----	1,111,767	24 51	27,244,079
8	Sheep -----	2,365,884	2 92	6,915,716
25	Swine -----	511,311	7 63	3,901,303
	Totals -----	4,765,068		\$79,067,976

* Rank relatively with other states.

The average price per head of all animals in the United States for 1903 was as follows: Horses, \$62.25; mules, \$72.49; milch cows, \$30.21; other cattle, \$18.45; sheep, \$2.63; swine, \$7.78. Our horses and mules are close to the general average, while our milch cows, other cattle, and sheep are considerably above the general average.

Wool.—There has been a gradual falling off in this industry, but it is now practically confined to the foothills and more arid districts and may be considered as having reached a permanent basis. For many years sheep-raising was one of the most important industries of the State, the wool output in 1876 being 56,500,000 pounds. Following is California's wool clip for the last five years:

Wool Production for the Last Five Years.

1899 -----	28,332,090 lbs.
1900 -----	27,750,000 lbs.
1901 -----	26,900,000 lbs.
1902 -----	21,000,000 lbs.
1903 -----	22,000,000 lbs.

Hops.—The following table gives the production of hops for the last five years:

Production of Hops for the Last Five Years.

	Bales.	Pounds.
1899 -----	59,000	11,210,000
1900 -----	38,000	7,220,000
1901 -----	48,000	9,120,000
1902 -----	53,500	10,165,000
1903 -----	57,000	10,548,000

Beet-Sugar.—The following table gives the output of beet-sugar in California during the five years from 1899 to 1903, inclusive:

Production of Beet-Sugar in the Several Localities, from 1899 to 1900.
(Tons of 2,000 lbs.)

Year.	Watsonville.	Spreckels.	Alvarado.	Crockett.	Union.	Chino.	Oxnard.	Alamitos.	Total.	
1899 -----	Discontinued.	20,000	3,704	1,158	1,262	6,483	8,393	1,100	42,100	
1900 -----		12,500	4,186	1,329	1,896	-----	9,695	713	30,319	
1901 -----		28,700	7,159	-----	-----	3,498	2,451	20,892	6,000	68,700
1902 -----		21,607	6,424	-----	-----	4,229	10,253	26,168	5,080	73,761
1903 -----		17,127	5,358	-----	-----	7,623	7,046	21,766	6,440	65,360

Timber.—During the five years 1899–1903, the production of redwood, sugar and yellow pine, spruce, cedar, and fir timber was as follows:

Production of Timber—1899–1903.

Year.	Redwood.	Sugar Pine.	Yellow Pine.	Spruce.	Cedar.	Fir.	Total.
	<i>M. Feet.</i>	<i>M. Feet.</i>	<i>M. Feet.</i>	<i>M. Feet.</i>	<i>M. Feet.</i>	<i>M. Feet.</i>	<i>M. Feet.</i>
1899 -----	272,283	50,736	211,115	21,963	4,882	20,508	581,488
1900 -----	327,916	67,920	181,272	20,204	4,049	49,583	650,981
1901 -----	287,001	83,467	152,565	32,943	33,550	38,259	627,770
1902 -----	343,142	68,749	180,726	33,488	2,424	34,648	663,179
1903 -----	465,463	48,939	264,892	12,192	5,478	55,671	852,638

TABLE SHOWING MINERAL PRODUCTION FOR THE LAST FIVE YEARS.

Products.	1899.		1900.		1901.		1902.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Antimony..... tons	75	\$13,500	70	\$5,700	50	\$8,350	34,511	\$349,344	41,670	\$903,659
Asbestos..... tons	30	750	50	1,250	110	4,400	33,490	43,411	21,944	55,106
Asphalt..... tons	15,000	308,130	12,575	253,950	21,634	313,219	33,490	43,411	21,944	55,106
Bituminous Rock..... tons	40,321	116,097	25,306	71,495	24,052	68,354	34,404,000	2,234,994	68,860,000 (crude)	651,400
Borax..... lbs.	40,714,000	1,133,882	51,674,000	1,013,251	14,442,000	982,380	171,000	423,600	640,868	963,727
Cement..... bbls.	60,000	180,000	52,000	121,000	71,800	159,842	171,000	423,600	640,868	963,727
Chrome..... tons	140	180,000	140	180,000	130	1,950	315	4,725	150	2,250
Chrysoprase..... lbs.	125,950	754,730	137,191	905,210	130,766	860,488	169,851	1,306,215	214,403	1,999,546
Clay, Brick..... M.	42,700	49,636	59,636	60,956	55,679	39,144	67,933	74,163	90,972	99,907
Clay, Pottery..... tons	160,941	420,109	176,936	535,531	150,724	401,772	88,460	248,622	93,026	265,383
Coal..... tons	23,915,486	3,900,534	29,515,512	4,748,242	34,431,788	5,401,782	27,860,462	3,239,975	19,113,861	2,520,997
Copper..... lbs.	620	12,400	500	3,750	1,000	19,500	987	19,246	280	4,750
Fuller's Earth..... tons	128,924	15,336,031	311,803	15,803,355	214,943	16,989,044	257,650	16,910,320	408,625	16,471,264
Granite..... cu. ft.	3,663	14,950	2,522	285,772	64	519,285	42	253,239	1,680	678,670
Gypsum..... tons.	360	30,642	520	10,088	3,875	38,750	175	53,500	6,914	46,441
Infusorial Earth..... tons.	124	343,700	440	315,231	1,100	434,133	822	400,140	700	16,015
Lime and Limestone..... tons	323,590	239,807	360,597	262,570	360,883	313,974	500,939	31,880	27,300	3,900
Lithia Mica..... tons	1,280	18,480	2,252	19,333	4,726	43,057	2,830	20,655	1,361	592,268
Macadam..... tons	295	3,165	131	1,310	425	4,405	870	7,140	1	436,172
Magnesite..... tons	9,082	10,550	4,103	5,891	2,945	4,630	19,305	37,616	84,624	20,515
Marble..... cu. ft.	1,704	20,294	529	3,993	325	875	50	2,500	90	97,354
Mica..... tons	1,338,537	406,691	2,456,115	268,607	1,555,328	559,057	1,701,142	1,533	3,720	3,800
Mineral Paint..... tons	305	95,000	1,192	34,578	1,920	92,034	3,502	612,477	2,056,340	568,201
Mineral Water..... gals.	2,677,875	2,600,793	4,324,484	23,775	8,786,330	41,075	94,443	120,134	76,237	131,612
Natural Gas..... cu. ft.	300	1,800	3,642	4,152,928	250	4,900,448	13,984,268	5,200,655	24,340,000	7,313,271
Paving Blocks..... M.	5,400	28,620	4,000	21,133	4,578	18,429	17,525	60,306	24,311	1,052
Petroleum..... bbls.	29,454	1,405,045	26,317	1,182,786	26,720	1,285,014	29,552	1,276,594	32,094	94,000
Platinum..... ozs.	641,308	547,025	428,690	299,072	169,513	327,063	1,555,076	830,981	1,610,140	1,335,854
Pyrites..... tons	149,588	2,000	89,338	204,754	126,218	366,376	113,208	263,876	102,895	1,237,419
Quartz Crystals..... lbs.	2,000	2,000	2,000	2,000	4,500	15,750	4,500	12,225	7,525	211,305
Quicksilver..... flasks	1,000	1,500	200	200	500	500	500	500	333,002	583,309
Rubble..... tons	56,264	103,384	378,468	254,140	226,741	192,132	212,123	142,506	353,002	800
Sand, Glass..... tons	500	2,000	350	2,000	89	890	512	5,065	99	517,444
Sand, Quartz..... tons	500	2,000	350	2,000	89	890	512	5,065	99	517,444
Sandstone..... cu. ft.	500	504,012	3,500	1,510,314	8,000	400,000	7,000	150,000	18,000	27,000
Serpentine..... cu. ft.	810	5,900	1,000	50,000	500	20,000	510	11,600	10,000	100,000
Silver..... squares	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Slate..... squares	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Soapstone..... tons	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Soda..... lbs.	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Tourmaline..... lbs.	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Turquoise..... lbs.	10,000	250,000	500	20,000	500	20,000	510	11,600	10,000	100,000
Total*		\$29,313,460		\$34,562,291		\$34,863,792		\$35,069,105		\$37,759,940

THE PETROLEUM INDUSTRY,

And the Extent to Which Oil Has Been Substituted for Coal, with the Effect on the Cost of Manufacture.

The cost of fuel has for many years put the California manufacturer at a decided disadvantage. Compelled to import coal from British Columbia or Australia or transport it by rail from Wyoming or Utah, he has found it difficult to compete successfully, even in the coast cities, with his Eastern rivals. Add to this, high freight rates to points beyond the Rockies—such rates kept at a maximum by this same high price of fuel—and it is readily seen that successful competition at Eastern points is absolutely impossible. Thus, notwithstanding her abundance of raw material, California has been compelled to manufacture only enough for home consumption, or at most for the coast contiguous, and even here the Easterner has been able to compete.

With the opening of the Philippine Islands, the awakening of China, and the tremendous strides made by Japan, the demand for manufactured goods has increased immensely. California and the Pacific Coast, thirty-five hundred miles nearer the consumer, should naturally be the location of the manufactories to supply this trade; but with Massachusetts and New York able to lay down goods in San Francisco more cheaply than they could be manufactured on the ground, the source from which the Oriental supply must come is not far to seek.

In addition to this, many articles such as concrete bricks, and certain iron and steel products, from the high percentage of fuel required, were absolutely impossible of manufacture.

The cost of fuel had come in 1898 to be of vast importance to California, and unless means could be devised whereby it could be lessened California bade fair to be robbed of her natural heritage, the commerce of the Pacific.

Oil has long been used as a fuel in California, but the supply has been so precarious that comparatively few establishments had adopted it entirely as a substitute for coal until very recently. In 1892 the Los Angeles County fields were exploited, and since then the supply has increased yearly until 1900, when there was a total production of 4,324,484 barrels, almost all of which was used for fuel. Even with this large supply of comparatively cheap fuel the cost was still high

enough, as seen by the following table, to give the Eastern mill the advantage:

Relation of the Cost of Fuel to the Total Cost, and the Total Value of the Manufactured Products in 1900, for Massachusetts, Illinois, and California.

State.	Total Cost of Manufacture.	Value of Product.	Total Cost of Fuel and Power.	Per Cent Cost of Fuel is of Total Cost.	Per Cent Cost of Fuel is of Value of Product.
Massachusetts ----	\$897,580,080	\$1,035,198,989	\$12,155,038	1.3	1.1
Illinois -----	1,124,203,813	1,259,730,168	18,724,655	1.6	1.4
California -----	264,967,767	302,874,761	4,865,105	1.8	1.6

The States here considered are taken as representing the three most widely separated districts. The comparative cost of fuel in California is here seen to exceed that of Illinois in one case by 12.5 per cent, in the other by 14.4 per cent; that of Massachusetts in one case by 38.4 per cent, in the other by 45.4 per cent. In this year there were produced 4,324,484 barrels of oil, and 1,624,126 tons of coal were imported. As practically all the coal consumed is imported, this latter figure represents very nearly the consumption of coal in 1900. The value of the four million barrels of oil consumed was \$4,152,928, and the coal, at \$6.50 per ton, \$10,556,819, making a total of \$14,709,747 expended for fuel in 1900. This covers the value of the small amount of petroleum exported and the coal used by the railroads and by private consumption.

Since 1900, the petroleum output has increased enormously and the price has decreased even more rapidly.

The following table shows the output of petroleum and the import of coal, together with the price of each:

Year.	Output of Petroleum.		Importations of Coal.	
	Barrels.	Value.	Tons.	Value.
1900 -----	4,324,484	\$4,152,928	1,624,126	\$10,556,819
1901 -----	8,786,330	4,900,448	1,444,404	9,388,626
1902 -----	13,984,268	5,200,000	1,265,082	8,223,033
1903 -----	24,340,000	7,313,271	1,152,816	7,493,304

The figures herein set forth are very instructive. In 1900, as we have seen, the part of the cost represented by fuel was 38.4 per cent higher in California than in Massachusetts. In that year the total fuel bill for California for all purposes was \$14,709,747; \$4,865,105 represented the fuel bill of the manufactories. Bearing in mind the fact that the railroads were the first to use oil extensively as fuel, we must concede that a considerable proportion of the petroleum output was in that year used by them, while the manufactories to a large degree depended upon coal.

In 1903 the total production of oil was 24,340,000 barrels, valued at \$7,313,271, and the import of coal was 1,152,816 tons, valued at \$7,493,304. The total value of all fuel consumed in 1903 (remembering that the coal mined in California and the oil shipped out of the State very nearly balance) was \$14,806,575. Now, this exceeds the cost of fuel used in 1900 by \$96,848 only. From results obtained by experiment at the State University it is found that from 4 to 4½ barrels of California crude oil are equal in heating value to one long ton of coal. Taking the value at 4.25 barrels, and, for purposes of comparison, reducing the petroleum for 1900 to its equivalent value in tons of coal, we get as a result 1,017,290 tons. Thus, the entire fuel used in 1900 is represented by 2,614,416 tons of coal. Proceeding in the same manner for 1903, the fuel for that year is represented by 6,879,818 tons, or almost three times that of 1900, and at a cost of but \$96,848 more. In other words, the work value of the fuel has increased nearly 300 per cent, while the cost has increased but 0.66 per cent. When we remember that very little oil is used in private consumption, it is readily seen that this great increase of power has been utilized almost entirely by the railroads and manufactories. But the railroads being the first to make the change from coal to petroleum, their percentage of increase is likely to be considerably smaller than that of the manufactories, and the increased number of mills and factories, especially among those whose percentage of fuel is high, bears witness to this fact.

THE STATE SAVINGS BANKS.

A fair idea of the prosperity or otherwise of the people of a State may be gained from the condition of the savings banks of such State. While undoubtedly many use the commercial banks as depositories for their surplus funds, yet these have been eliminated from the following table, as they are not so strictly for savings and do not make that class of business the main feature of their institutions.

If we were able to segregate the term or interest-bearing deposits from these banks, it would, no doubt, make a still better showing in favor of the laboring masses who are able to earn a little more than is necessary for living and further increase the amount of savings on deposit. Of the total deposits, \$152,599,078.03 is in the savings banks

of San Francisco, \$20,292,478.26 in the Los Angeles banks, and the balance, \$46,713,572.40, is divided throughout the State.

Number of Deposit Accounts, etc., in Savings Banks of the State, January 1, 1904.

Number of savings banks in State January 1, 1904	65
Number of deposit accounts opened during past year	114,592
Number of deposit accounts closed during past year	74,254
Number of deposit accounts open January 1, 1904	321,672
Total deposits in savings banks January 1, 1904	\$219,605,128 69
Amount deposited during past year	198,330,291 63
Amount withdrawn during past year	185,263,616 56
Amount of dividends or interest paid depositors during past year	6,224,529 37
Average rate of interest per annum on such deposits or interest	3.5%
Average amount of each deposit account, January 1, 1904	\$682 69

From the foregoing it will be seen that the number of deposit accounts opened during the year exceeded the number of accounts closed by 40,348, or 54.3 per cent, and that the amount deposited was \$13,066,675.07, or 7.1 per cent, greater than that withdrawn, showing a healthy growth in the financial institutions that are in closest touch with the people. The average amount of each deposit account, which is \$682.69, may be taken to mean one of two things: either those engaged in the laboring and agricultural pursuits are becoming more well to do and are saving their surplus funds by placing them in these banks where they will be earning something and of themselves increasing, or the people of large means, seeing the opportunity of safely obtaining a fair rate of interest, have deposited considerable sums therein rather than take the risk of investing in stocks or other securities of possibly doubtful safety, even though a higher rate of interest might be promised. The latter might be more fairly considered to be the case in San Francisco and the former premise be true in the balance of the State, bearing in mind, too, that many people from the interior, because of a lack of these banks, send their funds to some one of the San Francisco savings banks.

STATUTES AND DECISIONS AFFECTING LABOR.

The following are the enactments affecting labor, passed at the thirty-fourth and thirty-fifth sessions of the Legislature, and still on the statute books:

Lunch Hour for Laborers in Sawmills, etc.

[Stats. of Cal. 1901, p. 75.]

SECTION 1. Every person, corporation, co-partnership, or company operating a sawmill, shakemill, shinglemill, or logging-camp, in the State of California, shall allow to his or its employés, workmen, and laborers a period of not less than one hour at noon for the midday meal.

SEC. 2. Any person, corporation, co-partnership, or company, his or its agents, servants, or managers, violating any of the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than two hundred dollars nor less than one hundred dollars for each violation of the provisions of this Act.

SEC. 3. This Act shall take effect and be in force on the first day of April, nineteen hundred and one.

Liens for Services for Laundry Work, etc.

[Stats. of Cal. 1901, p. 270.]

SECTION 1. Section three thousand and fifty-one of the Civil Code of California is hereby amended so as to read as follows:

3051. Every person who, while lawfully in possession of an article of personal property, renders any service to the owner thereof, by labor or skill, employed for the protection, improvement, safe-keeping, or carriage thereof, has a special lien thereon, dependent on possession, for the compensation, if any, which is due to him from the owner for such service; and livery or boarding or feed stable proprietors, and persons pasturing horses or stock, have a lien, dependent on possession, for their compensation in caring for, boarding, feeding, or pasturing such horses or stock; and laundry proprietors and persons conducting a

laundry business have a general lien, dependent on possession, upon all personal property in their hands belonging to a customer, for the balance due them from such customer for laundry work.

SEC. 2. This Act shall take effect immediately.

Proper Sanitary Condition of Factories, etc.

[Stats. of Cal. 1901, p. 571.]

SECTION 1. Section four (4) of "An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employés," approved February sixth, eighteen hundred and eighty-nine, is hereby amended so as to read as follows:

Section 4. In any factory, workshop, or other establishment where a work or process is carried on by which dust, filaments, or injurious gases are generated or produced, that are liable to be inhaled by persons employed therein, the person, firm, or corporation by whose authority the said work or process is carried on shall cause to be provided and used in said factory, workshop, or establishment an exhaust fan or blower, with pipes and hoods extending therefrom to each wheel or other apparatus used to grind, polish, or buff metals. The said fan or blower, and the said pipes and hoods, all to be properly fitted and adjusted, and of power and dimensions sufficient to effectually prevent the dust and filaments produced by the abovesaid metal-polishing, metal-grinding, or metal-buffing from escaping into the atmosphere of the room or rooms of said factory, workshop, or establishment where persons are employed.

SEC. 2. Section six (6) of the said Act is hereby amended so as to read as follows:

Section 6. Any person or corporation violating any of the provisions of this Act is guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than fifty dollars nor more than three hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both such fine and imprisonment, for each offense.

Exclusive Right of Native-Born and Naturalized Citizens to Employment on Public Works.

[Stats. of Cal. 1901, p. 589.]

SECTION 1. No person, except a native-born or naturalized citizen of the United States, shall be employed in any department of the State, county, city and county, or incorporated city or town government in this State.

SEC. 2. It shall be unlawful for any person, whether elected, appointed, or commissioned to fill any office in either the State, county, city and county, or incorporated city or town government of this State, or in any department thereof, to appoint or employ any person to perform any duties whatsoever, except such person be a native-born or naturalized citizen of the United States.

SEC. 3. No money shall be paid out of the State Treasury, or out of the treasury of any county, or city and county, or incorporated city or town, to any person employed in any of the offices mentioned in section two of this Act, except such person shall be a native-born or naturalized citizen of the United States.

SEC. 4. This Act shall take effect immediately.

Regulating Employment, Hours of Labor, etc., of Children.

[Stats. of Cal. 1901, p. 631.]

SECTION 1. No minor under the age of eighteen shall be employed in laboring in any manufacturing, mechanical, or mercantile establishment, or other place of labor, more than nine hours in one day, except when it is necessary to make repairs to prevent the interruption of the ordinary running of the machinery, or when a different apportionment of the hours of labor is made for the sole purpose of making a shorter day's work for one day of the week: and in no case shall the hours of labor exceed fifty-four hours in a week.

SEC. 2. No child under twelve years of age shall be employed in any factory, workshop, or mercantile establishment, and every minor under sixteen years of age when so employed shall be recorded by name in a book kept for the purpose, and a certificate (duly verified by his or her parent or guardian, or if the minor shall have no parent or guardian, then by such minor, stating age and place of birth of such minor) shall be kept on file by the employer, which book and which certificate shall be produced by him or his agent at the requirement of the Commissioner of the Bureau of Labor Statistics.

SEC. 3. Every person or corporation employing minors under sixteen years of age, in any manufacturing establishment, shall post and keep posted, in a conspicuous place in every room where such help is employed, a printed notice stating the number of hours per day for each day of the week required of such persons, and in every room where minors under sixteen years of age are employed, a list of their names, with their ages.

SEC. 4. Any person or corporation that knowingly violates or omits to comply with any of the foregoing provisions of this Act, or who knowingly employs, or suffers or permits any minor to be employed,

in violation thereof, shall, on conviction, be punished by a fine of not less than fifty nor more than two hundred dollars, or by imprisonment of not more than sixty days, or by both such fine and imprisonment, for each and every offense.

SEC. 5. This Act shall take effect sixty days after its passage.

Unlawful Employment of Children.

[Stats. of Cal. 1901, pp. 449-451.]

SEC. 272. (Revision of Penal Code, 1901.) Any person, whether as parent, relative, guardian, employer, or otherwise, having the care, custody, or control of any child under the age of fourteen years, who exhibits, uses, or employs, or in any manner, or under any pretense, sells, apprentices, gives away, lets out, or disposes of any such child to any person, under any name, title, or pretense, for or in any business, exhibition, or vocation, injurious to the health or dangerous to the life or limb of such child, or in or for the vocation, occupation, service, or purpose of singing, playing on musical instruments, rope or wire walking, dancing, begging, or peddling, or as a gymnast, acrobat, contortionist, or rider, in any place whatsoever, or for or in any obscene, indecent or immoral purposes, exhibition, or practice whatsoever, or for or in any mendicant or wandering business whatsoever, or who causes, procures, or encourages such child to engage therein, is guilty of a misdemeanor, and punishable by a fine of not less than fifty nor more than two hundred and fifty dollars, or by imprisonment in the county jail for a term not exceeding six months, or by both such fine and imprisonment. Nothing in this section contained applies to or affects the employment or use of any such child, as a singer or musician in any church, school, or academy, or the teaching or learning of the science or practice of music; or the employment of any child as a musician at any concert or other musical entertainment, on the written consent of the mayor of the city or president of the board of trustees of the city or town where such concert or entertainment takes place.

SEC. 273. (Revision of Penal Code, 1901.) Every person who takes, receives, hires, employs, uses, exhibits, or has in custody, any child under the age, and for any of the purposes mentioned in the preceding section, is guilty of a like offense, and punishable by a like punishment as therein provided.

SEC. 273e. (Revision of Penal Code, 1901.) Every telephone, special delivery company or association, and every other corporation

or person engaged in the delivery of packages, letters, notes, messages, or other matter, and every manager, superintendent, or other agent of such person, corporation, or association, who sends any minor in the employ or under the control of any such person, corporation, association, or agent, to the keeper of any house of prostitution, variety theater, or other place of questionable repute, or to any person connected with, or any inmate of, such house, theater, or other place, or who permits such minor to enter such house, theater, or other place, is guilty of a misdemeanor.

An Act defining the duties and liabilities of employment agents, making the violation thereof a misdemeanor and fixing penalties therefor.

[Stats. of Cal. 1903, p. 14.]

SECTION 1. Any person, firm, corporation, or association pursuing for profit the business of furnishing, directly or indirectly, to persons seeking employment, information enabling, or tending to enable, such persons to secure such employment, or registering for any fee, charge, or commission the names of any person seeking employment as aforesaid, shall be deemed to be an employment agent within the meaning of this Act.

SEC. 2. It shall be unlawful for an employment agent in the State of California to receive, directly or indirectly, any money or other valuable consideration from any person seeking employment, for any information or assistance furnished or to be furnished by said agent to such person, enabling or tending to enable said person to secure such employment, prior to the time at which said information or assistance is actually thus furnished.

SEC. 3. It shall be unlawful for an employment agent in the State of California to retain, directly or indirectly, any money or other valuable consideration received for any registration made or for information or assistance such as is described in section two hereof, if the person for whom such registration is made or to whom such information or assistance is furnished fails, through no neglect or laches of his own, to secure the employment regarding which registration such information or assistance is furnished; and said money or consideration shall be by said agent forthwith returned to the payor of the same, upon demand therefor by the latter or his agent.

SEC. 4. It shall be unlawful for an employment agent in the State of California to receive, directly or indirectly, for registration made or for information or assistance such as is described in section

two hereof, any money or other consideration which is in value in excess of ten per cent of the amount earned, or prospectively to be earned, by the person for whom said registration is made or to whom such information is furnished, through the medium of the employment regarding which such registration, information or assistance is given, during the first month of such employment; *provided*, that said value shall not be in excess of ten per cent of the amount actually prospectively to be earned in such employment when it is mutually understood by the agent and person in this section mentioned, at the time when said information or assistance is furnished, that said employment is to be for a period of less than one month.

SEC. 5. The tax collector or license collector of each respective city, county, or city and county of the State of California shall furnish quarterly to the Commissioner of the Bureau of Labor Statistics of the State of California the name and address of each employment agent doing business in said city, county, or city and county; *provided*, that where the license is not a county license, but is collected by a municipal government, then the municipal collector of said tax shall furnish the names and addresses.

SEC. 6. Each employment agent in the State of California shall keep a written record, which shall show the name of each person making application to said agent for registration, information or assistance such as is described in section two hereof; the name of each such person to whom such registration or information is furnished; and the amount received in each such case therefor; the name of each person who, having received and paid for, as herein contemplated, registration, information or assistance such as is described in section two hereof, fails to secure the employment regarding which such registration, information or assistance is furnished, together with the reason why said employment was not by said person secured, and the name of each person to whom return is made, in accordance with the provisions of section three hereof, of any money or other consideration such as is in said section named, together with the amount of said money, or the value of said consideration, thus returned.

SEC. 7. Each employment agent in the State of California shall permit the Commissioner of the Bureau of Labor Statistics of said State, by himself, or by his deputies or agents, to have at all times access to, and to inspect, the record in section six hereof named, and upon demand in writing therefor by said Commissioner, shall furnish to such Commissioner a true copy of said record, or of such portion thereof as said demand in writing shall require a copy of to be thus furnished.

SEC. 8. Any employment agent or other person violating, or omitting to comply with, any of the provisions of this Act, shall be deemed guilty of misdemeanor, and upon conviction shall be punished by fine not exceeding five hundred (500) dollars, or by imprisonment not exceeding six (6) months, or by both such fine and imprisonment in the discretion of the court.

SEC. 9. All Acts and parts of Acts inconsistent with the provisions of this Act are hereby repealed.

SEC. 10. This Act shall take effect from and after the date of its passage.

An Act to amend section five of an Act entitled "An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employés," approved February 6, 1889.

[Stats. of Cal. 1903, p. 16.]

SECTION 1. Section five of an Act entitled "An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employés," approved February sixth, eighteen hundred and eighty-nine, is amended to read as follows:

Section 5. Every person, firm, or corporation employing females in any manufacturing, mechanical, or mercantile establishment shall provide suitable seats for the use of the females so employed, and shall provide such seats to the number of at least one third the number of females so employed; and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

An Act regulating the hours of service on regular duty by members of the police department of cities of the first class, cities and counties, cities of the first and one-half class, and cities of the second class.

[Stats. of Cal. 1903, p. 51.]

SECTION 1. In all cities of the first class, cities and counties, cities of the first and one-half class, and cities of the second class of this State where a regular police department is maintained, patrol captains, lieutenants, sergeants, and regular officers shall be required to serve on duty not longer than eight hours in every twenty-four hours; *provided*, that in case of riot or other emergency, every attaché of the police department shall perform such duty and for such time as the directing authority of the department shall require.

SEC. 2. This Act shall take effect immediately.

An Act limiting the hours of service of laborers, workmen, and mechanics employed upon the public works of, or work done for, the State of California, or of or for any political subdivision thereof; imposing penalties for violation of the provisions of said Act, and providing for the enforcement thereof.

[Stats. of Cal. 1903, p. 119.]

SECTION 1. The time of service of any laborer, workman, or mechanic employed upon any of the public works of the State of California, or of any political subdivision thereof, or upon work done for said State, or any political subdivision thereof, is hereby limited and restricted to eight hours during any one calendar day; and it shall be unlawful for any officer or agent of said State, or of any political subdivision thereof, or for any contractor or subcontractor doing work under contract upon any public works aforesaid, who employs, or who directs or controls, the work of any laborer, workman, or mechanic, employed as herein aforesaid, to require or permit such laborer, workman, or mechanic, to labor more than eight hours during any one calendar day, except in cases of extraordinary emergency, caused by fire, flood or danger to life or property, or except to work upon public military or naval defenses or works in time of war.

SEC. 2. Any officer or agent of the State of California, or of any political subdivision thereof, making or awarding, as such officer or agent, any contract, the execution of which involves or may involve the employment of any laborer, workman, or mechanic upon any of the public works, or upon any work, hereinbefore mentioned, shall cause to be inserted therein a stipulation which shall provide that the contractor to whom said contract is awarded shall forfeit, as a penalty, to the State or political subdivision in whose behalf the contract is made and awarded, ten (10) dollars for each laborer, workman, or mechanic employed, in the execution of said contract, by him, or by any subcontractor under him, upon any of the public works or upon any work hereinbefore mentioned, for each calendar day during which such laborer, workman, or mechanic is required or permitted to labor more than eight hours in violation of the provisions of this Act; and it shall be the duty of such officer or agent to take cognizance of all violations of the provisions of said Act committed in the course of the execution of said contract, and to report the same to the representative of the State or political subdivision, party to the contract, authorized to pay to said contractor moneys becoming due to him under the said contract, and said representative, when making payments of moneys thus due, shall withhold and retain therefrom all sums and amounts which shall have been forfeited pursuant to the herein said stipulation.

SEC. 3. Any officer, agent, or representative of the State of California, or of any political subdivision thereof, who shall violate any of the provisions of this Act, shall be deemed guilty of misdemeanor, and shall upon conviction be punished by fine not exceeding five hundred (500) dollars, or by imprisonment, not exceeding six (6) months, or by both such fine and imprisonment, in the discretion of the court.

SEC. 4. All Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed.

SEC. 5. This Act shall take effect and be in force from and after the date of its passage.

An Act to amend an Act entitled "An Act to establish a Penal Code," approved February 14, 1872, by adding a new section to said Penal Code, to be known and numbered as section four hundred and two and three quarters, relating to the furnishing or erecting of unsafe or improper scaffolding or mechanical contrivances.

[Stats. of Cal. 1903, p. 216.]

402 $\frac{3}{4}$. Any person or corporation employing or directing another to do or perform any labor in the construction, alteration, repairing, painting or cleaning of any house, building or structure within this State, who knowingly or negligently furnishes or erects or causes to be furnished or erected for the performance of such labor, unsafe or improper scaffolding, slings, hangers, blocks, pulleys, stays, braces, ladders, irons, ropes or other mechanical contrivances, or who hinders or obstructs any officer attempting to inspect the same under the provisions of section twelve of "An Act to establish and support a Bureau of Labor Statistics," or who destroys, defaces or removes any notice posted thereon by such officer or permits the use thereof, after the same has been declared unsafe by such officer, contrary to the provisions of said section twelve of said Act, shall be guilty of a misdemeanor.

An Act to amend an Act entitled "An Act to establish a Civil Code," approved March 21, 1872, relating to the obligations of employers.

[Stats. of Cal. 1903, p. 256.]

SECTION 1. Section nineteen hundred and seventy of the Civil Code of the State of California is hereby amended so as to read as follows:

1970. An employer is not bound to indemnify his employé for losses suffered by the latter in consequence of the ordinary risks of the business in which he is employed, nor in consequence of the negligence of another person employed by the same employer in the same general

business, unless the negligence causing the injury was committed in the performance of a duty the employer owes by law to the employé, or unless the employer has neglected to use ordinary care in the selection of the culpable employé.

SEC. 2. This Act shall take effect immediately.

An Act to prevent misrepresentations of conditions of employment, making it a misdemeanor to misrepresent the same and providing penalties therefor.

[Stats. of Cal. 1903, p. 269.]

SECTION 1. It shall be unlawful for any person, partnership, company, corporation, association, or organization of any kind, doing business in this State directly or through any agent or attorney, to induce, influence, persuade, or engage any person to change from one place to another in this State or to change from any place in any State, Territory, or country to any place in this State, to work in any branch of labor, through or by means of knowingly false representations, whether spoken, written, or advertised in printed form, concerning the kind or character of such work, the compensation therefor, the sanitary conditions relating to or surrounding it, or the existence or non-existence of any strike, lockout, or other labor dispute affecting it and pending between the proposed employer or employers and the persons then or last theretofore engaged in the performance of the labor for which the employé is sought.

SEC. 2. Any violation of section one or section two hereof shall be deemed a misdemeanor, and shall be punished by a fine of not exceeding two thousand dollars or by imprisonment for not more than one year, or by both such fine and imprisonment.

SEC. 3. This Act shall take effect on the date of its passage.

An Act to limit the meaning of the word "conspiracy," and also the use of "restraining orders" and "injunctions," as applied to disputes between employers and employés in the State of California.

[Stats. of Cal. 1903, p. 289.]

SECTION 1. No agreement, combination, or contract by or between two or more persons to do or procure to be done, or not to do or procure not to be done, any act in contemplation or furtherance of any trade dispute between employers and employés in the State of California shall be deemed criminal, nor shall those engaged therein be indictable or otherwise punishable for the crime of conspiracy, if such act committed by one person would not be punishable as a crime, nor shall such agreement, combination, or

contract be considered as in restraint of trade or commerce, nor shall any restraining order or injunction be issued with relation thereto. Nothing in this Act shall exempt from punishment, otherwise than as herein excepted, any persons guilty of conspiracy, for which punishment is now provided by any Act of the Legislature, but such Act of the Legislature shall, as to the agreements, combinations, and contracts hereinbefore referred to, be construed as if this Act were therein contained; *provided*, that nothing in this Act shall be construed to authorize force or violence, or threats thereof.

SEC. 2. This Act shall take effect immediately.

FEDERAL EIGHT-HOUR LAW.

An Act relating to the limitation of the hours of daily service of laborers and mechanics employed upon the public works of the United States and of the District of Columbia.

[Approved August 1, 1872. (27 Stats. at Large, p. 340.)]

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That the service and employment of all laborers and mechanics who are now or may hereafter be employed by the Government of the United States, by the District of Columbia, or by any contractor or subcontractor upon any of the public works of the United States or of the said District of Columbia, is hereby limited and restricted to eight hours in any one calendar day, and it shall be unlawful for any officer of the United States Government or of the District of Columbia or any such contractor or subcontractor, whose duty it shall be to employ, direct, or control the services of such laborers or mechanics, to require or permit any such laborer or mechanic to work more than eight hours in any calendar day, except in case of extraordinary emergency.

SEC. 2. That any officer or agent of the Government of the United States or of the District of Columbia, or any contractor or subcontractor, whose duty it shall be to employ, direct, or control any laborer or mechanic employed upon any of the public works of the United States or of the District of Columbia, who shall intentionally violate any provision of this Act, shall be deemed guilty of a misdemeanor, and for each and every such offense shall upon conviction be punished by a fine not to exceed one thousand dollars, or by imprisonment for not more than six months, or by both such fine and imprisonment, in the discretion of the court having jurisdiction thereof.

SEC. 3. The provisions of this Act shall not be so construed as to in any manner apply to or affect contractors or subcontractors, or to limit the hours of daily service of laborers or mechanics engaged

upon the public works of the United States or of the District of Columbia for which contracts have been entered into prior to the passage of this Act.

In the preceding pages an attempt has been made to get together the existing legislation of especial interest to labor. These enactments are in full effect except the one concerning employment agencies (Stats. of Cal. 1903, p. 14). In a decision of the Supreme Court, *Ex parte C. E. Dickey on Habeas Corpus*, Section 4 of this statute was declared unconstitutional, on the ground that such an enactment would tend to impair the obligation of contracts and could not stand except as a police measure. Inasmuch as the occupation of the employment agent is highly beneficial and tends in nowise to affect the health or safety of the people, it is not subject to police supervision. While only Section 4 is expressly declared unconstitutional, yet it is hinted by Beatty, C. J., in his concurring opinion, that Section 3 likewise must fail for the same reason.

During the two years since the last report of this Bureau many decisions affecting labor have been rendered by the State and Federal courts. Of especial interest are those on the constitutionality of the laws fixing the length of a working day, and on boycotts, picketing, etc. We have attempted to give the substance of these opinions only, as any more detailed account would be outside the province of this report.

All courts have held that a law fixing the maximum number of hours for a day's work for miners, street railway employes, etc., is constitutional, inasmuch as this is a legitimate use of the police power. (*State vs. Cantwell et al.*, Supreme Court of Missouri, 78 Southwestern Reporter, p. 569; *In re Boyce*, Supreme Court of Nevada, 75 Pacific Reporter, p. 1; *In re Ten-Hour Law for Street Railway Corporations*, 54 Atlantic Reporter, p. 602.)

In the case of laws fixing the length of a day's work on public buildings, etc., there have been conflicting opinions in the State courts. *In re Dalton*, Supreme Court of Kansas, 59 Pacific Reporter, p. 336, declares that an eight-hour law for work on public contracts is constitutional, provided there is a provision requiring a clause to that effect in the contract, since by such a provision prospective bidders have knowledge of the length of the day for their work and may figure accordingly. No man, of a right, gets a contract from the State, and every one may bid or refrain from so doing at his option, and the State, just as an individual, may say how many hours shall constitute a day's work. This is the prevailing doctrine, but in *City of Cleveland vs. Clements Brothers Construction Company*, the Supreme Court

of Ohio (65 Northwestern Reporter, p. 885) declares a law, even though it contains a provision for an eight-hour clause in the contract, unconstitutional, since it tends to impair the obligation of contracts.

The Supreme Court of the United States has set the whole matter at rest, however, in *Atkins vs. State*, appealed from a decision of the Supreme Court of Kansas. Justice Harlan says: "Whatever may have been the motives controlling the enactment of the statute in question, we can imagine no possible ground to dispute the power of the State to declare that no one undertaking work *for it or for one of its municipal agencies* should permit or require an employé on such work to labor in excess of eight hours each day, and to inflict punishment upon those who are embraced by such regulations and yet disregard them. * * *" Fuller, C. J., Brewer, J., and Peckham, J., dissented from this opinion.

California's eight-hour law (Stats. of Cal. 1903, p. 119) provides that a clause should be in each contract for public work limiting the length of each working day to eight hours. As this is very similar to the Kansas provision, the decision of the United States Supreme Court noted above is in point, and its constitutionality can not be called in question.

Of very great interest to labor in general, and especially organized labor, are the decisions on boycotting, picketing, etc. "Government by injunction" has been condemned by many people, whether or not justly it is not our province to say. It is simply sought here to give the facts without any bias whatever.

In general terms, the doctrine concerning picketing and boycotting has been that so long as none but peaceable means were used and persuasion merely, without any attempt at intimidation, no injunction would issue. The decision as to whether or not picketing or boycotting could exist without a certain amount of intimidation has varied with the different courts. The decision in *Southern Railway vs. Machinists' Local Union No. 14, et al.*, U. S. Circuit Court for Western District of Tennessee (111 Federal Reporter, p. 49) seems to embody the general doctrine. Here it is held that it is the right of every man to work when he will, quit work when he will, and work for whom he will. There can be no injunction against peacefully procuring information nor unobjectionable social intercourse for the purpose of begging or entreating men not to work, but an injunction will stand against men thrusting themselves upon unwilling "seabs" to argue or against picketing for that purpose.

In *Otis Steel Company Limited vs. Local Union No. 218, of Cleveland, Ohio, of the Iron Molders' Union of North America, et al.*, U. S. Circuit Court for the Northern District of Ohio (110 Federal Reporter, p. 698), the court in issuing an injunction against picketing says in substance, that the injunction is issued to restrain unauthorized persons

from exercising a like function. Picketing, says the court, is a form of injunction issued by a body of men not qualified to issue it. The union in question has issued an injunction against the company that it shall not continue in operation and against the non-union men that they shall not continue working.

In *Frank et al. vs. Herold et al.*, Court of Chancery of New Jersey (52 Atlantic Reporter), the same rule is followed as in the two preceding cases. In addition to this a man's right to carry on his business without molestation is declared a property right, and any interference therewith, since it tends to alienate property without due process of law, must be enjoined.

The same tenor is observed in *U. S. vs. Haggerty et al.*, U. S. Circuit Court for Northern District of West Virginia (116 Federal Reporter, p. 510); *U. S. vs. Weber et al.*, U. S. Circuit Court for Western District of Virginia (114 Federal Reporter, p. 950); *Union Pacific R. R. Company vs. Ruef*, U. S. Circuit Court for the District of Nebraska (120 Federal Reporter, p. 102); *Allis Chambers Company vs. Reliable Lodge*, U. S. Circuit Court for the Northern District of Illinois (111 Federal Reporter, p. 264).

In *Marx & Haas Jeans Clothing Company vs. Watson et al.*, Supreme Court of Missouri (67 Southwestern Reporter, p. 391), an injunction against the printing of circulars aimed at the plaintiff is refused, on the ground that such an injunction would impair the liberty of the press and stop free speech. A man may say or print what he will, abiding by the consequences of his act. If he errs he will be punished, but it is outside the province of a court to decide that his acts will be wrong prior to their commission. The power to issue an injunction in cases of intimidation, threats of violence, or destruction of property, was not passed upon.

In *Walsh vs. Association of Master Plumbers of St. Louis et al.* (71 Southwestern Reporter, p. 455) a boycott was declared illegal, since it tended to a restraint of trade and illegally took away a man's property in his business.

In *Wabash Railroad vs. Hanrahan et al.* (121 Federal Reporter, p. 563), the United States Circuit Court for the Eastern District of Missouri held that an association of men such as the Brotherhood of Locomotive Firemen or the Brotherhood of Railway Trainmen, banded together to better the condition of the individual members, does not form a conspiracy in restraint of trade, even though they threaten a strike, and in their efforts to get an increase of wages they endeavor to persuade the employés of the railroad to strike. An opinion of Judge Taft in *Thomas vs. Cincinnati, N. O. & T. P. Ry. Co.* (62 Federal Reporter, p. 803) is cited where the court uses this language: "It is of benefit to them and to the public that laborers should unite in

their common interest and for lawful purposes. They have labor to sell. If they stand together they are often able, all of them, to command better prices for their labor than when dealing singly with rich employers, because the necessities of the single employé may compel him to accept any terms offered him. * * * They may unite with other unions. The officers they appoint, or any other person to whom they choose to listen, may advise them as to the proper course to be taken by them in regard to their employment, or, if they choose to repose such authority in any one, he may order them, on pain of expulsion from their union, peacefully to leave the employ of their employer because any of the terms of their employment are unsatisfactory.”

The same rule is laid down by Judge, now Mr. Justice, Holmes in *Vegeahn vs. Guntner* (44 Northeastern Reporter, p. 1077).

Concerning the right of a majority of a union to force those in the minority to strike against their will, Judge Adams, in the main decision under consideration (*Wabash Railroad Company vs. Hanrahan et al.*), holds that this right is the same right as that exercised by the majority in any body politic. The rule of the majority is followed in our national life. It is assuming too much for a court to take away this right by injunction.

In *Erdman et al. vs. Mitchell et al.* (56 Atlantic Reporter, p. 327) it is held that while it is lawful for any man or set of men to decline to work in company with any man or set of men, yet it is not lawful to require the employer to discharge these men, and such action is intimidation on the part of an individual and conspiracy on the part of a number of individuals.

In the light of the decisions herein noted, it becomes plain that the legality of the boycott, or picketing, depends largely upon the attendant circumstances. Force or violence always renders them unlawful. These are not necessarily attendant, however, and the employer can not condemn the picketing, etc., in itself on account of these extraneous circumstances. The courts have differed as to whether or not the boycott in itself is a form of coercion; whether or not the mere existence of such a state of affairs does not tend to intimidation and conspiracy to injure the business of an individual. The decision in each case of this matter of fact has depended upon attendant circumstances as viewed by the judge.

In point here will be the decision of Judge Hunt, of the Superior Court, on the California Anti-Injunction Act (Stats. of Cal. 1903, p.289), in the case of *E. G. Pierce vs. Stablemen's Union, Local No. 8760*. An appeal has been taken from the decision to the Supreme Court. The Act is here declared unconstitutional, in that it is special legislation and takes away from the Superior Court its equity juris-

diction. Whether or not a "boycott" is, in itself, illegal is not decided, although the court says that it is generally so held.

On November 21, 1904, however, Judge Hebbard, of the Superior Court of San Francisco, rendered a decision which adopts the doctrine that the boycott *in itself* is a breach of the peace. The opinion was delivered in the case of *Goldberg, Bowen & Co. vs. Stablemen's Union, No. 8760*, and contains the following language: "To proclaim a business or the proprietors thereof 'unfair' in this manner is as infamous as to proclaim before a private dwelling that the inmates thereof are prostitutes. The acts complained of are breaches of the peace, and it is safe to say that if met by personal violence on the part of the one boycotted did he so elect, instead of appealing to the law, he would be justified by a jury under his constitutional right of self-defense. It is the opinion of the court that no man or woman, nor any number of either, may promenade before the place of business of the plaintiff, or any other person, bearing any sign, placard, transparency, or written or printed notice of any kind whatever, reflecting on the honesty, or integrity, or fairness of the business itself, or the proprietors thereof."

FINANCIAL STATEMENT.

FOR THE FIFTY-FOURTH FISCAL YEAR ENDING JUNE 30, 1903, AND FOR
THE FIFTY-FIFTH FISCAL YEAR ENDING JUNE 30, 1904.

FIFTY-FOURTH FISCAL YEAR.

APPROPRIATIONS.

Salary of Commissioner	\$3,000 00
Salary of Deputy Commissioner	1,800 00
Salaries of Special Agents, and contingent and traveling expenses	2,500 00
Printing.....	625 00
Office rent.....	600 00
Balance brought forward from contingent fund, fifty-third fiscal year.....	24 34
Balance brought forward from printing fund, fifty-third fiscal year	625 00
	<u>\$9,174 34</u>

DISBURSEMENTS.

Salary of Commissioner	\$3,000 00
Salary of Deputy Commissioner	1,800 00
Salaries of Special Agents	2,165 15
	<u>\$6,965 15</u>
Contingent expenses.....	235 68
Traveling expenses	117 30
Office rent.....	600 00
	<u>\$7,918 13</u>
Printing Biennial Report for the fifty-second and fifty-third fiscal years.....	1,250 00
	<u>\$9,168 13</u>
 Total appropriations	 <u>\$9,174 34</u>
Total disbursements.....	<u>9,168 13</u>
 Unexpended balance, June 30, 1903.....	 <u>\$6 21</u>

SALARY ACCOUNT ITEMIZED.

F. V. Meyers, Commissioner, July 1, 1902, to July 1, 1903	\$3,000 00
J. D. Kelsey, Deputy Commissioner, July 1, 1902, to July 1, 1903.	1,800 00
E. L. Reguin, Special Agent, July 1, 1902, to July 1, 1903	1,200 00
L. Brosnan, Special Agent, July 1, 1902, to February 6, 1903	432 00
W. P. Day, Special Agent, July 1, 1902, to July 1, 1903.....	302 87
K. Zwicker, Special Agent, July 1, 1902, to July 1, 1903	202 28
W. Macarthur, Special Agent, during October, 1902.....	28 00
	<u>\$6,965 15</u>

OFFICE RENT ACCOUNT ITEMIZED.

Rent from July 1, 1902, to July 1, 1903, at \$50 per month	\$600 00
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CONTINGENT EXPENSE ACCOUNT ITEMIZED.

Telephone	\$96 45
Postage	101 40
Stationery	18 70
Miscellaneous	10 13
Mercantile Towel Company	9 00
	<u>\$235 68</u>

TRAVELING EXPENSE ACCOUNT ITEMIZED.

1902.	
July —E. L. Reguin, Special Agent, carfare	\$2 10
J. D. Kelsey, Deputy Commissioner, carfare	1 90
Aug. —E. L. Reguin, Special Agent, carfare	2 55
J. D. Kelsey, Deputy Commissioner, carfare	2 65
Sept. —E. L. Reguin, Special Agent, carfare	2 30
J. D. Kelsey, Deputy Commissioner, carfare	1 10
Oct. —E. L. Reguin, Special Agent, carfare	2 90
J. D. Kelsey, Deputy Commissioner, carfare	95
Nov. —E. L. Reguin, Special Agent, carfare	1 40
J. D. Kelsey, Deputy Commissioner, carfare	1 55
Dec. —E. L. Reguin, Special Agent, carfare	1 90
J. D. Kelsey, Deputy Commissioner, carfare	1 30
F. V. Meyers, Commissioner, traveling expenses	12 90
1903.	
Jan. —E. L. Reguin, Special Agent, carfare	1 10
J. D. Kelsey, Deputy Commissioner, traveling expenses	8 20
F. V. Meyers, Commissioner, traveling expenses	7 50
W. P. Day, Special Agent, carfare	45
Feb. —E. L. Reguin, Special Agent, carfare	2 60
J. D. Kelsey, Deputy Commissioner, traveling expenses	23 20
F. V. Meyers, Commissioner, traveling expenses	18 35
Mar. —E. L. Reguin, Special Agent, carfare	2 20
J. D. Kelsey, Deputy Commissioner, carfare	80
F. V. Meyers, Commissioner, traveling expenses	11 00
April —F. L. Reguin, Special Agent, carfare	1 80
J. D. Kelsey, Deputy Commissioner, carfare	95
May —E. L. Reguin, Special Agent, carfare	1 20
J. D. Kelsey, Deputy Commissioner, carfare	1 00
June —E. L. Reguin, Special Agent, carfare	90
J. D. Kelsey, Deputy Commissioner, carfare	55
	<u>\$117 30</u>

FIFTY-FIFTH FISCAL YEAR.

APPROPRIATIONS.

Salary of Commissioner	\$3,000 00
Salary of Deputy Commissioner	1,800 00
Salaries of Special Agents and traveling and contingent expenses	2,500 00
Printing	625 00
Office rent	600 00
	<u>\$8,525 00</u>

DISBURSEMENTS.

Salary of Commissioner.....	\$3,000 00
Salary of Deputy Commissioner.....	1,800 00
Salaries of Special Agents.....	2,051 75
Contingent expenses.....	169 25
Traveling expenses.....	30 85
Office rent.....	600 00
	<hr/>
	\$7,651 85
Printing (unexpended*).....	625 00
	<hr/>
	\$8,276 85
	<hr/>
Total appropriations.....	\$8,525 00
Total disbursements.....	8,276 85
	<hr/>
Balance unexpended June 30, 1904.....	\$248 15

SALARY ACCOUNT ITEMIZED.

F. V. Meyers, Commissioner, July 1, 1903, to July 1, 1904.....	\$3,000 00
J. D. Kelsey, Deputy Commissioner, July 1, 1903, to July 1, 1904.....	1,800 00
E. L. Reguin, Special Agent, July 1, 1903, to April 26, 1904.....	986 65
K. Zwicker, Special Agent, July 1, 1903, to July 1, 1904.....	657 10
W. P. Day, Special Agent, July 1, 1903, to July 1, 1904.....	408 00
	<hr/>
	\$6,812 75

OFFICE RENT ACCOUNT ITEMIZED.

Rent from July 1, 1903, to July 1, 1904, at \$50 per month.....	\$600 00
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TRAVELING EXPENSE ACCOUNT ITEMIZED.

1903.	
July—E. L. Reguin, Special Agent, carfare.....	\$1 10
Sept.—E. L. Reguin, Special Agent, carfare.....	2 70
J. D. Kelsey, Deputy Commissioner, carfare.....	1 00
Oct.—E. L. Reguin, Special Agent, carfare.....	1 10
J. D. Kelsey, Deputy Commissioner, carfare.....	1 60
Nov.—E. L. Reguin, Special Agent, carfare.....	1 70
F. V. Meyers, Commissioner, traveling expenses.....	6 00
Dec.—E. L. Reguin, Special Agent, carfare.....	80
1904.	
Jan.—E. L. Reguin, Special Agent, carfare.....	90
Feb.—E. L. Reguin, Special Agent, carfare.....	2 90
J. D. Kelsey, Deputy Commissioner, carfare.....	1 40
W. P. Day, Special Agent, carfare.....	90
Mar.—E. L. Reguin, Special Agent, carfare.....	1 70
Apr.—J. D. Kelsey, Deputy Commissioner, carfare.....	1 25
E. L. Reguin, Special Agent, carfare.....	2 40
May—J. D. Kelsey, Deputy Commissioner, carfare.....	1 90
June—J. D. Kelsey, Deputy Commissioner, carfare.....	1 50
	<hr/>
	\$30 85

CONTINGENT EXPENSE ACCOUNT ITEMIZED.

Telephone.....	\$93 65
Postage.....	35 50
Stationery.....	4 00
Miscellaneous.....	27 10
Mercantile Towel Company.....	9 00
	<hr/>
	\$169 25

*To be expended immediately, together with appropriation for fifty-sixth fiscal year, in printing this report.

In compliance with the law directing the submission of a statement covering the expenditure of funds appropriated by the State for the maintenance of the Bureau, the foregoing is herewith presented.

The full amount appropriated for salaries of the Commissioner and Deputy Commissioner and office rent during the fifty-fourth and fifty-fifth fiscal years has been expended.

On July 1, 1903, there was an unexpended balance of \$6.21 from the amount allotted to the salaries of special agents and traveling and contingent expenses, which, according to law, reverted to the State Treasury.

The amount of \$1,250 now on hand for printing will, no doubt, be wholly insufficient for the printing of this present biennial report, entirely aside from other supplies necessary.

On July 1, 1904, the sum of \$248.15 remained unexpended from the fund of \$2,500, which was duly carried forward to credit of said fund for the fifty-sixth fiscal year. This amount remained owing to the fact of Special Agent E. L. Reguin's resignation and the vacancy not having been filled until after the end of the fiscal year.



BIENNIAL REPORT

OF THE

DEPARTMENT OF HIGHWAYS

OF THE

STATE OF CALIFORNIA.

DECEMBER, 1904.

N. ELLERY, - - - COMMISSIONER.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT STATE PRINTING.

1905

STATE CAPITOL, SACRAMENTO, CALIFORNIA,
DEPARTMENT OF HIGHWAYS,
November 28, 1904.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California:

SIR: I herewith submit for your consideration the work of the Department of Highways, covering the period from November 1, 1902, to November 1, 1904, as provided for in Chapter CCLXXII of Statutes and Amendments, 1897; and, appended thereto, the Report of the Lake Tahoe Wagon Road Commissioner.

Very respectfully,

N. ELLERY,
Highway Commissioner.

Attest: CLARK ALBERTI, Secretary.

REPORT OF THE DEPARTMENT OF HIGHWAYS.

During the past two years, there has been an augmented activity by the various counties of the State in the improvement of the county roads. The use of cheap asphaltic oil has, no doubt, greatly assisted in this work, and has considerably improved over 2,000 miles of the 45,000 miles of the roads within California. Through the impetus given the good-roads movement by the application of crude oil to road surfaces, there has been developed a strong desire to construct more permanent roads than we now possess. This partially sprang from the apparent necessity for such in connection with the oiled roads. However, their construction quite often was incomplete. The many diversified opinions without consideration of the fundamental road principles have led to many diversified results; and in some instances where individual interest guided the work, excellent roads were obtained, while a considerable mileage was benefited only in so far as the dust was laid, allowing the road in winter to become decidedly bad and incapable of facilitating heavy hauling.

Information received by this Department concerning oiled roads, and personal observation of the numerous examples, clearly indicate a lack of systematic work. Such defects as are apparent not only exist in oiled roads, but generally pervade our whole system of road-making. Thus while we have bettered some of our roads, we still fall far below the standard of efficiency that should obtain, and practically remain in the same condition in which our application of road affairs has hitherto placed us.

From the figures taken from the records of the counties of this State, the road expenditures have increased, until now the total for the fiscal years 1902-03 and 1903-04 is \$4,310,921—an increase of \$543,883 over the prior two fiscal years. The expenditure of \$2,000,000 per annum for highway work should of itself attract attention enough to make certain the solution of the problem of good substantial roads for our communities, but it is to be regretted such has not been the case up to the present time. Since railroads have been constructed into nearly all sections of the State and are doing the larger share of the business of the main common roads, the opinion prevails among many that the principal function of the road should be but a feeder to the railroad. It is the fact that the short line of road leading from the interior to the

nearest railway station is a very important factor to the farming interest, and should be developed to its highest efficiency; but from this it does not follow that the improvement of our main roads would not be a vast saving to the State. These long stretches of principal highways, if made good, contribute their part toward the reduction of transportation rates just as the improvement of the waterways brings such rates, in competition, to a reasonable basis which can be maintained. And further, the main roads do and will exist for the pleasure, communication, and business of the whole people; and while the counties are endeavoring to keep them in shape, why not introduce a system of economy in the expenditure that will place them in condition for an extension of the present uses and eventually reduce road taxation? The remedy is apparent. This branch of our public service should be placed on a definite and systematic plan, obtained through changes in our present laws sufficient to develop a keen interest of the public for substantial roads.

The more progressive Eastern States had a similar experience to ours, and eventually overcame it by the passage of State-aid laws. The plan has worked admirably and has given the relief sought. These laws have created a strong favorable public interest, and have resulted in the building of excellent and economic roads, which in time will prove the wisdom of their enactment in reducing the road tax to a minimum as soon as the period of construction ends. The problem of good roads is practically solved, and those States are spending millions of dollars in construction work. Therefore, after their practical experience and success, California is able to approach the plan with assurance, and in consequence the following law, closely resembling the New York aid law, is recommended for enactment:

AN ACT TO PROVIDE FOR THE IMPROVEMENT OF THE PUBLIC HIGHWAYS, AND TO MAKE AN APPROPRIATION THEREFOR.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Board of Supervisors in any county of the State may, and upon presentation of a petition as provided in section two hereof must, pass a resolution that public interest demands the improvement of any public highway, or section thereof, situate within such county, and described in such resolution; but such description shall not include any portion of a highway within the boundaries of any city or incorporated village; and within ten days after the passage of such a resolution shall transmit a certified copy thereof to the State Highway Commissioner.

SEC. 2. The owners of two thirds of the lineal feet fronting on any such public highway or section thereof in any county of the State may present to the Board of Supervisors of such county a petition setting forth that the petitioners are such owners and that they desire that such highway or section thereof be improved under the provisions of this Act.

SEC. 3. Such Highway Commissioner, upon receipt of such resolution, shall investigate and determine whether the highway or section thereof sought to be improved is of sufficient public importance to come within the purposes of this Act, taking into account the use, location, and value of such highway or section thereof for the pur-

poses of common traffic and travel, and after such investigation shall certify his approval or disapproval of such resolution. If he shall disapprove such resolution, he shall certify his reasons therefor to such Board of Supervisors.

SEC. 4. If he shall approve such resolution, such Highway Commissioner shall cause the highway or section thereof therein described to be mapped both in outline and profile. He shall indicate how much of such highway or section thereof may be improved by deviation from the existing lines whenever it shall be deemed of advantage to obtain a shorter or more direct road without lessening its usefulness or wherever such deviation is of advantage by reason of lessened gradients. He shall also cause plans and specifications of such highways or section thereof to be thus improved to be made for telford, macadam, or gravel roadway or other suitable construction, taking into consideration climate, soil, and materials to be had in the vicinity thereof and the extent and nature of the traffic likely to be upon such highway, specifying in his judgment the kind of road a wise economy demands. The improved or permanent roadway of all highways so improved shall not be less than eight feet nor more than sixteen feet in width, unless for special reasons to be stated by such Highway Commissioner it is required that it shall be a greater width. He shall if requested by the resolution include provision for steel-plate or other flat-rail construction in double track.

SEC. 5. Upon the completion of such maps, plans, and specifications such Highway Commissioner shall cause an estimate to be made of the cost of construction of the same and transmit the same to the Board of Supervisors from which such resolution proceeded, together with a certified copy of such maps, plans, specifications, and of his certificate of the approval of the highway or section thereof so designated as aforesaid.

SEC. 6. After the receipt thereof, upon a majority vote of such Board of Supervisors, it may adopt a resolution that such highway or section thereof so approved shall be constructed under the provisions of this Act, or of any existing Act, and thereupon shall transmit a certified copy of such resolution to such Highway Commissioner.

SEC. 7. In case the boundaries of such proposed highway shall deviate from the existing highway, the Board of Supervisors must make provisions for securing the requisite right of way prior to the actual commencement of the work of improvement.

SEC. 8. Upon receipt of the certified copy of the resolution provided in section six, such Highway Commissioner shall advertise for bids once a week for four successive weeks in a newspaper published at the county seat of such county and in one such other newspaper as shall be deemed of advantage for the construction of such highway or section thereof, according to such plans and specifications, and award such contract to the lowest responsible bidder, except that he may in his discretion award the contract to the Board of Supervisors in the county in which such highway lies, provided that they shall agree to do said work at a cost at least ten per cent less than the lowest bid received, and except that no contract shall be awarded at a greater sum than the estimate provided in section five. But if no bid otherwise acceptable be made within such estimate, such Highway Commissioner may amend his estimate, certify the same to the Board of Supervisors, and upon the adoption by it of a resolution as provided in section six based on such amended estimate, proceed anew to obtain bids and award the contract as herein provided. Such Highway Commissioner may reject any or all bids, and before entering into any contract for such construction he shall require a bond with sufficient sureties conditioned that if the proposal shall be accepted, the party thereto will perform the work upon the terms proposed and within the time prescribed and in accordance with the plans and specifications; and as a bond of indemnity against any direct or indirect damages that shall be suffered or claimed during the construction of such road, and until the same is accepted. The people of the State of California shall in no case be liable for any damages suffered. Partial payments may be provided for in the contract, and paid in the manner herein provided when certified to by such Highway Commissioner, to an amount not to exceed seventy-five per cent of the value of the work done; twenty-five per cent of the contract price shall be retained until the entire work has been accepted. Whenever a county engineer or surveyor has been appointed or elected in the county in which such highway or section thereof is to be constructed, he shall have general charge and supervision of the work under the direction of the Highway Commissioner, and shall report to him from time to time the progress of the work and such facts in relation thereto as may be required. If there is

no county engineer or surveyor, such Highway Commissioner shall have some competent person to superintend and have engineering supervision of the work.

SEC. 9. Two fifths of the expense of the construction thereof shall be paid by the State Treasurer upon the warrant of the Controller, issued upon the requisition of such Highway Commissioner, out of any specific appropriations made to carry out the provisions of this Act. And three fifths of the expense thereof shall be a county charge in the first instance, and the same shall be paid by the County Treasurer of the county in which such highway or section thereof is, upon the requisition of such engineer or surveyor; but the amounts so paid shall be apportioned by the Board of Supervisors, so that if the same has been built upon a resolution of said board without petition, forty per cent of the cost of construction shall be a general county charge, and twenty per cent shall be a charge upon the road district in which the improved highway or section thereof is located, and if the same has been built upon a resolution of said board after petition as provided in section two, forty per cent shall be a general county charge and twenty per cent shall be assessed upon and paid by the owners of the lands benefited in the proportion of the benefits accruing to said owners as determined by the County Assessor in the next section hereof.

SEC. 10. The Assessor of the county in which any highway or section thereof has been improved or constructed pursuant to petition as provided in section two of this Act, shall have power, and it shall be his duty upon receiving notice from the Board of Supervisors of the county of the cost of construction or improvement of such highway or section thereof in such road district, to assess an amount equal to twenty per cent of said total cost upon the lands fronting or abutting on such highway or section thereof. Such assessment shall be apportioned according to the benefits accruing to the owners of the lands so located, according to the best judgment of said Assessor, upon at least ten days' notice of the time and place of such apportionment to the persons affected thereby, and after such persons have had an opportunity to be heard, and the assessments so made when duly attested by the oath of such Assessor shall be collected in the same manner as the general taxes of such county are collected.

SEC. 11. The construction and improvement of highways and sections thereof, under the provisions of this Act, shall be taken up and carried forward in the order in which they are finally designated, as determined by the date of the receipt in each case of the certified copy of the resolution provided in section six by such Highway Commissioner as hereinbefore provided.

SEC. 12. Upon the completion of such highways or sections thereof so constructed by such Highway Commissioner and his acceptance of the same and after payment has been made as herein provided, such Highway Commissioner shall inform the Board of Supervisors of such counties that the highways or sections thereof designated have been constructed as herein provided; and he may serve notice on said board to accept such highway thus constructed, which notice shall be filed in the office of the clerk of such county; and twenty days after service and filing of said notice, such highway or section thereof shall be deemed accepted by said Board of Supervisors of said county; and thereafter they shall maintain the same as a county road and apportion the expense as they may be empowered by law. The county wherein such improved highways lie shall care for and keep the same in repair under the direction and supervision of the State Highway Commissioner, and such rules and regulations as he may prescribe. Should the county fail to comply with said rules and regulations, then such Highway Commissioner shall cause the maintenance work to be done, and the cost of the same shall be a county charge, paid for in the same manner as for other county roads.

SEC. 13. Whenever any county has had aid in building any such highway, and it seems advantageous to such Highway Commissioner that a section or sections of highway, not exceeding one mile in length, shall be constructed under this Act to connect these roads together, and would be a great public utility and general convenience, he may serve notice on the Board of Supervisors of such county, and shall file one in the County Clerk's office, designating the highway already constructed and the existing termini, and the section or sections, in his opinion, necessary to be constructed and the reasons therefor. And it shall be the duty of the Board of Supervisors to provide for the construction of such connecting highway or section thereof, within one year after the service and filing of such notice. The procedure for such work shall be in accordance with the provisions of this Act.

SEC. 14. There is hereby appropriated out of any money in the State Treasury not otherwise appropriated, the sum of seventy-five thousand dollars to carry into effect the provisions of this Act.

SEC. 15. The operation of this Act shall not be affected by any conflicting Act or conflicting part of any Act wherever the same may now exist, and the highways may be improved under this Act or any existing Act relating to roads.

SEC. 16. This Act shall take effect immediately.

MOUNTAIN ROADS.

The travel incumbent on the Commissioner of this Department in pursuance of his duties and inspection and survey of the State roads has led to a study of the various county roads traversed. In nearly every instance these roads are of excessive grades and not of sufficient width for their purpose. No doubt the ups and downs in the grade could be remedied and thereby give a general reduction in the total elevation. Wherever teams are required to pass each other on narrow stretches of road a sufficient number of turnouts should be made to facilitate travel and to lessen the danger from accident. One remarkable feature of these mountain roads is, where the bed is cut through rocky ground and the winter storms wash away the earth from the rocks in the bed, there is a general tendency to blast or dig out such rocks, thereby creating only a canal for a repetition of the same thing the following season and again a lowering of the roadbed. The proper method certainly is to fill the gullied-out bed to its original surface, and should any rock tend to protrude from the surface, if large, blast the top of it off; if small and loose and near the surface, then remove. Another important item in the maintenance of mountain roads on sidehills is the removal of the surface rocks rolled into the road. They should never, as has been the partial practice, be removed and placed on the upper side of the road, but always on the lower side, where they will not again require handling and expense. If the proper drainage is had by use of more culverts than is the custom, the erosion of the bed can be greatly reduced, thus making the spring opening expense materially less. Care should be taken on the heavier grades where the erosive power of water is great, to have them protected from the surface run-off of water. During the spring of the year when the road is receiving repairs and the fallen trees are being removed, always have the tree trunks cut far enough back to prevent interference with teams, making the cut liberal and avoiding all narrow passages between logs, and always using the utmost care in the repair of the drains so that the water may be kept from both the road foundation and the surface.

In several of the counties of the State their valuation will not permit of any extended road work. Therefore, in such cases the State should grant material assistance, that their development and that of adjoining counties may go on unhampered.

OILED ROADS.

The production in California of oil with an asphalt base has given us a means of cheaply and satisfactorily improving a considerable mileage of our roads. For the past four years its application has gone on with varying results in accordance with the means of construction employed. Close study of the successful and unsuccessful oiled roads of the State leads us to certain deductions which we must carefully regard if we are to make the progress this process offers.

Numerous instances exist where the oil was applied to a road without any previous preparation, with the result that the dust was laid, but very little other improvement occurred. Again, wherever due care in the constructive work was exercised, and an interest taken, we find some excellent results of a permanent nature. With the earnest desire to bring road-oiling and work incident thereto to its proper place, the following suggestions are made:

Foundation.—No road which has been constructed without a proper foundation will ever be wholly successful. If a macadam road is being built, give thorough attention to the details of its base so that its capacity to resist the pressure from above is sufficient, and keep the density of the work as uniform as possible, so that weak spots or ruts may be reduced to a minimum. This applies equally to an earth road. Compact, as much as practicable, the roadbed, keeping always in mind that a smooth, even foundation makes a smooth, even surface. The neglect of the foregoing stamps the work as incomplete and without good road value.

Drains and Ditches.—Whatever be the kind of road, it should be well drained and ditched, so that the sub-grade will be as free from water as can well be made. In low, damp ground the roadbed should be raised high enough to prevent a saturated base; and on the roadside should be good, deep ditches conducting the water away from the road. With the oiled road the drainage should be such as to keep the water from getting under the oiled surface and creating a disagreeable oiled mud during the wet season. Experience with a number of oiled roads has proven this conclusively.

Surfacing.—The top layer should be worked down as perfectly as the means will permit. With the earth road heavy rolling can not be overdone. Saturate the road material with water, but not excessively; practice will soon determine how much should be used. In the damp winter climate of central and northern California, it is well to give a good heavy crown that the rain may be readily shed and thereby allow no chance for percolation to the sub-grade. Preparatory to the oiling, the surface should be dried out to a depth of at least two inches,

for oil will not mix with a wet material. Do not allow teams to pass over a road thus prepared and break the surface irregularly, but loosen evenly just enough of the road surface to allow for the absorption and retention of the oil, otherwise it would run to the sides of the road.

Oiling.—The application should be by means of an oil wagon, which may be operated at will in spreading quantities necessary to a proper coating on the particular road being worked. There are several makes of good oil wagons on the market, any of which, properly handled, will do good work. However, the fact should not be overlooked that extra broad tires for such wagons are the best. After spreading the oil, cover it with a material to give it body. Sand has been preferably used for this purpose, because it is a natural absorbent of oil. Vary the application of sand just enough to cause the mass to be consistent, and allow no places where the oil stands free in small puddles. When this is accomplished, then should the road be rolled, beginning lightly at first and continuing heavier as the mass becomes compacted, until there is no perceptible yielding. Now keep off the travel, if possible, until the oiled material has been allowed to set, and develop all of its asphalt qualities.

In the matter of whether hot or cold oil should be applied it may be said good oiled roads have been obtained by either process; but as cold oil is considerably cheaper, my preference is by all means for cold oil. The claim that hot oil penetrates faster and deeper than cold oil is, perhaps, not without some truth, yet as it takes some time after application for the asphaltic qualities of the oil to be asserted, there is no particular advantage gained, and with the present sanding method the cold oil is absorbed sufficiently for practical purposes.

The selection of the oil is a matter of vital importance. Always seek that quality which contains the highest percentage of asphalt. The proper plan is to have a test for asphalt made to ascertain the amount of such substance when the oil becomes dry. For this purpose herewith is given an excellent test and a table of results compiled by the State Mining Bureau:

Test.—“Probably the best, certainly the simplest, test of the road-making value of an oil is to evaporate a weighed sample in an open metal dish, down to the hardness of commercial ‘D’ asphalt, and weigh the residue. We thus get at once both the original asphalt and that formed during evaporation, and while it is not likely that the percentage of asphalt thus obtained is the same as would be gotten by allowing the oil to dry in the sun, yet is highly probable that the comparison between different oils thus made is accurate. This test requires no apparatus except an iron or copper pan, a scale, and a plumber’s fire-pot, though it must be admitted that the even grading of the asphalt requires care and a little skill.”

Comparison of Road-Making Value of Crude Oils.

Sample No.	Source.	Gravity.	Asphalt*	Sample No.	Source.	Gravity.	Asphalt*
		<i>deg. Be.</i>	<i>per cent.</i>			<i>deg. Be.</i>	<i>per cent.</i>
1464	Colorado	41.3	None.	2452	Coalinga	18.7	24.7
1400	Canada	34.9	None.	2432	Sargents	18.6	41.3
1407	Coalinga	33.3	Trace.	2462	Newhall	17.2	28.9
2441	Fullerton	33.0	19.1	2437	Midway	17.1	40.5
2438	Fullerton	32.8	20.4	487	Kern River	17.0	25.0
2402	Kansas	31.4	None.	2445	Fullerton	15.9	45.9
2426	Puente	28.0	26.1	2453	Coalinga	15.9	35.5
2442	Ventura	28.0	29.5	2463	Los Angeles	15.7	25.7
2433	Ventura	26.8	13.1	2440	Coalinga	15.7	30.4
495	Wyoming	23.7	33.7	2444	McKittrick	15.1	27.8
2424	Fullerton	23.3	36.5	2496	Kern River	14.3	48.5
2448	Whittier	23.1	23.3	1432	Sunset	14.1	29.2
494	Beaumont, Tex.	22.6	11.0	2454	Newhall	13.9	52.4
1421	Coalinga	21.2	25.0	2495	Los Angeles	13.0	42.2
2450	Whittier	20.4	30.2	2405	Coalinga	11.9	33.2
1482	Midway	20.2	22.0	486	Sunset	9.9	61.8
1403	McKittrick	18.9	22.6	2400	Santa Barbara	9.0	85.5

*The figures in these columns are considered to be accurate to within three per cent.

Through the proper handling and making of oiled roads there undoubtedly will be developed new ways of utilizing oil for this purpose. My belief is that eventually we will have artificially bituminized roads made from crude oil, and perhaps, in the case of macadam roads, the top layer or metaling may be mixed with oil of heavy asphalt percentage, resulting in a sort of bituminous pavement, which should make a first-class road in every particular.

LAKE TAHOE WAGON ROAD.

It has been the purpose of this Department to advise with the Commissioner of the Lake Tahoe Wagon Road on all matters pertaining to any engineering work thereon or in any matter affecting the betterment of the road. In consequence of this, and an undefined general supervision by this Department and the powers given the State Commissioner by the Act of 1903 relating to the care, management, and protection of State roads, I have assisted in the work of the road and have made trips of inspection over it.

From an appropriation made in 1899 by the Legislature for the improvement of the road and the structures thereon, and to make a survey thereof, the then State Commissioner of this department began, on September 27, 1900, a survey of the Lake Tahoe Wagon Road and continued the same until inclement weather prevented further work that year. The survey having extended over 25 miles of the 60 miles of the road, could not be completed the following year on account of the expenditure of the money appropriated, and therefore the work stands incomplete at this date. Of the work done, all crossings, topographical features, widths of road, grades, and future permanent survey monuments were marked and set. For the purpose of marking the

total survey, milestones cut of granite at Folsom, of the size 18 inches wide, 6 inches thick, and 54 inches long, and indicating the distance to Placerville, were delivered at Riverton; but with the exception of the first twenty-five, which now represent the survey as far as completed, have not been erected. Without further delay the remaining 33 miles of the road should be surveyed and the thirty-three milestones should be located and set.

For this purpose, I therefore again recommend an appropriation of \$2,000 to be expended under the direction of this Department.

Upon traversing the road during the past two years, my examinations clearly revealed the facts that the maintenance fund of \$4,000 per annum is insufficient to meet the new constructive work to be done. Several small bridges are in a tumbledown shape; stone walling, long ago built insecurely upon, in a number of instances, logs or very poor foundation, have fallen down; numerous old decayed wooden culverts must be replaced, and fills in gullies where brush and logs temporarily served the purpose must now be dug out and be properly rebuilt.

All the permanent work in the culverts and fills that could be done from the money available out of the maintenance fund after grading the road and making the necessary repairs to culverts, bridges, and ditching, was made with either stone or salt-glazed vitrified pipe.

There are ten small bridges which should be replaced with either stone or concrete, two of which—the Trout Creek bridge between the State line and Myer's station, which is a 30-foot span, and a 20-foot span bridge about three miles west of Riverton—are in such bad condition as to require their replacement next summer. Besides this work there are about eighty culverts which need rebuilding, and a considerable length of stone retaining wall at various places along the road should be made.

For the construction of permanent work in culverts, bridges, walls, and large fills, it is recommended that an appropriation of \$15,000 be made, and the expenditure of the same be placed under the control of this Department.

On April 17, 1903, I examined the road as far as Riverton, and made suggestions for the repair of some small bridges, and on September of the same year inspected the summer work on the whole length of road. The office of the Lake Tahoe Wagon Road Commissioner having become vacant in November, 1903, by the death of Mr. S. J. Baker, I assumed charge of the road, disbursed claims to the amount of \$661.85 incurred by him, and collected all papers appertaining to the road, which I turned over to his successor in office, Mr. A. S. Lyon. During 1904 I made two trips over the road—one in June in company with Mr. Lyon, the Commissioner, at which time the summer work was outlined, and one in September viewing the work done.

On April 9, 1904, the El Dorado Lumber Company, a corporation doing business in El Dorado County, made application to this office to construct and maintain a broad-gauge railroad across the Lake Tahoe Wagon Road at a point just above its beginning near Smith's Flat. They filed a map of the location, and after inspection of the point of crossing, the application was granted upon and under rules and restrictions regarding the maintenance of said road by the company at such point, of crossing.

Under the present law, the Commissioner of the Lake Tahoe Wagon Road has direct charge of the road and the expenditure of the maintenance appropriation, thus dividing the State road business in an unsystematical and uneconomical manner. Believing the work could be more advantageously done if directly under the supervision of the Department of Highways, the following law is recommended:

AN ACT TO PLACE THE LAKE TAHOE WAGON ROAD UNDER THE CARE, CONTROL, AND MANAGEMENT AND SUPERVISION OF THE DEPARTMENT OF HIGHWAYS OF THE STATE OF CALIFORNIA; TO PROVIDE FOR NECESSARY ALTERATIONS AND EXTENSIONS OF SAID ROAD, AND THE REPAIR AND CONSTRUCTION OF THE ROAD STRUCTURES THEREON, AND MAKING AN APPROPRIATION THEREFOR.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. On and after the thirtieth day of June, A. D. nineteen hundred and five, the Department of Highways, State of California, shall have the care, control, management, and supervision of that certain wagon road belonging to the State of California known as the "Lake Tahoe Wagon Road," and situated in the county of El Dorado, in said State, commencing at the junction of the said road with the Placerville and Newton road, a short distance from the village of Smith's Flat, in said county of El Dorado, and running thence to a point on the east boundary line of said State at or near Lake Tahoe.

SEC. 2. It shall be the duty of the Department of Highways to keep said road, and the bridges and culverts thereon, open to travel at all times, except when prevented by the severity of the elements. It shall repair and rebuild said road, or any of the structures thereon, when in its judgment necessary and there are funds provided therefor. The Department of Highways may alter or change the route of said road, and may and shall do all things necessary or proper to care for, manage, maintain, improve, protect, alter, or extend said road, together with its road structures, and in so doing said Department of Highways is authorized to appoint a superintendent and employ assistance, and to procure all material and property, real and personal, in its judgment necessary therefor.

SEC. 3. For the purpose of carrying out the provisions of this Act, and for the repair and reconstruction of defective road structures, where economic and necessary on said road, and for any necessary engineering expenses, the sum of fifteen thousand dollars (\$15,000) is hereby appropriated out of any money in the State Treasury not otherwise appropriated, and the State Controller is hereby directed to draw his warrant from time to time, and in such sums as shall be due on claims presented and approved by the Department of Highways. Said warrant shall be made payable to the Highway Commissioner, and the State Treasurer is hereby directed to pay said warrant, and the Highway Commissioner shall disburse the same.

SEC. 4. All Acts or parts of Acts in conflict with the provisions of this Act are hereby repealed.

SEC. 5. This Act shall take effect and be in force from and after June thirtieth, nineteen hundred and five.

THE SONORA-MONO ROAD.

When the Legislature of 1901 made that part of the Sonora and Mono toll road, extending between Long Barn and Bridgeport, a State highway, it made no appropriation for the maintenance or improvement of the same.

For two years, while under State control, it was therefore subjected to the weather with scarcely any work being done. This, in conjunction with the fact that the road had completely run down and had become almost impassable at the time it came under the charge of this Department, made its repair most difficult and expensive. The bridges, culverts, ditches, fills, and roadbed were in a most deplorable condition.

In 1903 an appropriation of \$2,000 per annum for the maintenance of 78 miles of mountain road with heavy grades and in extraordinary bad condition, was wholly too small and nothing could be done but scratch over the surface of the roadbed in an endeavor to allow teams to pass. A considerable part of this money was applied to three bridges which were entirely unsafe for travel—the Eagle Creek bridge, Long bridge, and the Stanislaus bridge. The remainder was spent in filling over the 24 miles of rocky bed, cleaning out and diverting ditches, some very necessary culvert work, cutting out fallen timber, grading out the one mile of lava roadbed at Bald Mountain, and general patch-work.

Three heavy thunder-storms during the past year completely washed out the road in two places, and thus necessitated the expenditure of about \$400 in repair. After this work was finished, I traversed, September 11–12, 1904, the whole length of road and found the same in fair condition, considering the small amount of money available for expenditure. The Eagle Creek bridge is now substantial; the Stanislaus bridge was repaired, but can not more than survive this winter; and Long bridge, which was left to decay, has a temporary roadbed constructed for 450 feet on the sidehill around it. The 24 miles of rocky roadbed is much smoother than at any time since the State took control and the drainage has been greatly improved.

The road from Bridgeport, Mono County, to the junction where the Sonora road leaves the Antelope Valley road is built almost entirely in soil with scarcely any rock, which can be easily handled or worked with plow and grader. In the seventeen miles of this section there are few steep pitches or grades but what may be greatly reduced by a change of road line. From Bridgeport westward for about 2½ miles the road is over flat meadow land very low and wet, which will require a heavy crown to prevent washing from the high waters of spring. This division of the total road can be made very good without a very heavy expenditure, and should receive proper attention, for it is a part of the

main road to Carson Valley and is traveled as much as any road in that section of California. From Junction in a westerly direction, the road extends 13 miles to the western boundary of Mono County at the summit of the Sierra Nevada Mountains and is principally over rough and rocky ground. The 30 miles of this road in Mono County will require the construction of one hundred and fifteen culverts and thirteen bridges; eleven of the latter are small structures, averaging perhaps fourteen feet in span, and two, the East Walker River span and the West Walker River span, are 70 feet and 40 feet respectively. Therefore, the estimate of this constructive work and of the grading and rock work is as follows:

<i>Estimate.</i>	
115 culverts, at \$25	\$2,875 00
11 small bridges, average 14 feet	6,000 00
2 bridges (fair size)	5,500 00
Grading	800 00
Rock work, 5 miles	2,000 00
Total for 30 miles	<u>\$17,175 00</u>

From the summit of the Sierra Nevada Mountains westerly to Baker's station, and from the foot of Patterson grade to Niagara Creek, the roadbed is composed of granite boulders. In addition to this, there are short stretches of boulders aggregating one mile in length, and also about $1\frac{1}{4}$ miles of exposed lava roadbed at Bald Mountain. Thus, out of a total length of 48 miles that traverses Tuolumne County, there are perhaps 19 miles over rough and rocky country, while the remaining 29 miles are through a timbered country with good soil. The number of bridges and culverts necessary on this section of road is as given in the following estimate:

<i>Estimate.</i>	
143 culverts, at \$25	\$3,575 00
15 small bridges, average 14 feet	8,250 00
Stanislaus bridge, 75 feet in span (must be built)	3,800 00
Eagle creek bridge, 35 feet in span	1,700 00
Rock work, 19 miles	7,000 00
Grading and ditching	2,000 00
Total for 48 miles	<u>\$26,325 00</u>

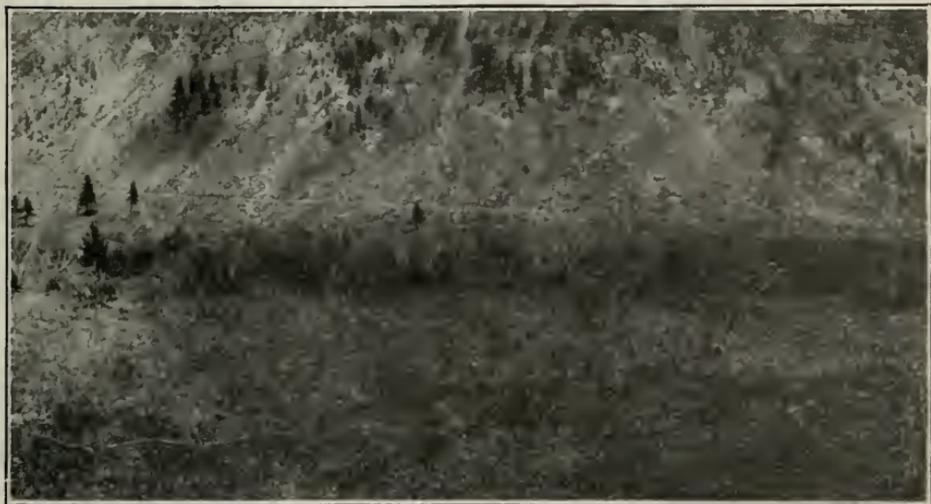
In view of my examinations and trips of inspection of the Sonora-Mono road work, it is recommended that \$25,000 be appropriated for the construction of culverts, bridges, and grading, \$5,000 of which be made available immediately; and also that the maintenance appropriation be increased to \$5,000 per annum.

MONO LAKE BASIN ROAD.

This road, which when completed will connect Mono county with the eastern extremity of the Tioga road and thus give that part of



SONORA AND MONO ROAD AT DEADMAN'S CREEK—SHOWING GRANITE FORMATION.



MONO LAKE BASIN ROAD. MAXIMUM GRADE OF 7 PER CENT ON THE PART CONSTRUCTED.

California east of the Sierra Nevada Mountains a direct outlet to the central part of the State, has now been constructed for 4 miles of its eastern part; and the remaining distance is under contract for completion August 20, 1905.

By the original survey in 1901, the total length of this connecting road was 9.25 miles, which was divided into two sections for contracting purposes. In 1902 the available money was not sufficient to construct over about one half, and accordingly a contract was made with Mr. James Touhey of Sacramento for the construction of 4 miles, 1,010 feet of the eastern end for \$14,000. During this year he worked over about $3\frac{1}{2}$ miles of the contracted length, but did not finish such mileage. On account of severe storms, Mr. Touhey was compelled to withdraw from Mono County and wait until the following spring. In 1903 he returned to complete the remaining work under his contract, but particularly worked the one mile untouched the preceding year. Upon notification the first part of September, 1903, by Mr. Touhey, of the completion of his contract, I visited and examined the work accomplished and found the same not in accordance with the specifications. After a careful calculation, I recommended the payment of \$2,500 for the work of 1903, and retained \$3,500 of the original contract price of \$14,000. In the spring of 1904 I requested Mr. Touhey to complete his work in accordance with agreement, but upon his failure to begin such work, I formally notified him that under the terms of the contract I would relieve him of further work and undertake to finish the 4 miles, 1,010 feet of road in strict compliance with the agreement. Accordingly, on August 7, 1904, I employed Mr. T. Silvester as foreman and directed him in the work to be done. At this date there was held by the State the retention money of \$3,500, and a cash bond of \$1,000 which was to be used if necessary. Mr. Silvester with a crew of men has, at this date, completed 3 miles of the contract work in a most satisfactory manner. Further work this year, however, has been suspended by reason of the snow encountered.

The Legislature of 1903 appropriated \$25,000 for the completion of this road (that is, the construction of the remaining 5 miles, 593 feet), but did not make the appropriation available until January 1, 1904. Through a desire and effort to come to some understanding with the owners of the Tioga road proper, regarding their non-resumption of the collection of toll, much time was lost without accomplishing anything. Therefore the work on the last 5 miles, 593 feet of the road was delayed until this fall, too late to begin operations at an altitude of 8,000 feet until the spring of 1905.

On August 20, 1904, advertisements for sealed bids for the completion of the Mono Lake Basin road were inserted in a Sacramento daily paper for one week, and three weekly insertions each in the Bodie Miner-Index

and the Bridgeport Chronicle-Union. On September 6, 1904, the final date set for bids, there was but one received. Mr. J. F. O'Brien of San Francisco agreed to construct the road for \$23,861, and accompanied his bid with a certified check in the sum of \$4,000 as a bond for the performance of the work. His proposal being in proper form and very close to the filed estimate in this office of \$24,345 for this work, a contract was entered into with him, which was filed October 5, 1904.

Separate from the contract of Mr. Touhey was the bridge at station 203+25, which was built during 1903 by day labor at a cost of \$280. The structure has dry rubble masonry abutments filled in behind with rock and earth and a superstructure of tamarack timber, the planking of which is six inches in thickness. It is 20 feet in width and is sufficiently strong and well built to meet all requirements.

Much the greater part of this road follows along the side of the mountains up Levining Cañon and is cut out of solid or broken rock or rocky ground. When in the spring of the year the steep mountain sides above it are thawing, large quantities of rocks and bowlders roll down and in many cases will lodge on the roadbed. The slope cuts which are new and not yet fixed in position will, with the storms, gradually slide into the road, necessitating, for the first three years, considerable work in the removal of such débris. With this knowledge there should be some provision made for the maintenance of the road, and I therefore recommend that \$800 per annum be provided for such work.

TRINITY-HUMBOLDT ROAD SURVEY.

The Legislature of 1903 appropriated \$1,800 for a survey for a wagon-road from the town of North Fork, Trinity County, to some point in Humboldt County at or near China Flat. The statute contemplated a route along or partly along the Trinity River, or a route to be found for the most feasible location of a road in the general direction of such river. The money became available January 1, 1904, making it incumbent upon this Department to conduct the survey during this year. Therefore on August 23, 1904, a surveying party was organized and proceeded to a point on the main Trinity River near the Trinity-Humboldt county line, where camp was pitched August 27. For four days thereafter Mr. G. W. Conners, the engineer in charge of the work, and myself reconnoitered the country for the first 8 miles up the river, and thereupon determined the location along the main stream and on the north side or sunny slope of the mountains. Other engineering features being reasonably without difficulty, a far superior roadbed can be obtained on ground where the sunshine strikes perpendicularly or nearly so to the surface. Especially in a country like northern California, where the timber and brush growth is much denser and heavier on the hillside receiving the least sunshine or the very slanting rays

of the sun, is this fact exemplified. For the foregoing reason our investigation covered the north river side so far as practicable for a road. Another point we carefully followed was a proper location for grade and alignment. My endeavors were to eliminate all ups and downs in the road and thus relieve California State roads of some of the disagreeable and expensive features of most of her county roads.

No doubt the location of a wagon road through this section of the State should follow just as a railroad would do, the natural courses of the streams and not be climbing hills when no necessity for such work exists. The banks of the Trinity River for about 25 miles on the Humboldt end of the proposed line of road are steep and precipitous for an elevation of approximately 100 feet above the river bed. Beyond this, for about 20 miles to the town of North Fork, the river bank is more gradual of descent, and excluding numerous short and narrow points of solid rock, is excellent road ground.

From the beginning of the survey on a Humboldt road near China Flat, the grade in no place will exceed three per cent, while there will be stretches of 4 and 5 miles with a one per cent grade. This grade occurs in the rougher section of the work, so that it is firmly believed that on the eastern end for 22 miles yet unsurveyed the grade can be made to not exceed one and a half per cent.

An item of serious moment in the cost of construction of this road is the bridge work. In the first 6 miles, the main Trinity River must be spanned with a 225-foot central truss and at least a 75-foot truss on each end; two 100-foot spans must be constructed at the Schauber double sloughs; the Trinity River must, by the present survey, be crossed and recrossed to avoid a solid rock mountain just southeast of New River, where must be constructed a 150-foot span at Hawkins' Bar and another 225-foot span with one 50-foot and one 100-foot secondary span just below Don Juan Point. Almost any crossing selected on the river in the vicinity of the proposed road has excellent opportunities for solid rock foundations. The bedrock juts out from the banks usually from 10 to 25 feet above the summer flow of water, and will make substantial bases for the necessarily high structures required, for all the bridges crossing the main river will be at least 85 or 90 feet above the mean water level.

The 22 miles of survey now completed traverse more difficult ground than the remainder of the route shows by an examination made by myself September 1, 1904. With an earnest desire to obtain the best possible route at the least cost it seems that for the last 8 miles of the present survey a duplicate should be made on the opposite side of the river in order to calculate the difference in actual work.

A party of seven men, including cook, was employed under the direction of Mr. Conners, an engineer, up to October 10, 1904, when he

was compelled to leave the work. At the time of his departure there were completed 80,000 feet of road survey, giving all data required for contracting or building purposes. I then personally assumed charge of the crew and continued the work until October 25th, when 113,000 feet, or practically 22 miles, were finished. The appropriation, which was wholly insufficient for a survey of 45 miles of a rough mountain country, in a county difficult of access, was entirely expended on the work accomplished.

The data already obtained, giving 1,100 lineal feet in the five large bridges, and the 22 miles of road line with approximately 5 miles of difficult work and the remainder of easy construction; and a cursory examination of the yet unsurveyed part of about 22 miles which contain no large bridges and very little difficult ground, give enough information to make the following general estimate :

Estimate.

1,100 feet of large bridges.....	\$40,000 00
45 miles of road, at \$1,500 per mile.....	67,500 00

Trinity County, through which this road would run, with the exception of one half mile, is altogether without funds for an improvement of such magnitude, and yet its construction would be a splendid thing for the development of that section of California. I believe that if the road were built in three sections, thus reducing the heavy expenditure at one time, a very necessary and excellent mountain road could be made without being a burden to the State. By all means there should be appropriated \$2,400 for the survey of the remaining 22 miles and also a parallel survey to some of the present work to determine their relative costs.

EEL RIVER SURVEY.

Eel River, which is principally included within the bounds of Humboldt County, drains a large part of the southern and eastern sections of the county, besides receiving large quantities of drainage water from northern Mendocino County, a part of northern Lake County, and a small part of southern Trinity County. It flows in a general north-easterly direction, with a heavy grade until it reaches the valley some few miles above the mouth of the Van Duzen branch, where the fall reduces quite gradually until it empties into the ocean between Cape Mendocino and Humboldt Bay. The drainage area beyond the mouth of the Van Duzen River is well covered with a very heavy growth of timber and brush, which, at the present time, is a vast help in keeping in check extraordinarily heavy floods in the fertile Eel River Valley, extending about 18 miles in length and an average width of about 4 miles. As the timber is cut down for lumber, we can not but look for a much greater flow of water in a shorter space of time. The standing



EEL RIVER NEAR SINGLEY'S STATION—SHOWING BANK DESTRUCTION.



PROJECTING BEDROCK, TRINITY RIVER—ONE OF MANY EXCELLENT BRIDGE SITES.

trees and brush with their roots and soft top layer of soil and mold act very materially in the retardation of the run-off. As this condition passes then must we expect a diminished amount of percolation and retention by the soil of the rainfall, and then will be seen the necessity for a present protection of one of the most productive spots in all California. Even in the past years and during recent winters the capacity of this stream has been severely overtaxed to carry away the heavy rainfall of this section. If a severe winter occurs, practically the whole valley is inundated, and especially is this so if a heavy storm occurs at the time of the large spring tides, which back up the river for about seven or eight miles. When the waters coming down the upper stretches of the river encounter the slighter grade the immense amount of alluvium in suspension is partially deposited, and as the velocity continues to reduce the finer silts are precipitated, thus tending to raise the stream's bed at or near its mouth. By observation of the river at its low summer stage we note, as we descend, the heavier gravels give way to finer and finer material until we reach the alluvium deposits. The erosive power of water therefore tends to cut deeper and deeper the river-bed where the grade and consequent velocity are great. This deepening gradually reduces to zero as we travel toward the river's mouth. From this point, the velocity has not the power to clear the bed, but creates shoals, and the channel works back and forth, shifting the material to various locations. The sinuosities of a stream are created by a deflection, in the beginning, of some obstacle, and then as the force of the water is directed wholly or partly perpendicular to the bank, this necessarily, if of easily washed material, must gradually cause a turning of the river channel. The deflecting once started, continues until the water encounters another obstacle, again varying its course, and so on until we have in ground capable of being washed, a very crooked river, depending somewhat on its grade and therefore its velocity. Undoubtedly, most of us have seen the lodgment of a tree on a river gravel bar and noted the root end lying up stream, caused by its deeper draft and consequent catching on the bar and swinging its top down stream. We have also noted that above and around the roots a digging or hollowing out occurs, while a small shoal forms down stream from it. The barrier thus created by the roots checked the velocity, allowing an extra deposit to take place beyond it and as an impediment in the stream, the water is forced around it in all directions with a swirl that digs up the material, allowing it to be carried below by the velocity. The breakwater or wingdam, where contracting the width of a stream, always creates a faster flow capable of carrying in suspension material deposited under ordinary conditions and scouring out by increased erosive power between barriers or around the end if a wingdam or single jetty.

With Eel River the problem is one of difficulty. In a case of the kind, the engineering features are special for this one undertaking, therefore all details should be most carefully worked out before any start is begun. With this in view, let us gather if possible the peculiarities of the problem before we begin the application of general hydraulic plans and propositions.

The marshes near and in the vicinity of the mouth of the river were gradually, at some early date, built out between Table Bluff and the ridge of hills on the south. Then the ocean waves have through years been washing up the sands in a vain endeavor to close the mouth of the river. This is the general tendency of the waves to cut off irregular indentures along the coast and to form a smooth and more even line of seashore. The reasons for this are simple and shall, so far as our problem is concerned, be passed.

Thus the mouth of Eel River is ever changing in its battle with the ocean waves for an outlet. Sometimes the mouth is directly in line with the last stretch of river, and sometimes a sharp turn from such stretch is necessary for its waters to enter the ocean. In this latter case there is an immense friction to overcome on the turn which undoubtedly backs up the flow or tends to choke up the mouth. This part of the problem, although affecting a general scheme of improvement, is too vast to be handled for any accruing benefits to the valley.

At some time Eel River built up the principal part of Eel River Valley and now seeks to destroy it by its changing channels and cutting away of the banks. Travel over that valley and you will see various old riverbeds left behind and partially filled by this same stream. Salt River itself at one time carried a large part of the waters going to the ocean from this valley. The natural question arises, why not let the river alone, for where it cuts into one bank the opposite side builds out and fills up? To a certain extent this is true; but wherever it is so doing the land made by this process is lower than the older deposits and has not a value comparable to them. The gravel beneath the thin covering of silt allows the moisture to percolate through as if a filter, thus creating a direct loss in the land wealth of this county and therefore to the State.

Practically there has been nothing done to prevent this loss of valuable land, not even some of the simple remedies which can not but be of some success. The banks are vertical or nearly so, composed of a light rich alluvium which melts away with astonishing rapidity. Whenever these banks become saturated either by the high water covering the land or by absorption, and the river begins to fall, thus relieving the hydrostatic pressure from the wall of silt, large masses tumble into the river and pass away down stream, not to be regained. Stand on the river's bank, and note when the largest amount of ground goes

out, and you will be convinced of the truth of this statement. To the people directly affected by the loss I would recommend a trial of the simple plan of cutting back the bank to a slope of say forty-five degrees or even a slighter slope and using a profusion of willows battened down with wires. In all cases this will not accomplish the end desired, but in some instances it will prove efficient, and should the willows obtain a good start will save, perhaps, the destruction of property. Of course it may require concerted action of the property-owners living on or owning the length of any particular stretch of high bank.

Eel River Valley has been cleared of brush and timber to adapt the land for dairying purposes; but it is my opinion more brush should be kept along the river's course, for some protection is afforded by even the roots. Particularly on the bars forming opposite the steep banks the willows and alders should not be destroyed, as they protect the land adjoining.

The necessary protection against the bank destruction along this river resolves itself down to the matter of riprapping the banks with rock sufficiently large to withstand the velocity, and of entangling the same with willow brush, which in time will form a solid brush and rock bank. By reason of the constantly changing course of the channel it is necessary that this work for any particular part be planned in the spring of the year for construction the same summer.

At some points which may be located on the maps of the present course of the stream, jetties built out would be highly beneficial for deflecting the river and causing a scouring out of a new channel; but as a general proposition for the purpose desired, riprapping the banks would prove the most efficient and least expensive.

In the interest of this protection work the river was completely surveyed from its mouth to the Van Duzen branch in 1903. Prior to the regular surveying crew being placed in the field, a levelman and assistants were employed from July 15th to August 5th for the purpose of locating bench marks and obtaining levels and tide gauge readings near the river's mouth. The field work proper began August 5th, being conducted under the supervision of Mr. H. S. Smith as engineer, and occupied three months for completion. During this time levels were run from the base of mean low tide, obtained after a month's readings on both banks of Eel River, to the Van Duzen River and the whole length of Salt River. Every 500 feet on either bank were established firm stakes with elevations, with permanent benches at all opportunities on trees. Meanders were run on both sides of Eel and Salt rivers; all topographical features were noted, old river courses were determined, as well as the quantity of brush available and property divisional lines. The whole length of river was either cross-sectioned or sounded every 500 feet in length and all general conditions

were determined. Both sides of the river were staked on the survey, so that at least a complete line of transit points may be had, even though large tracts of land where the stakes set may be washed away.

The maps and data now in possession of this office are such as to be valuable in the study of the river conditions, and as time goes by will be a great source of help in the determination of any work thereon. The cost of the work to date is approximately \$3,800.

A project of the magnitude contemplated in the statute of 1903 can not be fully accomplished without the expenditure of a large sum of money. If we resorted to the riprapping of the exposed high banks at the date of the survey in 1903, 14 miles of the work would be necessary, while in addition some river jetties would be indispensable. Assuming all rights of way to be free, the probable cost of the foregoing will approximate the given general estimate, as follows:

Estimate of Riprap Work.

Bank sloped to 30°—earth removal.....	\$59,000 00
Brush used in conjunction with rock.....	27,000 00
Rock dumped at work.....	517,500 00
Labor.....	85,000 00
Incidentals.....	25,000 00
Total.....	\$713,500 00
Jetties, per 1,000 feet of length.....	28,000 00

The people owning property in the Eel River Valley adjoining the river have at times endeavored to stop the ravages of the floods in a small way, but so far their efforts have proven futile. Therefore, I earnestly believe that assistance granted them by actual work, so that they may watch its practicability and ability to prevent further damage at the point of application, would result most beneficially. It would certainly stimulate the land-owners to a greater effort in their own behalf.

An appropriation of \$35,000, with an equal sum from Humboldt County or the people of the Eel River Valley, would, I think, be ample to construct a section of permanent work sufficient in magnitude to be of substantial value and present an excellent example to those directly interested in the protection of this land wealth.

YOSEMITE VALLEY.

The engineering work of the Yosemite Valley has partially come under this Department through requests from the Commissioners having in charge the conduct of its affairs. The results of my visits there are better given in my reports to the Commission, and I therefore give their text in full:

SACRAMENTO, CAL., September 21, 1903.

To the Honorable Yosemite Valley Commissioners, San Francisco, Cal.:

GENTLEMEN: Pursuant to a request made by your Commission to investigate and examine the condition of the Yosemite Valley roads and bridges, and offer some plan of improvement of the former, I desire to submit the following report and suggestions for your consideration:

During the latter part of August, 1903, I traveled and examined all the roads of the valley and the trails on which are located bridges, and closely observed the character of both soil and rock formation, as also did I pay attention to the Merced River's position to furnish water for sprinkling. All the bridges except the new one on the Yosemite Point trail were visited and thoroughly inspected.

The kind and condition of the roads and bridges are in deep contrast to the magnificence of the valley, and certainly show that the prime item in the work of the valley is the improvement of the roads.

There are between 22 and 23 miles of road within the bounds of the valley, and of these there are perhaps 14 miles in the floor of the valley. These 14 miles are almost wholly of a decomposed granite sand, varying considerably in coarseness. In a few places may be found an alluvium deposit which modifies the character of the roadbed to an approach to the ordinary dust road. In general the floor of the valley is composed of this decomposed granite sand, with the result that the roads are heavy and very disagreeable to travel.

Three plans are here given looking to the improvement, as also are the difficulties attending each:

First, might be suggested that sprinkling with water taken at intervals along the Merced River be resorted to; but this becomes so very expensive as to be at present prohibitive. The granite sand retains so much of the heat from the sun and consequently evaporation is so rapid that it is difficult to keep the road sufficiently dampened for travel, and this, too, with constant work.

Secondly, the plan to macadamize and thus build good and substantial roads is one that under ordinary circumstances meets with approval; but in the valley there is no available rock for such purposes, and this scheme becomes impracticable. All the rock formation in and near the valley is granite, which is unsuitable for macadam work.

The third and at present last plan is the application of oil to form a road crust and thereby give the desired effect of reducing the pull and the dust. It is upon this plan I shall deal most fully, for it now appears to me to be the most feasible, although some difficulties will be encountered. I believe with care in the application of oil a considerably improved condition of road will result in the valley; but before suggesting too strongly this plan I desire to call your attention to the following facts:

The roads should be made to conform to true grades, with good alignment, and all ruts should be properly filled and all rocks should be taken out. Then there should be enough crown given to prevent damage by water, and the roadbed prepared to receive the oil. Again the question of width of road is one of importance, and as the conditions of travel determine this, a 16-foot roadbed, it seems to me, is none too wide for the needs of the valley.

After road bed preparation has been made to receive oil, I would apply per mile about 225 barrels of crude oil in its cold state to a width of 10 or 12 feet. Certainly the cold oil will be readily taken up by the porous sand roadbed. After thorough incorporation of the sand and oil and rolling the road if necessity requires, a first year's oiling would be completed. During the second year in my judgment 100 barrels of oil per mile should again be applied to make a good road crust and give satisfactory results.

However, with results on oiled roads we now have to base an opinion on, regarding the different kinds of roadbeds, I earnestly believe, before any extensive work of this nature be done, that a wise plan would be to experiment for say a half mile or a mile with oil on this granite sand, and determine what quality of road such without a mixture of silt or alluvium will give.

BRIDGES.

An examination of all the bridges except the Yosemite Point trail bridge was made, and all except two were found in fair condition. The abutments, built of dry masonry,

are very substantial, and the timbers in all structures showing any decay whatever were bored and all the rotten parts detected.

In all I examined eleven road bridges and four trail bridges, and found only two in need of repairs or replacement. The one at Lick House, of 63-foot span, needs replacing by a new bridge, and the one near El Capitan, of 90-foot span, was dangerous for travel, through failure of parts of a bad design. I gave the Guardian, Mr. Stevens, details of work that should be done on this structure to hold it solidly in place, and suggested that the work be done immediately.

In replacing the bridges and culverts of this State property I think it not amiss to recommend the use of stone in both such structures. In time it would prove economical and vastly more in harmony with the immense granite valley.

I append hereto an estimate of the cost of oiling the valley roads, and also a list of the bridges, with size and condition.

Knowing that at times there is need of engineering assistance on the work of the valley, I hold myself in readiness at your request to aid your Commission so far as within my power.

Very respectfully,

N. ELLERY,
Highway Commissioner.

Estimate of Oiling Valley Roads (One Application), 10- to 12-foot Roadbed.

Oil, 225 bbls. per mile, first application, delivered at Raymond, at 70 cents	-----	\$157 50
225 bbls. freight to Valley from Raymond, at 1 cent	-----	742 50
Toll for 9 trips of 10 animals each, at \$1 per head	-----	90 00
Distributing the oil in valley, and work incidental thereto	-----	150 00
		\$1.140 00
Five per cent extra	-----	57 00
		\$1,197 00
Plant to be used on any number of miles:		
Four tanks delivered at Raymond	-----	\$450 00
Oiling attachment and extras	-----	200 00
		\$650 00

Yosemite Valley Bridges. (Condition August, 1903.)

	Kind.	Span.	Condition.
		<i>feet.</i>	
1. Main bridge near Sentinel Hotel	Iron	101	Fair; very light structure.
2. El Capitan bridge	Wooden truss	90	Must be repaired.
3. Yosemite Creek bridge	Wooden truss	45	Good.
4. Bridge at Power-House	Wooden truss	63	Good.
5. Lick House bridge	Wooden truss	63	Bad; should be rebuilt.
6. Bridge near Camp Curry	Wooden truss	80	Good.
7. Tenaya Creek bridge	Wooden truss	58	Good.
8. Pohono bridge	Wooden truss	82	Fair.
9. West branch of Bridal Veil Falls bridge	Wooden stringer	25	Fair.
10. East branch of Bridal Veil Falls bridge	Wooden stringer	32	Good.
11. Middle branch of Bridal Veil Falls bridge	Wooden stringer	52	Fair.
TRAIL BRIDGES.			
1. Bridge near Vernal Falls	Wooden truss	57	Good; 50-ft. approach.
2. Bridge below Nevada Falls	Wooden stringer	47	Fair; railing loose.
3. Bridge above Nevada Falls	Wooden truss	50	Good.
4. Illilouette bridge	Wooden stringer	48	Fair; sill on west end rotten.

The three stringer bridges over the forks of the Bridal Veil Falls stream could be built of stone of the following spans; 10 feet, 20 feet, and 20 feet respectively.

Lick House bridge should certainly be replaced before next year's travel.

Cost for wooden-truss bridge is very closely \$500.

Respectfully,

N. ELLERY,
State Highway Commissioner.

SACRAMENTO, CAL., June 18, 1904.

To the Honorable Yosemite Valley Commission, San Francisco, Cal.:

GENTLEMEN: The request of your Commission to experiment with oil in the betterment of road conditions in the Yosemite Valley was carried out during my stay there from May 24 to June 4, 1904. The experience and conditions attending such work are here given in detail for your consideration, as are also other road and engineering items that came to my attention.

Prior to my arrival, Mr. Stevens, the Guardian, prepared three stretches of road for the application of oil. Two of these were on the main road between the Sentinel Hotel and the El Capitan bridge, on the south side of the Merced River. They were given a crown of 8 inches for a width of 14 feet, of a material composed mostly of granite sand. The third piece of road was across the meadow land between the Sentinel Hotel and the Yosemite Camp. It was crowned 6 inches in 16 feet of width, and was composed of silt, gravel, and sand.

On May 26, 1904, there were received in the valley four tanks of oil of 25 barrels capacity each, which on May 27th was applied as follows: 50 barrels were distributed on the Sentinel Hotel-Yosemite Camp road for a distance of 840 feet and a width of 12 feet, thus making approximately an average of 300 barrels to the mile; and 50 barrels were distributed on a piece of the Sentinel Hotel-El Capitan road for a distance of 2,050 feet and a width of 8 feet, thus making approximately 190 barrels per mile.

The apparatus to conduct the work was crude. In the use of the mountain wagons and teams by which the oil was transported, great difficulty was found in keeping the prepared road surface intact. The wagons had very narrow tires, and when containing the oil weighed about 15,000 pounds. In using them to distribute the oil, they cut the road surface into a veritable plowed ground, thus requiring considerable more oil than otherwise, with far less beneficial results. Then no oil could be held in reserve for such places as were not sufficiently covered to give a good even surface. This again added a difficulty.

On the Sentinel Hotel-Yosemite Camp road, the oil after application was sanded and rolled as thoroughly as our appliances would permit. It certainly received as fair a test as the circumstances would allow, and I believe that with the exception of some weak spots in the oiled surface, it will give a good idea of the ability to make a road surface of oil in the valley. In regard to the other oiled piece, it was my intention to demonstrate the fact that the oil in insufficient quantity and without further care will practically last but a year or two and then become worn out and gone, when to again prevent dust another application is necessary. The expense of such renewals without any permanent result is surely most unsatisfactory and far too expensive to warrant such work. What is desired is a permanent road surface, and to obtain this on the character of soil at hand there must be used from 300 to 350 barrels of oil per mile on a 12-foot strip of road. Even this is not the best for the travel to which the valley roads are subjected.

To my mind the improvement of these roads should be substantially permanent for heavy travel, and in making experiments for this purpose nothing but the best and most economical plan should be sought. Therefore I earnestly believe that a far more satisfactory and lasting road can be built there by the application of the macadam principle for a foundation with an oiled surface. With this view I suggest to your body the plan of constructing a piece of road of the river gravel obtained at points along the Merced River. This gravel without surface protection would be useless on

your roads and would entail unnecessary expense, while if protected with an oil covering would give very good results. It is certainly the best for the valley's travel to have good rock foundations for your road work; and it can be stated without reserve that the above-mentioned river gravel properly handled and applied and then oiled will effect a far better result and will prove much more economical of maintenance than the direct application of oil to the present condition of roadbed and surface.

There are at least 15 miles of roads on the floor of the valley to be improved. To do this work in a thorough manner with oil would require about 5,500 barrels and the purchase of proper appliances for such work. But before any action is taken I desire to recommend a trial of the graveled and oiled road that you may discern the relative efficiency of the two methods. This suggestion is made after careful observation of the oiling already done.

While in the valley I looked over the iron bridge which spans the Merced River at the Sentinel Hotel, and had it tightened. This structure is of very light weight and needs yearly inspection. In the matter of the new El Capitan bridge, I made measurements of the old structure so that the new design which is now being made will avoid any of the weak points that caused failure in the old bridge.

I visited the new reservoir once in company with Guardian Stevens and again with Messrs. Short and Hender, and found the location and work well suited for its purpose. When finished this work will be substantial and far superior to any plan of building with rock and cement.

Another item that came to my attention through Mr. C. A. Givens was the lack of any plat or survey of your sewers or water mains in and about the town of Yosemite. To have an intelligent idea of those systems, it is necessary that you have a contour map showing the lines of pipes, connections, relative elevation, branches, and other relative data, by which you may easily outline any new or contemplated work or connections with the present work. I verbally offered my services in this matter to Mr. Givens, and herewith further offer to do such work upon my next visit to the valley if so desired by your Commission.

Upon the request of the Commission, on June 5th I visited and closely examined the big tree known as the Grizzly Giant, in the Mariposa big trees. It was found to lean $18\frac{1}{2}$ feet from a vertical line and to have some partially decayed surface roots on the side farthest from the lean. To ascertain whether or not it has of late increased its deflection from the vertical line is difficult and uncertain, but I established transit points by which any further movement may be accurately detected. Mr. Leach, the guardian of the trees, accompanied and assisted me in this work, and I gave him points by which he can determine any movement of the tree. The destruction of this giant sequoia can be stayed by attaching two cables sufficiently divergent to each other to form a substantial triangle; the cables to be fastened to pine trees near by, but unconcealed from the view of visitors. The resort to this plan is suggested, providing any additional deflection is determined.

Very respectfully,

N. ELLERY,
Highway Commissioner.

Additional to the foregoing, the plans in detail were gotten out by this department for a new wooden bridge over the Merced River at El Capitan. The span is 90 feet, which makes it the second largest bridge in the valley. The lower chords were single sticks hewn from the yellow pine near the site, and thereby avoided any joint near the center, which was the cause of failure in the old structure.

All the bridges of this State property with the exception of the iron structure near the Sentinel Hotel are made of wood and are, in consequence, very short lived. Twelve years is about the average length of their usefulness in that climate, while bridges built massively and

rough of the broken granite found at most points along the valley would practically be indestructible. The first cost would be a little greater, but the reconstruction and maintenance would be reduced to a minimum.

TRAVELING AND CONTINGENT APPROPRIATION.

In 1901 the traveling and contingent appropriation of this Department was reduced to \$250 per annum, and has so continued at that figure up to the present time. This is wholly inadequate for the purposes intended. The necessary travel in connection with the State roads and surveys costs considerably more than such appropriation, and outside traveling for road purposes must be done away with if the contingent fund is relied on at its present amount. A trip of inspection of the oiled roads of California for gathering data on the subject has so depleted the above appropriation that there will be a deficiency of \$100. I therefore ask for an appropriation of \$100 for contingent expenditures for the remainder of the fifty-sixth fiscal year, and that the traveling and contingent appropriation be increased to \$750 per annum.

MISCELLANEOUS WORK OF THE DEPARTMENT.

At the request of the Boards of Supervisors of Marin and Sonoma counties, I accompanied Mr. Richardson and Mr. Smyth, county surveyors respectively of the above counties, and advised with them on the location of a bridge site on a proposed line of road, over Petaluma Creek near Black Point.

During June, 1904, I visited Sonoma County and recommended to the Board of Supervisors the construction of a rubble-stone bridge on the Petaluma-Santa Rosa road at the point of crossing Petaluma Creek. A complete design in detail was made by this Department, of the following dimensions: Span, 24 feet; length over all, 34 feet; width of roadway, 18 feet in the clear; and rise, 5½ feet. After an estimate of the cost of construction by this office the Board of Supervisors advertised for bids, which were received as follows:

Estimate of Rubble Stone Bridge.

115½ cubic feet of concrete	\$23 10
5,143 cubic feet of rubble masonry.....	1,333 25
66 cubic yards of earth fill.....	19 80
140 cubic yards of earth cut.....	35 00
Total cost	\$1,411 15
Bids: \$1,145 (award), \$1,608, and \$1,789.	

The bridge over Sonoma Creek on the State property at Eldridge, Sonoma County, was carried away by the high waters of the winter of 1903-04, and at the wish of the Board of Managers of said property and F. W. Hatch, M.D., General Superintendent of State Hospitals,

I designed a steel structure with large concrete piers and wooden approach for the crossing. Every item in the work was made extra heavy and strong so that a good substantial bridge would be built. Pursuant to advertisement by the Board of Managers, bids were received, ranging from \$3,374 by Mr. James McMahan of San Francisco to \$4,457 by the Dundon Bridge Company of San Francisco. Mr. McMahan received the contract, and I was placed in charge of the work. During the construction work about eleven visits of inspection were made, and upon its completion my recommendation to the Board of Managers was for the acceptance of the work, provided \$125, which is ample, be deducted from the contract price for not strictly complying with the specifications in the matter of the concrete for the piers. However, the bridge as it now stands is an extra strong and substantial structure, with a large capacity for the work to which it will be subjected.

From 1902 to 1904 I have attended road meetings and participated in their work at the places and dates indicated: Martinez, May 30, 1903, State convention of Boards of Supervisors; Sonoma, December 15, 1903, road meeting; Elk Grove, March 23, 1904, Farmers' Institute meeting; Santa Barbara, April 19-20, 1904, El Camino Real Association meeting; Glen Ellen, May 30, 1904, good-roads meeting.

With the limited means at hand I have also visited and examined the methods of construction and results of a large number of oiled roads in the southern and central parts of California.

REPORT LAKE TAHOE WAGON ROAD COMMISSIONER.

ARTHUR S. LYON, COMMISSIONER.

SMITH FLAT, CAL., October 31, 1904.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California:

SIR: I beg leave to inform you that after assuming my duties on the 6th of January, 1904, as soon as was possible I traversed the Lake Tahoe Wagon Road as far as the snow allowed.

I found said road in fairly good condition with the exception of culverts which had previously been constructed of wood, and which were nearly all in a condition where they should be replaced either with stone or terra-cotta pipe culverts.

Starting early in the spring, I graded and rounded up about a mile and a third of roadbed through soil filled with boulders, lava, and bedrock formation. I used a bedrock plow, with a road-scraper to move most of the dirt, a considerable amount of powder being required to loosen the ground in places. I also handled three small slides which threatened to impede travel; all at a cost of about \$500.

I have also constructed seven stone culverts, at an average cost of about \$55 each. Also twenty-five terra-cotta pipe culverts, ranging from 6 to 18 inches in diameter, at a cost for labor of about \$25, and cost of pipe and hauling of about \$10 each.

As there are a good many of our larger waterways on this road that should have immediate attention, I would recommend that the next Legislature be asked to give \$10,000 to be expended only on bridges and culverts. Also, to appropriate \$5,000 to finish surveying this road, which has been done as far as the twenty-five milestone, and to deliver and place in position the remainder of the stones up to the State line. These stones are now stored at Riverton on the side of the road, and considerable comment is made as to why they are not placed in position, but the reason is that no official survey has been made further than said twenty-five milestone since the State acquired this road. Also, that the maintenance fund of \$4,000 per year is not any more than adequate to maintain the roadbed of this 60 miles of mountain road in good, passable shape. I therefore respectfully ask that the next Legislature give us a little more aid on this road, and by that means we will

be able to rebuild some of the walls on the lower side of the roadbed in places where they have slipped away, making the roadbed narrow, also causing comment about the road being allowed to run down.

I have spent in all since last January about \$3,200, all of which has been used in ditching and repair work, except as above mentioned, leaving about \$1,800 to spend in repairs to the 1st of July, 1905.

Respectfully submitted.

ARTHUR S. LYON,
Lake Tahoe Wagon Road Commissioner.

FINANCIAL STATEMENT.

(November 30, 1904.)

Trinity-Humboldt Road Survey.		
1903—Appropriation		\$1,800 00
1904—Expenditures		1,677 12
Balance		<u>\$122 88</u>
Eel River Survey.		
1903—Appropriation		\$5,000 00
1904—Expenditures to November 30		3,781 90
Balance		<u>\$1,218 10</u>
Mono Lake Basin Road.		
1899—Appropriation		\$25,000 00
1904—Expenditures to November 30		23,903 68
Balance		<u>\$1,096 32</u>
1903—Appropriation		\$25,000 00
1904—Expenditures to November 30		366 60
Balance		<u>\$24,633 40</u>
Sonora and Mono Road Maintenance.		
1903—Appropriation, fifty-fifth and fifty-sixth fiscal years		\$4,000 00
1904—Expenditures to November 30		3,804 09
Balance		<u>\$195 91</u>
Traveling and Contingent.		
1903—Appropriation, fifty-fifth and fifty-sixth fiscal years		\$500 00
1904—Expenditures to November 30	\$323 19	
Expenditures not yet paid	108 40	
		<u>431 59</u>
		<u>\$68 41</u>
Lake Tahoe Wagon Road Maintenance.		
1903—Appropriation, fifty-fifth and fifty-sixth fiscal years		\$8,000 00
1904—Expenditures		6,320 30
Balance		<u>\$1,679 70</u>

Amounts of Taxes Levied in the Several Counties for County Road Purposes and
Expended by the Boards of Supervisors.

COUNTIES.	1903.	1904.	Totals.
Alameda	\$110,077 11	\$90,296 51	\$200,373 62
Alpine	1,688 25	1,843 32	3,531 57
Amador	20,635 30	17,632 39	38,267 69
Butte	53,994 98	56,116 27	110,111 25
Calaveras	20,603 83	21,774 58	42,378 41
Colusa	37,922 94	38,694 11	76,617 05
Contra Costa	35,041 95	50,332 16	85,374 11
Del Norte	7,659 56	9,762 93	17,422 49
El Dorado	12,110 26	13,625 51	25,735 77
Fresno	68,789 20	72,681 48	141,470 68
Glenn	28,101 07	25,789 31	53,890 38
Humboldt	73,313 32	69,028 10	142,341 42
Inyo	3,919 66	5,488 47	9,408 13
Kern	47,806 88	44,835 36	92,642 24
Kings	18,687 54	18,681 60	37,369 14
Lake	15,627 04	14,925 68	30,552 72
Lassen	14,250 60	15,692 99	29,943 59
Los Angeles	221,392 96	223,956 68	445,349 64
Madera	22,397 02	20,023 01	42,420 03
Marin	30,655 40	28,549 16	59,204 56
Mariposa	9,080 58	9,664 02	18,744 60
Mendocino	44,507 61	37,644 25	82,151 86
Merced	41,422 76	42,321 13	83,743 89
Modoc	13,650 51	13,414 95	27,065 46
Mono	2,871 95	2,240 06	5,112 01
Monterey	67,197 90	55,821 64	123,019 54
Napa	23,547 32	28,521 95	52,069 27
Nevada	17,380 92	17,577 74	34,958 66
Orange	36,202 50	33,449 30	69,651 80
Placer	20,892 64	21,451 24	42,343 88
Plumas	12,984 66	21,325 28	34,309 94
Riverside	23,817 78	22,087 62	45,905 40
Sacramento	66,310 84	51,536 12	117,846 96
San Benito	17,521 88	17,699 83	35,221 71
San Bernardino	38,008 92	34,649 06	72,657 98
San Diego	39,295 77	33,906 89	73,202 66
San Francisco*			
San Joaquin	77,216 63	79,777 81	156,994 44
San Luis Obispo	41,648 45	42,337 08	83,985 53
San Mateo	63,802 94	69,159 01	132,961 95
Santa Barbara	45,995 84	42,887 18	88,883 02
Santa Clara	142,347 79	127,158 74	269,506 53
Santa Cruz	30,653 78	31,326 73	61,980 51
Shasta	26,621 54	27,748 05	54,369 59
Sierra	6,254 75	6,331 09	12,585 84
Siskiyou	25,074 83	38,019 93	63,094 76
Solano	56,460 48	52,150 71	108,611 19
Sonoma	73,695 39	74,356 70	148,052 09
Stanislaus	38,608 53	41,476 30	80,084 83
Sutter	20,404 85	18,221 90	38,626 75
Tehama	27,412 89	28,305 36	55,718 25
Trinity	6,605 45	7,979 37	14,584 82
Tulare	44,347 15	46,132 63	90,479 78
Tuolumne	23,714 68	36,904 22	60,618 90
Ventura	35,782 62	27,830 55	63,613 17
Yolo	48,730 18	51,245 68	99,975 86
Yuba	10,033 52	13,749 68	23,783 20
Totals	\$2,164,781 70	\$2,146,139 42	\$4,310,921 12

*San Francisco: Incorporated as a city and county. No expenditures on roads.

CALIFORNIA STATE MINING BUREAU

LEWIS E. AUBURY, - - State Mineralogist.

REPORT

OF THE

BOARD OF TRUSTEES

COVERING THE

FIFTY-FOURTH FISCAL YEAR ENDING JUNE 30, 1903, AND FIFTY-FIFTH
FISCAL YEAR ENDING JUNE 30, 1904.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1904.

[Thirty-fifth Session of the Legislature of California. Page 540, Statutes of California, 1903.]

GENERAL APPROPRIATION ACT PROVIDING FOR THE SUPPORT OF THE STATE
GOVERNMENT FOR THE FIFTY-FIFTH AND FIFTY-SIXTH FISCAL
YEARS.

[Approved March 26, 1903.]

The clauses relating to the State Mining Bureau are as follows :

“For salary of State Mineralogist, six thousand dollars.

“For support of State Mining Bureau, forty-five thousand dollars.

“For printing, binding, ruling, and all other work performed and materials furnished by the State Printing Office to the State Mining Bureau, ten thousand dollars.”

REPORT OF BOARD OF TRUSTEES OF STATE MINING BUREAU.

SAN FRANCISCO, November 1, 1904.

To His Excellency GEORGE C. PARDEE, *Governor of California:*

SIR: The Trustees of the State Mining Bureau herewith submit their biennial report, in pursuance of the Act of the Legislature approved March 23, 1893, and amended March 10, 1903, entitled "An Act to provide for the establishment, maintenance, and support of a bureau, to be known as the State Mining Bureau, and for the appointment and duties of a board of trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management and control of said State Mining Bureau, and to provide for the appointment, duties and compensation of a State Mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the Board of Trustees of the State Mining Bureau."

No reports have been printed since the XIIIth (or third biennial), issued September 15, 1896, relating to the general mining interests of the State, although numerous bulletins have been issued, as enumerated in the Report of the State Mineralogist. The Board of Trustees and the State Mineralogist have, however, made biennial reports in accordance with the law above quoted.

THOMAS B. BISHOP,
HAROLD T. POWER,
FRANK MONAGHAN,
J. E. DOOLITTLE,
F. H. HARVEY,

Board of Trustees of State Mining Bureau.

MUSEUM.

About six hundred different minerals are at present known to science, and most of these are represented in their many forms in our Museum. There are on exhibit nearly 17,000 specimens, as well as a large duplicate set, part of which is now in St. Louis.

The most recent and interesting specimens received are Kunzite and Californite. The former was discovered in San Diego County, and

named after Prof. George F. Kunz, of New York. The Bureau's specimen was donated by Fred M. Sickler. Californite is a variety of Vesuvianite, a new ornamental stone resembling jade, discovered in California, and can be classed among the semi-precious stones of the United States. This mineral was found by A. E. Heighway in Siskiyou County. Both of these minerals have a commercial value for gems.

Two other valuable acquisitions are specimens of Carnotite and Uraninite, from Colorado. These specimens are interesting, as both carry radium. The latter is the variety known as pitchblende.

The Bureau acquired by exchange with Prof. A. B. Fitch, a splendid variety of zinc ores from Magdalena, New Mexico.

Mr. W. B. Dennis has presented a cabinet of quicksilver ores from the Black Butte Mine, of Lane County, Oregon.

Calaveras and Tuolumne counties have jointly donated a large collection of ores from their producing mines, together with a handsome stand on which they are mounted. This collection was prepared by Pacific Commandery, No. 3, for the Knights Templar Triennial Conclave, held in San Francisco during the month of September, 1904.

A. Selwyn Browne has donated some very fine specimens of tin ore from New South Wales.

Through the efforts of the State Mineralogist, a very large and valuable collection of tourmalines has been loaned to the Museum by Mr. Ernest Schernikow, of New York City. This collection is considered the finest of its kind in the world. The gems were mined at the recently discovered deposits at Mesa Grande, San Diego County.

There have been received during the past two years nearly seven hundred new specimens of ores and minerals suitable for case material, together with a great number of duplicates, which are made into small sets, and sent to the different schools throughout the State for educational purposes.

The intention is to make the Museum a depository of the material representing the mineral wealth of the State; also ~~as~~ a reference place for miners, prospectors, and students.

During the current year, upward of 100,000 visitors registered in the book kept for that purpose, which is strong evidence of the public appreciation of this department. It can, moreover, be safely estimated that fully as many more persons visited the Museum without registering.

The new entrance to the Mining Bureau is nearly completed. This is a valuable and needed improvement. It will increase the number of visitors to the Museum, as the entrance can be seen by thousands passing through the Union Ferry Building, who were apt to overlook the old entrance.

For the continuous free transportation of specimens and exhibits

addressed to the Bureau, the Board of Trustees hereby expresses its thanks to the Southern Pacific Railroad Company, Wells, Fargo & Co., and the Santa Fé Railway Company.

The following list represents those who made donations to the Museum during the two years covered by this report :

Agler, W. C.	Harvey, J. McL.	Merriam, C. R.
Anthony, J. H.	Hunter, R.	Nelson, A. N.
Alton, W. P.	Hutsenpeller, J.	Northey, G. V.
Aubury, Marion	Hamilton, E. M.	Ney, I. W.
Bent & Sampson	Jens, J. C.	Pettit, A. C.
Bardwell, W. S.	Judd, L. S.	Ryall, Andrew
Brown, L. H.	Kunz, George F.	Rayeroft, A. F.
Bonetti, C. E. A.	Kimber, A. W.	Rule, W. J.
Benedict, E. A.	King, A. W.	Reardon, P. H.
Blandon, M.	Kanawyer, P. A.	Rodgers, M.
Bailey, G. E.	Lewis, F. L.	Randsburg Coal and Power Co.
Combes, J.	Maryanski, Modest	Seits, Mary
Conway, George	MacDonald, A. R.	Storms, W. H.
Cornell, C. C.	McAllister, G. W.	Sickler, Fred M.
Cross, C. C.	Madeira, George	Selwyn-Brown, A.
Fairchild, S.	Mayer, A.	Sanders, F. S.
Forstner, William	Myero, A. G.	Stadmuller, F. H.
Fisher, J. M.	Mitchel, D. C.	Thrift, E. E.
Goodwin, B. F.	MacCrellich, Mrs. M. P.	Tyron, F. P.
Green, W. H.	McKnight, J. H.	Western, D. E.
Grider, W. F.	Marle, A. W.	Whitney, H. F.
Gibson, F. W.	Mitchell, John	Wescott, W. H.
Graham, J. S.	McPherson, J. F.	Wyman, C. H.
Houghton, F. T.	Matherell, Chas. E.	Walters, C.
Howell, John	McCarthy, W. E.	
Harson, J. O.	Mount Almo Mica Co.	

A number of specimens have also been brought into the Museum by Field Assistants, who obtained them during their investigations.

LIBRARY.

Owing to lack of funds, very few books—not to exceed twenty in number—have been purchased for the Library. It is to be regretted that the reference library of mining and metallurgical works can not be made more complete and kept up to date with latest editions of the more important books. There is a constant demand for a certain class of books, which the Trustees find themselves unable to meet for the reason stated. The Bureau, being a State institution and open to the public, is visited yearly by many thousands, and while most of these find their interest in the Museum, the Library is also sought by students, mining engineers, and others. It is impossible, however, under present circumstances, to keep the Library replenished with new technical books. About four hundred books and pamphlets have been donated by various institutions, and many magazines and newspapers are sent free. Large newspaper racks have been put in place, with

room for eighty-five papers to be put in respective files. This is found to be a great convenience. A new stand for the card catalog has also been purchased.

PUBLICATIONS.

All publications of the Bureau (with the exception of the statistical bulletins) are now sold at a price intended to cover the cost of publication, not including the cost of preparation. This method of distribution of publications is imperative upon the Trustees, as the following Act of the Legislature, approved March 10, 1903, will show:

SECTION 1. Section eight of an Act entitled "An Act to provide for the establishment, maintenance, and support of a bureau, to be known as the State Mining Bureau, and for the appointment and duties of a board of trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management and control of said State Mining Bureau, and to provide for the appointment, duties and compensation of a State Mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the Board of Trustees of the State Mining Bureau," approved March 23, 1893, relating to the powers of the Board of Trustees of the State Mining Bureau, is hereby amended to read as follows:

Section 8. The Board of Trustees of the State Mining Bureau shall biennially report to the Governor of the State the condition of the Bureau, with a statement of the receipts and disbursements in detail, and with said report shall be incorporated the biennial report of the State Mineralogist, and the report of said Board of Trustees and State Mineralogist shall be printed as are the reports of the other State officers. The Board is hereby empowered to fix a price upon and to dispose of to the public, at such price, any and all publications of the Bureau, including reports, bulletins, maps, registers, etc. The sum derived from such disposition must be accounted for and used as a revolving printing and publishing fund for other reports, bulletins, maps, registers, etc. The prices fixed must approximate the actual cost of printing and issuing the respective reports, bulletins, maps, registers, etc., without reference to the cost of obtaining and preparing the information embraced therein.

SEC. 2. This Act takes effect and is in force from and after its passage.

LABORATORY.

During the term from December 15, 1902, to October, 1904, inclusive, the department for determination of minerals, in conjunction with the laboratory, has shown an increased use by the miners and prospectors of the State. The records show that 2,424 separate samples have been forwarded by mail for determination during this period, and at least an equal number have been brought in by individuals personally.

Aside from these, numerous inquiries have been received and answered, dealing with mining and metallurgical questions.

As the aim of this department is to acquaint parties with the character and possible commercial values of the samples forwarded, but not to interfere with the legitimate business of the licensed assayers and chemists of the State, no quantitative work is carried out. Should the parties sending samples wish for more detailed information as to the exact values of their ores, they are necessarily referred to an assayer or analytical chemist.

On account of the increased patronage of this department, and the enlarged scope and character of the questions submitted for opinion, it has become very needful that a chemical assistant be added to the laboratory staff, if patrons are to receive quick returns.

EXCHANGES.

The Board of Trustees wishes to extend thanks to the editors and publishers of the following papers, which have been forwarded free to the Library:

Amador Dispatch, Jackson.	Mineral Wealth, Redding.
Amador Ledger, Jackson.	Mines and Minerals, Scranton, Pa.
Amador Record, Sutter Creek.	Mining and Engineering Journal, San Francisco.
Angels Record, Angels Camp.	Mining Journal, No. 121 Fleet St., London.
Australian Mining Standard and Financial Review, Sydney and Melbourne.	Mining Magazine, No. 120 Liberty St., N. Y.
Bee, Sacramento.	Mining Record, Colorado Springs, Colo.
Calaveras Weekly Citizen, San Andreas.	Mining Reporter, Denver, Colo.
Calexico Chronicle, Calexico.	Mining Review, Los Angeles.
Chino Valley Champion, Chino.	Mining Review and Metallurgist, Baltimore, Md.
Citrograph, Redlands.	Mining and Engineering Journal, New York.
Coal and Coke, Baltimore.	Mining and Engineering Review, San Francisco.
Courier, Shasta.	Mountain Democrat, Placerville.
Contra Costa Gazette, Martinez.	Mountain Messenger, Downieville.
Commercial News, San Francisco.	Mother Lode Banner, Sonora.
Del Norte Record, Crescent City.	New Zealand Mines Record, Wellington.
Delta, Visalia.	News, Red Bluff.
Democrat, Woodland.	Nuggett, Placerville.
Dispatch-Democrat, Ukiah.	Oceanside Blade, Oceanside.
El Dorado Republican, Placerville.	Oregon Mining Journal, Portland.
Electricity, Power, and Gas, San Francisco.	Pacific Oil Reporter, San Francisco.
Enquirer, Oakland.	Placer County Republican, Auburn.
Enterprise, Healdsburg.	Petaluma Weekly Courier, Petaluma.
Free Lance, Hollister.	Pick and Drill, San Francisco.
Free Press, Redding.	Porterville Enterprise, Porterville.
Free Press, Ventura.	Placer Herald, Auburn.
Gazette, Georgetown.	Press-Democrat, Santa Rosa.
Gazette-Mariposan, Mariposa.	Press-Horticulturist, Riverside.
Graphic, Oakdale.	Prospect, San Andreas.
Herald, Los Angeles.	Record, Chico.
Herald, Arroyo Grande.	Register, Napa.
Hotel Register, San Francisco.	Republican, Fresno.
Humboldt Standard, Eureka.	Reveille, Cloverdale.
Inyo Independent, Independence.	River News, Rio Vista.
Inyo Register, Bishop.	Rustler, King City.
Ione Valley Echo, Ione.	San Diegan Sun, San Diego.
Jerome Mining News, Jerome.	Scott Valley Advance, Etna.
Journal, Los Angeles.	Searchlight, Redding.
Journal, Salinas.	Sentinel, Colfax.
Journal, Napa.	Silver State, Winnemucca, Nev.
Journal of Commerce, San Francisco.	Siskiyou News, Yreka.
Mercury, Madera.	Southwest, Los Angeles.
Mercury, Oroville.	Sun, Colusa.
Middletown Independent, Middletown.	
Miner-Transcript, Nevada City.	
Miner, Wickenburg, Ariz.	

Stanislaus County Weekly News, Modesto.	Valley Record, Ashland, Ore.
Town and Country Journal, Melbourne, Australia.	Weekly Union, San Diego.
Tribune, Healdsburg.	Western Mining World, Chicago, Ill.
Tribune, Oakland.	Willows Journal, Willows.
Tribune, San Luis Obispo.	Wood River Times, Hailey, Idaho.
Union-Democrat, Sonora.	Yolo Semi-weekly Mail, Woodland.
U. S. Investor, Boston, Mass.	Yuma Sun, Yuma, Ariz.

FINANCIAL STATEMENT.

FIFTY-FOURTH FISCAL YEAR, JULY 1, 1902, TO JULY 1, 1903.

Balance on hand July 1, 1902		\$1,355 66
Appropriation		28,500 00
Salaries of Geological Assistants.....	\$7,402 75	
Traveling expenses of Geological Assistants	3,208 15	
Rent of premises (Bureau).....	1,620 00	
Salaries of Bureau employés.....	8,051 55	
Library account.....	1,350 88	
Laboratory.....	526 94	
Freight and express charges.....	204 86	
Postage account.....	420 14	
Sundry expenses of Bureau	1,836 84	
Salary of State Mineralogist	3,000 00	
Clerical assistants.....	833 61	
	\$28,455 61	
Balance.....	1,400 05	
	\$29,855 66	\$29,855 66

FIFTY-FIFTH FISCAL YEAR, JULY 1, 1903, TO JULY 1, 1904.

Balance forward		\$1,400 05
Appropriation		22,500 00
Salaries of Geological Assistants	\$4,565 40	
Traveling expenses of Geological Assistants.....	3,038 20	
Sundry expenses.....	1,090 18	
Rent of premises (Bureau).....	1,620 00	
Salaries of Bureau employés.....	9,799 68	
Library account.....	1,042 82	
Laboratory.....	178 73	
Freight and express charges.....	122 61	
Minerals and Museum	389 86	
Postage.....	353 61	
	\$22,201 09	
Balance	1,698 96	
	\$23,900 05	\$23,900 05

According to the custom of the Board of Trustees, the accounts of the Bureau have been audited by Mr. George W. Ade, an expert accountant. His report shows that the books and accounts are neatly and correctly kept, and that all funds are properly accounted for. This examination is made quarterly.

REPORT OF THE STATE MINERALOGIST.

To his Excellency, GEORGE C. PARDEE, Governor of the State of California:

SIR: In pursuance of the provisions of "An Act to provide for the establishment, maintenance, and support of a bureau to be known as the State Mining Bureau," etc., approved March 23, 1893, I herewith present my report of the work performed by the State Mining Bureau from December 15, 1902, to November 1, 1904.

Respectfully submitted.

LEWIS E. AUBURY,
State Mineralogist.

SAN FRANCISCO, November 1, 1904.

For reasons stated in the report of the State Mineralogist December 15, 1902, no regular biennial report embracing all of the work of the State Mining Bureau was issued for the fifty-second and fifty-third fiscal years; and the system adopted of issuing bulletins on special subjects has been continued during the past two years.

PUBLICATIONS.

The publications which have been issued under my direction during that period are summarized as follows:

Bulletin No. 27, "Quicksilver Resources of California," 273 pages, which treats of the condition of the quicksilver industry and the production. This publication also furnishes a description of the development of the various deposits, together with their economic geology. Geological maps of the different districts are included in the bulletin, together with a description of processes of reduction.

Bulletin No. 28, the annual statistical sheet, which furnishes the amount and value of the mineral production by counties for the year 1902.

Bulletin No. 29, an annual statistical sheet, showing the mineral production for sixteen years, from 1887 to 1903.

Statistical sheet showing the gold production and value for years from 1848 to 1903.

Bulletin No. 30, "Bibliography relating to the Geology, Paleontology,

and Mineral Resources of California," 290 pages, including a list of State and County maps. This bulletin was compiled by Anthony W. Vogdes, Lieutenant-Colonel of Artillery Corps, U. S. A. It is a most valuable mining reference. The manuscript for this bulletin was donated by Colonel Vogdes to the State Mining Bureau.

Bulletin No. 31, a single sheet which contains a general description of sixty-two representative oil wells, selected from the different districts. A commercial analysis of the oil produced by each well is also furnished.

Bulletin No. 32, "Production and Use of California Petroleum," 230 pages, with maps. This bulletin furnishes a description of the producing oil fields, and the conditions affecting the industry. Geological conditions are treated very briefly, the aim of the bulletin being more to illustrate the various uses to which petroleum may be applied, and its manner of application. The bulletin is illustrated, and maps of the oil districts, showing the producing wells, are also included. Bulletin No. 31 is also embodied in the report.

Bulletin No. 33, statistical sheet, showing the mineral production of California by counties for the year 1903.

Bulletin No. 34, statistical sheet, showing the mineral production for seventeen years, inclusive of 1903.

Bulletin No. 35, "Minerals of California," 55 pages, which includes the mineral production of 1903, a brief description of the work of the State Mining Bureau, and illustrations of its departments; gold production from 1848 to 1904, with other statistical information. In the bulletin are included a map of each county in the State, showing railroad and stage lines, together with distances.

MAPS AND REGISTERS.

In addition to the Maps and Registers which were issued by the Bureau, and mentioned in my last report, those of the following counties have been published: Amador, Butte, Kern, Mariposa, Tuolumne, Sierra; and Map and Register of the Los Angeles oil wells.

A combined Relief and Mineral Map of California has also been issued.

BULLETINS IN PREPARATION.

At the present time, Field Assistants are engaged in completing the work in gathering data for bulletins to be issued, as follows: "The Structural and Industrial Materials of California," and "Gems and Jewelers' Materials." The field work on these bulletins will in all probability be completed by March, 1905.

Some data are also being gathered concerning "Gold Dredging," and

it may be possible to issue a bulletin on that subject by the above stated date.

With these bulletins completed, all of the work originally outlined by me to be finished during my administration will have been performed.

WORK OF THE BUREAU.

Besides the regular work of the Bureau in gathering data concerning the various mineral interests of the State and publishing the same in the form of bulletins and maps and registers, a very large number of letters of inquiry on subjects not covered by the publications are answered annually by the State Mineralogist.

SCHOOL COLLECTIONS.

With a view of creating a more extended knowledge of our mineral interests among the advanced grades of the public schools of the State, a number of collections of the more common minerals which California produces have been made from duplicate specimens in the Museum, and sent to various schools, together with Bureau publications. The publications are sent to such schools as maintain libraries.

It has been found that in recent years more attention has been paid to the study of mineralogy in the public schools of the State, and as this department is in a position to assist the schools, everything has been done that was possible to aid them in the furtherance of this particular branch of study.

PROTECTION OF MINING INTERESTS.

One matter which has been considered of much importance outside of the regular work of the Bureau, and of which mention was made in my last report, is the suppression of fraudulent mining companies. In my opinion, very great assistance can be rendered the legitimate mining operator by the elimination of the "get-rich-quick" mining schemes, which are from time to time foisted on the investing public, and to do this, a recommendation is made that a law be enacted which will serve to deter these sharks from further operations in this State. The Bureau has used every effort to protect investors by furnishing reliable information concerning this class of operators, but its efforts would be materially strengthened were such an Act in operation.

The Postoffice department has been successful in securing convictions in the United States courts of some of these fraudulent operators, and much of the evidence and assistance furnished by the Bureau was the means of bringing these parties to justice.

THE ILLEGAL ENTRY OF MINERAL LANDS.

A large portion of the government land in California which was temporarily withdrawn from entry during 1902, with a view of selections for forest reserve purposes, has recently been again thrown open to entry. As there is embraced in this territory a large area of mineral land, it is imperative, in order to preserve these lands for the benefit of the miner, that some urgent action should be taken to protect them from scrippers, or entries other than mineral.

Portions of these mineral lands are covered with timber, and speculators are now preparing to file upon them. Altogether, 1,097,120 acres embraced in the Redding, Susanville, Sacramento, Stockton, and Visalia land districts are affected by the recent order of the Secretary of the Interior, releasing the lands referred to. Nearly all of these lands were surveyed many years ago by contract, or by men entirely unacquainted with geological conditions, and for these reasons a proper segregation of the mineral portions was not made.

These lands, before being restored to public entry, should be carefully examined by competent authority (and the United States Geological Survey is suggested), so that a proper reclassification may be made.

This department is in possession of data showing that, particularly in the Marysville and Susanville land districts are located large tracts of mineral lands which are affected by the order. These lands were not properly returned as mineral by the United States Surveyor-General, and should they not be reclassified the rights of mineral locators will be jeopardized.

With a view of protecting the mineral lands herein referred to, the Board of Trustees of the State Mining Bureau and the State Mineralogist have prepared a memorial to the President, setting forth in detail the facts herein contained, and urging upon him the necessity of reclassification of these lands before restoration to entry.

LOUISIANA PURCHASE EXPOSITION.

For the greater part of the year 1903, and also the early part of 1904, the State Mineralogist was engaged in collecting a mineral exhibit to be installed at the St. Louis Exposition. This work was performed in connection with the regular work of the Bureau. Nearly five months' time was given to the exhibit, and while at St. Louis the State Mineralogist also attended to detail work and correspondence of the State Mining Bureau.

According to the provisions of an Act requiring all State institutions to assist the California commissioners in preparing exhibits for the St. Louis Exposition, the State Mineralogist, acting under the direction of the Board of Trustees of the State Mining Bureau, made a selection

from the duplicate specimens of the different ores in the Museum. These, with the model five-stamp mill and such other material as would add to the general State exhibit, were loaned to the commissioners. Complete sets of the Bureau publications, which could be consulted by those desiring information concerning California minerals, were also forwarded. A large amount of literature bearing on the mineral industry of the State was also printed and furnished for free distribution at the Exposition.

As the State Mineralogist was designated by the Act above referred to as Chief of the California Mining Department at the Exposition, it was his endeavor to aid the commissioners as much as possible in making a collection of minerals at the least possible expense, and with this aim in view, the various Field Assistants of the Bureau were instructed and did collect many specimens of ores, petroleum, etc., during the course of their work for the Bureau, and at no expense to the Commissioners. The Bureau employés also assisted very materially in the work for this exhibit.

It was desired that choice specimens of minerals on exhibit in the cases of the Museum should be loaned to the exhibit, but profiting by the experience where many specimens were loaned to past expositions, and never returned to the Bureau, the Board of Trustees wisely refused their permission to remove such specimens from the Museum.

In this connection it is pertinent to state that it is my opinion that it is inadvisable to permit the removal of case specimens from the Museum in building up a mineral collection, and it is suggested that a *separate* collection be made for exposition purposes, which collection can be increased from the duplicate specimens received by the Bureau. The present State collection now at St. Louis, after its return from the Lewis and Clark Exposition, could form the nucleus of such an exhibit, and the State would then be prepared, at comparatively small expense, to make a mineral display as occasion required.

CONDITION OF THE MINING INDUSTRY.

The numerous mineral substances now being mined, quarried, or otherwise commercially utilized in the State were of the value of \$35,069,105 in 1902, and of the value of \$37,759,040 in 1903, an increase of \$2,689,935 for the year. In fact, since 1893 the increase in the value of products has been practically two million dollars per year. The total mineral product of the State for the past seventeen years, including 1903, has been \$418,851,853. This includes fifty-one mineral substances. Of this amount, \$247,371,953 has been in gold. The relative annual value of the mineral products of the State is now as follows: 1st, Gold; 2d, Petroleum; 3d, Copper; 4th, Clays and their products;

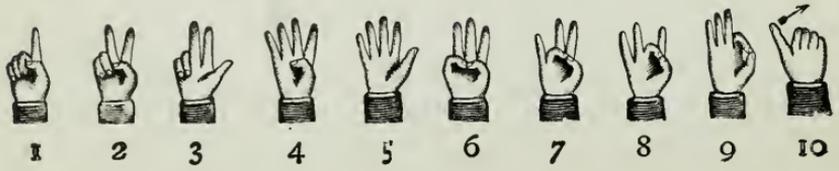
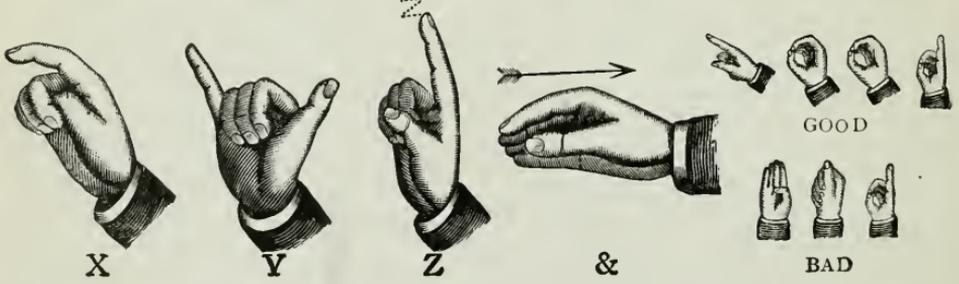
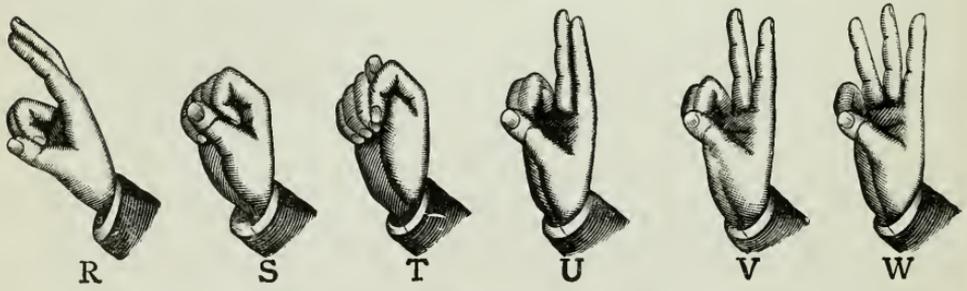
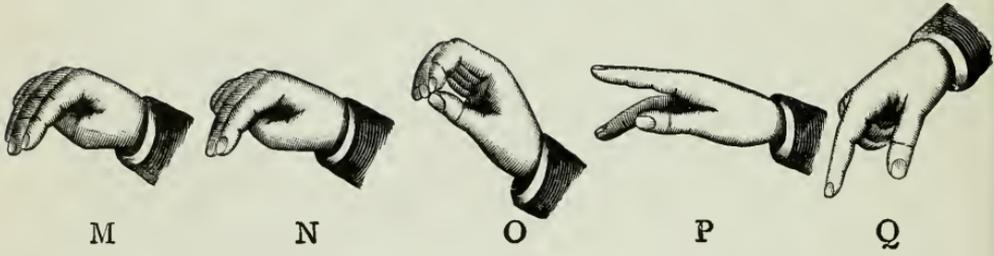
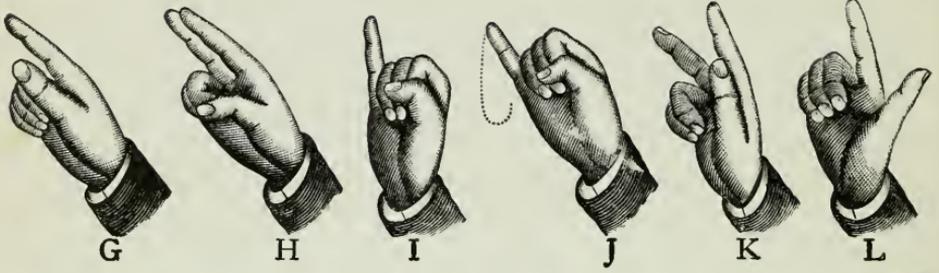
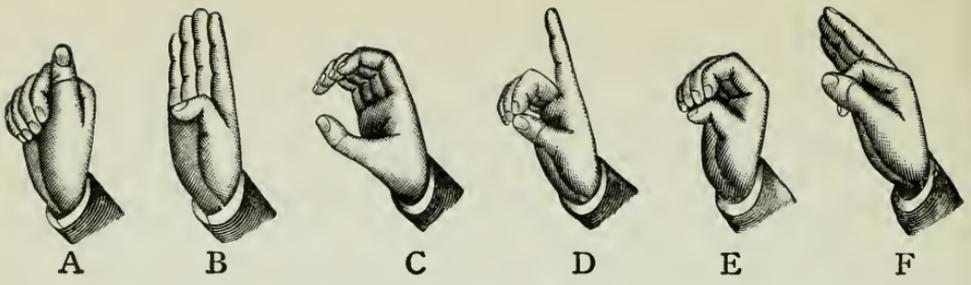
5th, Quicksilver; 6th, Rubble; 7th, Cement. The largest increase at present is shown in structural materials, which include brick and pottery clays, portland cement, lime and limestones, macadam, rubble and concrete rock, paving-blocks, marble, granite, sandstone, serpentine, slate, glass sand, and soapstone. In 1903, these represented a total value of \$6,908,463, an increase of \$2,799,440 over the previous year. The hydrocarbons and gases, including asphalt, bituminous rock, natural gas, and petroleum also increased in value in the same period \$2,760,886. Most of this was due to petroleum, of which there were produced 24,340,839 barrels, valued at \$7,333,271, in 1903, as compared with 14,356,910 barrels, worth \$4,692,189, in 1902. Fifty-four out of the fifty-seven counties of California are now producing mineral substances. Gold was mined in 34 counties, and is known to exist in several others. Silver and brick clays were produced in 26 counties; rubble in 19; mineral waters in 18; macadam in 16; copper and lime in 15; granite in 13; limestone in 10; quicksilver in 9; asphalt in 8; petroleum and sandstone in 7; salt in 6; bituminous rock and marble in 5; cement, coal, pottery clay, paving-blocks, and platinum in 4; borax, mineral paint, lead, and natural gas in 3; glass sand, gypsum, infusorial earth, magnesite, and pyrites in 2. The following substances were each produced in one county: Chrome, chrysoprase, Fuller's earth, lithia mica, mica, manganese, quartz crystals, slate, soapstone, serpentine, tourmaline, and turquoise. This statement relates only to mineral substances produced in 1903. There are, however, numerous places where minerals are known, but where they are not at present being mined. Details of source and value of all these materials may be found in Bulletins Nos. 33, 34, and 35 of this Bureau.

The brief statement herein made shows how prosperous is the present condition of the mining industry of California, and it also proves that instead of being in a state of decadence, there is a steady and large increase in value of annual output, which has extended over a period of years and still continues.

With this report is presented copies of all bulletins, reports, and maps and registers which have been issued since December, 1902, and which have been herein described.

Respectfully submitted.

LEWIS E. AUBURY,
State Mineralogist.



TWENTY-SIXTH REPORT

OF THE

BOARD OF DIRECTORS AND OFFICERS

OF THE

California Institution for the Education of the Deaf and the Blind,

FOR THE

TWENTY-FOUR MONTHS ENDING JUNE 30, 1904.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT STATE PRINTING.
1904.

BOARD OF DIRECTORS.

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I. H. CLAY, - - - - - *Treasurer, and Secretary of Board.*

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WARRING WILKINSON, M.A., L.H.D.

PRINCIPAL'S ASSISTANT:

WILLIAM A. CALDWELL, M.A.

TEACHERS OF THE DEAF:

WILLIAM A. CALDWELL, M.A.,	FRANK O'DONNELL.
CHARLES S. PERRY, M.A.,	THEO. D'ESTRELLA,
THEODORE GRADY, B.L.,	HENRY FRANK,
MARY A. DUTCH,	LAURA NOURSE,
MARIE P. ORR,	ANITA GOMPERTZ.
JAMES W. HOWSON, M.A.	

TEACHERS OF ARTICULATION:

NATHAN F. WHIPPLE,	LIZZIE MOFFAT.
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TEACHERS OF THE BLIND:

CLARENCE W. PECK, B.L.,	FLORENCE E. MONTGOMERY, B.L.
MARY W. EASTMAN.	

TEACHERS OF MUSIC:

OTTO FLEISSNER,	BERTHA BUTLER.
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TEACHER OF PHYSICAL CULTURE:

ETHEL A. COPLIN.

T. C. McCLEAVE, M.D.,	- - - - -	Physician.
FRANCIS R. MUSSER, M.D.,	- - - - -	Oculist and Aurist.
DOUGLAS KEITH,	- - - - -	Clerk.
MRS. ETTA BROWN,	- - - - -	Office Assistant.
GUSSIE MAST,	- - - - -	Typewriter.
GEORGE SCHULTZBERG,	- - - - -	Boys' Supervisor.
HARLEY D. DRAKE,	- - - - -	Assistant Supervisor.

MATRONS:

MARION G. BROWN,	ALICE MUNROE.
CAROLINE C. ALBERS,	SARAH A. KIRK,
HELEN M. CAMMET.	

J. C. JENSEN,	- - - - -	Foreman Carpenter Shop.
ALFRED P. McCARTHY,	- - - - -	Foreman Printing Office.
FRED HANSEN,	- - - - -	Engincer.
JOHN TREVETHIAN,	- - - - -	Electrical Engincer.

exceeded, and in the erection of the twelve buildings now in use, and costing from \$5,000 to \$85,000 each, the Directors have never been called upon to face a deficit or to ask the Legislature to make provision therefor. The Directors approve this policy in the past, and hope to continue it in the future.

The Directors call attention to the plan of "Institution Extension," as he calls it, proposed by the Principal, and set forth at some length in his report. It commends itself as an excellent method of continuing the stimulus and influence of the school, only on higher planes and broader lines. It does not offer crutches for the deaf which they do not need, nor a means of livelihood which they can earn for themselves, but it does propose to make life sweeter, more joyous, and spiritually better for those who care to avail themselves of the opportunity. It is to cost the State nothing, and is a labor of love on the part of the Principal and teachers. The project is well worth the trial, and the Directors will watch with sympathetic interest the result.

The paragraphs in the Principal's report referring to the day schools for the deaf seem to the Directors to merit careful consideration. From a large mass of correspondence submitted to our examination from nearly all the best educators of the deaf in the United States, we judge that the views of the Principal coincide with results of experience elsewhere. It is a subject upon which the Directors can not pass intelligent judgment, because they have not the expert knowledge of facts necessary, but they have confidence in the good sense, experience, and impartiality of the Principal; they know that the Institution offers facilities for the care and preservation of the health of the pupils which few homes possess, and that the teachers are competent and faithful. Under these circumstances, it is reasonable to suppose that better results can be obtained in the Institution than in the day schools.

The Directors approve of the estimates submitted by the Principal for the support of the Institution for the two years ending June 30, 1907, namely:

For salaries and wages.....	\$91,200 00
For supplies.....	40,960 00
	<hr/>
Total.....	\$132,160 00

This is the same sum appropriated by the Legislature two years ago, and unless there is a great rise in prices, which there is no reason to expect, it will suffice for the coming two years. We therefore respectfully ask that this sum be incorporated in the General Appropriation Bill to be passed during the coming winter.

The segregated hospital has been completed, and partially furnished, and now affords, against contagious and infectious diseases, the protection which has been so long desired.



INSTITUTION FOR THE DEAF AND THE BLIND—FROM THE SOUTHWEST.

For all matters of detail, financial statements, dissections, etc., we beg leave to refer you to the Principal's report.

In conclusion, the Directors desire to express their appreciation of the faithful work which the officers and teachers have done and are doing in this interesting department of public instruction, and they commend the Institution and all its concerns to the favorable consideration of your Excellency and to the Legislature about to convene.

Respectfully submitted.

A. J. RALSTON,

President of Board of Directors.

BERKELEY, CAL., November 10, 1904.

REPORT OF THE PRINCIPAL.

To the Directors of the California Institution for the Deaf and the Blind:

GENTLEMEN: I have the honor herewith to submit my biennial report, setting forth in detail the history of the Institution for the Deaf and the Blind for the two years ending June 30, 1904; what the receipts and expenditures have been during the same period; together with estimates of appropriations needed for the proper support of the Institution for the fiscal period ending June 30, 1907.

The movement of pupils for the period under review has been as follows:

On rolls, June 30, 1902:		
Deaf—Boys.....	85	
Girls.....	57	
		142
Blind—Boys.....	40	
Girls.....	27	
		67
Total both classes.....		209
The admissions since same date have been as follows:		
Deaf—Boys—Admitted, 17; readmitted, 3.....	20	
Girls—Admitted, 22; readmitted, 1.....	23	
		43
Blind—Boys.....	16	
Girls.....	13	
		29
Total under instruction.....		281
There have been graduated, discharged, and died during the same period:		
Deaf—Boys—Graduated and discharged, 27; died, 1.....	28	
Girls—Graduated and discharged.....	18	
		46
Blind—Boys—Graduated and discharged, 13; died, 1.....	14	
Girls—Graduated and discharged, 9; died, 1.....	10	
		24
Total deductions.....		70
On rolls June 30, 1904.....		211
Admitted since opening of school.....		18
		229
Discharged since opening of school.....		5
On rolls at date of report.....		224

HEALTH.

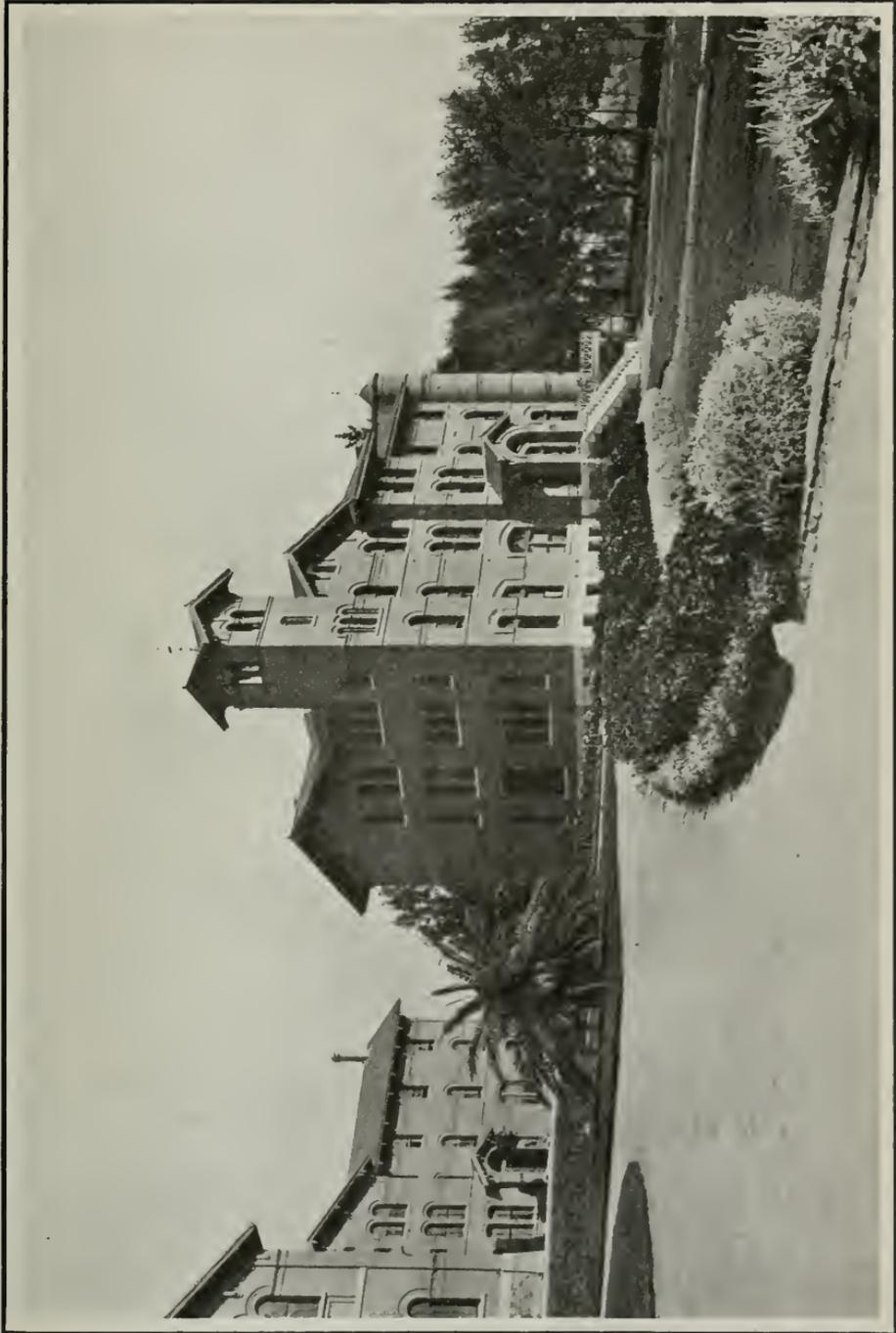
The health of the pupils in any school is the first consideration. It has been well said that the world can wait for an educated brain, but a sound physique is a primal necessity in the development of a race.

Therefore, every provision looking to the safety and bodily welfare of our pupils claims careful attention. I think it may be fairly asserted that in site, buildings (in both plan and construction), environment, climate, drainage, and sewer system, the California Institution for the Deaf and the Blind is entitled to take rank with the best in the country. The food is wholesome and abundant; the air is mild and balmy, and even the summer wind coming from the ocean through the Golden Gate in front of the grounds has its harshness ameliorated by the waters of the broad bay before it reaches the Institution grounds nestled under the foothills which rise behind the buildings on the east. The treeless farm of thirty-five years ago has been converted into gardens and orchards, and, by judicious planting of shrubbery and ornamental trees, traversed by pleasant drives, it has come to serve almost as a park for the beautiful city of Berkeley, which has grown from a hamlet of a hundred people at the time of our location here in 1866 to a thriving municipality of 20,000 souls. It is reasonable to expect that in such an environment the health of the household would be exceptionally good, and the experience of many years justifies that expectation. A few statistics from the records may not be without interest to the parents who entrust the care of their children to the Institution during the years necessary for their education. The records show the mortality for the forty-four years since the opening of the school on May 1, 1860, to be as follows:

- 1868—One death, caused by spinal meningitis.
- 1873—One death, caused by spinal meningitis.
- 1876—Three deaths, caused by diphtheria.
- 1877—One death, caused by diphtheria. *
- 1882—One death, caused by consumption.
- 1884—One death, caused by consumption.
- 1886—One death, caused by consumption.
- 1891—One death, caused by consumption.
- 1892—One death, caused by heart disease.
- 1894—One death, caused by heart disease.
- 1901—One death, caused by burns.
- 1903—Two deaths, caused by spinal meningitis and appendicitis.
- 1904—One death, caused by spinal meningitis.

An analysis of the causes of mortality is also of interest. Of the sixteen deaths in forty-four years, four, or 25 per cent, were from diphtheria. These were all during one year when we were crowded into the shop building which was occupied after the fire in 1875. Four deaths, or 25 per cent, were from consumption, and among children who were, by heredity and physical frailty, doomed before they entered the Institution. Four, or 25 per cent, were from spinal meningitis. Two, or 12½ per cent, were from heart disease, one from appendicitis, and one from accident.

During the last two years, the general health of the pupils has been good, though an epidemic of measles in April and May attacked a large

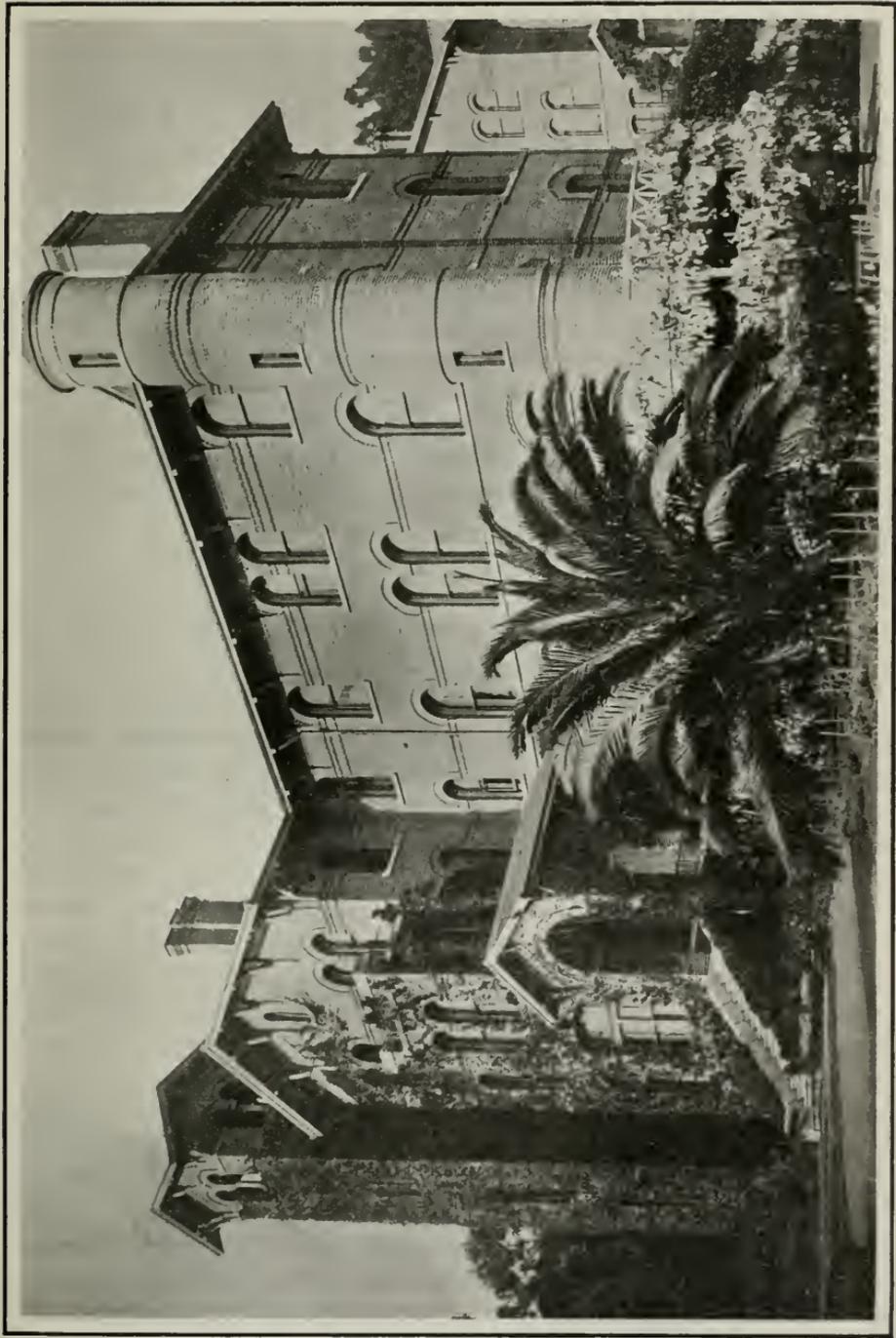


BARTLETT HALL—INSTITUTION FOR THE DEAF AND THE BLIND.

number of pupils and seriously interfered with classroom work for two months, but none of the troublesome sequelæ which sometimes attend this disease were in evidence and the pupils all went home fully recovered. It is our painful duty, however, to report three deaths since the submission of the last biennial report, viz: Raymond Oliver, a blind boy, 10 years of age, who died at the West Bay Sanitarium on the 21st of March, 1903, from spinal meningitis; May Gillespie, a blind girl, 15 years of age, who died November 16, 1903, at Fabiola Hospital, following an operation for appendicitis; and William Johnson, a deaf boy, 16 years of age, who died of spinal meningitis on the night of the 31st of May, 1904. It is a satisfaction to know that though the disease in each case was sudden and rapid, the mothers of these children each reached the bedside in time to minister with maternal love and tenderness to their final needs.

Since the last report, Mr. Charles T. Wilkinson, a faithful teacher and head of the Blind Department for thirty-seven years, has been called to his rest. His sudden death from pneumonia, on the 27th of February, 1903, came so quickly and unexpectedly as almost to paralyze, not only the brother whose duty it is, as Principal, to pen this tribute to his worth, but the department which he had so long and so faithfully administered. Mr. Wilkinson entered the service of the Institution as teacher of the blind in April, 1866. Though he had had no experience in this peculiar work, he had been a teacher in other schools for a number of years. He happened to be on this coast when my great need of a teacher for the blind, as well as a helper in the duties I had been called from New York to perform, enabled me to enlist his interest and his services. He entered upon his work with an enthusiasm and a zeal that never tired. He was the friend as well as the instructor of his pupils, and his unfailing sympathy and kindness won their respect and affection. He was unusally ingenious in devising apparatus for illustrating his classroom work, and quick to adopt suggestions from far and near that might aid him in making the fingers perform the service of the eye. He had unbounded faith in the capacity of the blind to do what seeing people do, and in this respect was a constant stimulus. He never wearied in searching for opportunities for the blind, and was always on the lookout for situations where they might earn a livelihood. He made many friends and few enemies. Indeed, it is difficult to see how any one could be his enemy, for he was the soul of pleasant companionship and void of malice, full of generous impulses, sympathetic and kindly to the last degree. His lamented departure called forth expressions of affectionate remembrance and appreciation from his former pupils and many friends that gave evidence of the abiding impression his loving personality had made upon those who knew and esteemed him.

The vacancy caused by Mr. Wilkinson's death was filled until the end



DURHAM HALL.—INSTITUTION FOR THE DEAF AND THE BLIND.

of the term by Mr. Frederick Smyth, who had some years before taught as substitute; but at the close of the term, Mr. Smyth felt that his other business demanded his attention, and declined to serve further. Mr. C. W. Peck was offered the position on the opening of the academic year, August 26, 1903, and has proved a competent teacher, whose usefulness will grow with experience.

In August, 1902, Miss Maxwell resigned her position as assistant teacher of the blind, and Miss Florence E. Montgomery, a graduate of the University of California, was appointed to succeed her.

In the domestic department, Mrs. Helen Cammet succeeded Miss Martha Cameron as matron of Bartlett Hall in August, 1903; and on June 1, 1904, Dr. O. D. Hamlin, physician of the Institution, resigned his position in consequence of his increasing Oakland practice, and Dr. McCleave was elected to fill the vacancy.

Just before the opening of the term in 1903, Mr. W. S. Runde resigned his position as assistant supervisor of boys, to accept a position as teacher in the North Dakota School for the Deaf. At present writing his place has not been filled.

Mr. W. B. Hill also resigned his position as supervisor of the boys, to accept employment in the University more favorable to his life work, and Mr. H. B. King was appointed in his stead.

THE SCHOOLS.

It is a satisfaction to report that Raymond W. Henderson, a blind graduate of the Institution, received his diploma as B.L. at the University of California in May, 1904. Mr. Henderson is now taking a post-graduate course, looking to his Master's degree. His specialties are history, English, and elocution. His standing throughout his University course was good. He has already done some creditable literary work, and gives promise of better things by and by.

Hugh Buckingham, formerly a totally blind pupil of this Institution, is now in his sophomore year in the University, and has taken a leading position as debater, which argues well for his future success in the law, which he intends to follow as a profession.

And this leads me to say that for the blind we must try to prepare our pupils for those employments where brain work is demanded rather than hand work. It seems hardly necessary to defend this statement. In these days of sharp commercial competition and when the machine plays so large a part in what used to be handicrafts, the blind man who tries to get a living by manufacturing, except as employer, is at a disadvantage. There is no sentiment in business. The dealer buys where he can buy cheapest and with the largest profit to himself, and the consumer follows his example.

But I am glad to say that there are many occupations where the

educated brain plus energy and perseverance can overcome the handicap of blindness. Besides music-teaching and piano-tuning, which are arts rather than trades, there are many small business ventures, solicitorships, middlemen between producer and consumer, book and insurance agents, newspaper vendors, and many other occupations which offer opportunity for the exercise of business tact and energy. Many of our boys are working this field with success.

And yet there will always be a percentage of the blind who will need a helping hand. Some lose sight in adult years, and find it hard to adjust themselves to new conditions. Some lose heart in the struggle for existence, and give up the fight. Some have no initiative, no capacity for business; they are willing to work, but don't know how. They need executive direction and skill, and public assistance to eke out the difference between earnings and support. To supply this deficit working homes for the adult blind have been established in various States and are serving a most beneficent purpose. California has not been behind her sisters in this noble work, and it is gratifying to know that, according to the report of the New York commission appointed by the Legislature to investigate the condition of the adult blind, the Home at Oakland is reported as the most successful institution of the kind in America. It is also gratifying to be able to say that the superintendent, Mr. Joseph Sanders, is himself a blind man.

The general work of the classrooms during the past two years has been on the whole satisfactory. The teachers have been patient and faithful; the pupils have been docile and as a rule well behaved. There has been a noticeable development in those qualities which go to make manhood and womanhood, and, after all, these are the best fruits of education.

The history of the pupils who have been trained at Berkeley gives evidence that our labor has not been in vain. To say that every one has fulfilled in the highest degree the measure of character and usefulness that we hoped for would be a foolish boast. Now and then, not often, one falls by the wayside. It is the sad experience of every teacher, but it is no exaggeration to say that our percentage of failure is less than in the average schools of the State. The great proportion of our graduates in spite of their handicap are peaceable, industrious, law-abiding members of the commonwealth, fulfilling the duties of intelligent, good citizenship, and contributing their full share to the weal of society. Their services are sought by many employers who have had experience of their worth, and the best evidence of their industry, faithfulness, and integrity is the long time they hold positions. The deaf marry and rear well-behaved children; they acquire property, open bank accounts, vote intelligently, and win the respect of the community in which they live.

But with all this excellent showing the thought has come to me whether our duty to the deaf ends with the classroom curriculum? Is it not possible to organize an educational influence that shall stimulate our graduates to obtain, after they leave school, a freer comprehension and use of language, which shall help them to clearer thinking as well as to nobler ideals of life and its purposes, than the average graduate possesses?

“INSTITUTION EXTENSION.”

One of the important educational influences of the last thirty years has been a movement known as “University Extension.” It was inaugurated by Cambridge University, England, and was soon adopted by Oxford, and is designed to enlarge the literary and scientific horizon of the great mass of people who have neither the means nor the time, perhaps not the ambition, of attending a college, but who gladly avail themselves of opportunities for self-culture through properly directed reading courses, lectures, personal intercourse, and correspondence, all brought, as it were, to their doors by university teachers specially fitted for this sort of work.

It is not my purpose here to give a history of this movement nor of the various forms it has assumed in England and America, but it has suggested to my mind a method of helping the deaf who have had the advantage of instruction in a school for the deaf for the usual term of years which the State allows. It need not be said that this instruction, with the deaf as with the hearing, is often inadequate for the desires of young men and young women who wish to keep abreast of the world. It is a trite saying that neither the school nor the college is the end of education. Both offer merely the preliminary studies for life, usefulness and culture. The man or woman who crystallizes at graduation from school or college, or who retrogrades in moral or intellectual efficiency, is a failure, whether he carries away the diploma of the university or of an institution for the deaf. To teach students how to think rightly—for “he who thinks awry will scarce act straightly,” as Mrs. Browning well says;—to impart such moral instruction as will develop into an abiding life-principle of action; to lay the foundations of true manliness on the corner-stones of integrity, honesty, industry, and perseverance; and to give a knowledge of how to use the tools and material with which to rear a superstructure of character and self-culture, is a worthy accomplishment and may well satisfy any faithful teacher. It must be confessed, however, that we sometimes come short of the end we seek, and it is largely due to the handicap of deafness and by reason of subsequent environment. The deaf man or woman is to a certain extent deprived of that mutual attrition which the hearing man enjoys, often unconsciously, by the multitudinous voices that

surround him. In the case of a hearing man, with eyes and hands occupied, the "winged words" of speech may go back and forth in social intercourse without interruption of his work. On the street, in the marts of trade, at divine worship, among the audience of the lecture-room, at the family table or the evening "function," the hearing person is always *en rapport* with his fellows and shares their intellectual stimulus. Even the blind have the advantage of this bookless education which forms so large a part in one's mental equipment. But from all this interchange of thought the deaf is cut off. His communication with the human world must be by the laborious use of paper and pencil or the still less satisfactory instrument of often unintelligible speech and the guesswork of lip-reading. For social purposes or for intellectual improvement the speech is utterly insufficient, the number of people who know the manual alphabet is few, and the task of writing soon becomes laborious and distasteful, especially if the interlocutor is weak in his syntax and spelling and not overfluent in expressing himself in writing, and is conscious of it. Now and then a deaf mute has the good fortune to possess a devoted and intelligent family and circle of friends who begrudge no expenditure of time, patience, and loving helpfulness, if thereby they may cultivate his literary expression and keep their halting brother in touch with the world; but such instances are rare. In ordinary intercourse with his fellows, the deaf mute finds that strangers soon tire of trying to understand his imperfect speech after their curiosity is satisfied, and he himself wearies in the effort to read the lips of people who often make no visible movement of lips, teeth, or tongue, and so communication degenerates to the scriptural "yea, yea" and "nay, nay," or the few commonplaces of greeting and physical necessities for which monosyllables will suffice.

For several years I have been in correspondence with a large number of our old pupils; some of whom have graduated, and some of whom have left school under time limit or the harsh necessities of *res angusta domi* before they had acquired that accurate use of the English language which it is our chief effort to give. In many of their letters one could see reflected the scant intellectual atmosphere of the writer's environment, and the sad isolation due to his deafness. The aridity of life in the mountains, on cattle ranches, on remote farms, and in the mills where many have sought and found remunerative employment is not favorable to mental development, less even for the deaf than for those who can hear. Many of the letters I receive contain errors of grammatical construction, misuse of words, and those inverted forms of expression which are known as "deaf-mutisms," and which indicate certain processes of thinking rather than methods of education. It has been my custom to correct these letters and return them to the writers with such "notes" as seemed appropriate and helpful. The improve-

ment in subsequent communications was so marked and satisfactory as to lead me to believe that an "Institution Extension" course might be organized, and inaugurated with profit and pleasure for former pupils. Those to whom I have spoken of it approve the undertaking. The expense in the experimental stage at least would be trifling. A small membership fee would pay for postage stamps. It may be necessary in special cases to supply books for the students, and the Durham fund or the Strauss fund would not be put to misuse if either were called upon to contribute something toward this method of advancing the welfare of the deaf. The teachers will be glad, I am sure, to coöperate in the way of preparing courses and correcting papers, while the California News, the Institution publication, can be made a useful adjunct in the scheme by becoming the official organ of the Extension work. The courses, when fully developed, will include studies in English, mathematics, history, and such courses in science as will enable the student to keep abreast with the progress of modern research and discovery. If there is a demand for Latin or modern languages, provision will be made for satisfying such demands.

Preliminary steps are now being taken to carry out the project, and it is hoped to have it in operation by the opening of the new year, 1905.

So far as I know, the scheme outlined above has never been attempted for the deaf, and I am not prepared to say what its outcome will be, but the plan seems feasible, and its carrying out may prove so helpful and popular with the deaf as to justify the employment of a special teacher or even a corps of instructors, who shall give their full time to this means of advancing the best interests of those whose handicap of deafness interferes so seriously with intellectual progress.

DAY SCHOOLS FOR THE DEAF.

At the last session of the Legislature a new section was added to the Political Code, which reads as follows:

SECTION 1618. The board of education of every city or city and county, or school board of trustees of every school district, in this State, containing five or more deaf children, or children who from deafness are unable to hear common conversation, between the ages of three and twenty-one years, may in their discretion establish and maintain separate classes in the primary and grammar grades of the public schools, wherein such pupils shall be taught by the pure oral system of teaching the deaf.

So far as I can see the passage of this statute has added nothing to the powers already vested in school boards, but the new section has been looked upon as giving legislative approval to the theory of educating the deaf in small local schools as against the support of a State boarding-school where deaf children may be gathered from all parts of the Commonwealth and provided with a temporary home where the advantages of a carefully regulated regimen and of combined experience are so arranged as to give the best results in the object desired, namely: the

education of the deaf. I do not think that the passage of the Act had any such purpose, but it has been so interpreted.

The theory of the day school, as presented to parents and to those who are little acquainted with the peculiar needs of the deaf, has some plausible features, largely sentimental, which appeal to the public. The separation of the deaf child from its home and the tender influence of a loving mother is not to be ignored. It seems, and often is, hard; but when I look over my letter-files, and read the many expressions of gratitude from mothers who appreciate what this maternal self-sacrifice has ultimately brought to them in the way of comfort and happiness, I can not help feeling that this hardship is exaggerated. Now and then, a parent is found who declines to send his deaf child away from home to be educated, but these instances are very few, and are generally followed by keen regret in after years, when it is too late to make good the loss.

The theory of the day school is not a new thing. In 1815 an essay on the subject was published in the Bavarian "School Friend," and in 1819 Mr. J. P. Arrowsmith of England issued a little book on "The Art of Instructing the Infant Deaf and Dumb," which is based upon his experience with a deaf brother, and in which he advocated the education of deaf and hearing children together in ordinary schools. Since his time repeated efforts have been made, with varying success, to carry into practice this plan of educating the deaf in day schools, sometimes with hearing children and sometimes classed by themselves. The history of our art is strewn with the wrecks of such schools, though many have been developed into boarding-schools supported by the State.

The oldest day school in the United States was established in 1869 by Miss Sarah Fuller, a most estimable woman, who is still at the head of it. During the next twenty-five years, from 1869 to 1894, eight other day schools were opened—two in Chicago and one each in Cincinnati, St. Louis, Detroit, Sheboygan, Cleveland, and Milwaukee. In 1895 the present activity in promoting day schools for the deaf began, and has had its most fruitful field in Illinois and Wisconsin, spreading so rapidly in the latter State as to receive the name of the "Wisconsin system," as though it were a new cult. Seventeen such local schools have been established there. Illinois has seventeen day schools for the deaf, of which twelve are in Chicago. Michigan has eight, Ohio seven, California three, Massachusetts one, Missouri one—a total of fifty-four schools in the United States.

The following statistics, taken from the American Annals for the Deaf, January, 1904, are not without interest. According to these figures there were under instruction on November 10, 1903, at all the schools for the deaf in the United States, 11,225 pupils, of which 9,935 were in the various State institutions; 844 were in the day schools, and

446 were in denominational and private schools. Reduced to decimals, these figures show that there were in institutions, 88.50 per cent; in day schools, 7.51 per cent; in denominational and private schools, 3.99 per cent.

Considering that the theory of the day school is so plausible; that it has been before the public in practical operation for thirty-five years, and that for the past ten years it has been pushed with extraordinary vigor by its disciples, one wonders why it has not made greater headway.

The day school is advocated by a few women of executive experience and success as oral teachers, notably Miss Sarah Fuller, referred to above, Miss Mary McCowan, principal of the twelve Chicago schools, and Miss Frances Wettstein, principal of the Milwaukee school. It is also favored by Dr. Alexander D. Bell, the distinguished inventor of the telephone, a man of large wealth, of most pleasing personality, and whose interest in the deaf has been so proven by his generous contributions of money and his many acts of kindness as to win the affectionate esteem of all members of the profession, irrespective of differences of opinion concerning methods of instruction; but I do not think that Dr. Bell will claim to be a *teacher* of the deaf save in an amateurish and experimental way, as in his little school in Washington, D. C., which he supported for a year or two to illustrate certain theories of his in regard to line writing and co-companionship of deaf and hearing children, and his interesting supervisory work with George Sanders, an account of which he wrote and published in the *American Annals*, vol. 28, pages 124-139. Dr. Bell's belief in the superiority of the oral method of instruction has led him to an exaggerated faith in the advantage of the day school, as set forth in his open letter to the Legislature of Wisconsin in 1885, and which had so large an influence in furthering the passage of a bill at that time. Several of the points in the summary of his letter would be conceded by most teachers, but the arguments for the same in the body of the letter are not justified by facts and are not approved by the great number of those who are best fitted by years of fruitful service, of careful and impartial study, of broad and many-sided investigations to decide which is the better way of educating the deaf and preparing them for useful citizenship—in local day schools or boarding-schools.

It must be kept in mind that this decision involves no question concerning the merits of the German or oral system, the French or manual method, the Rochester or manual alphabet method, or the Combined method. Concerning the value of these different methods in accomplishing what we all seek, the best good of the deaf, there are strong differences of opinion, but they all agree that within limitations to which I shall refer later, the day school fails to secure results adequate

to the time and money expended. The strongest argument in my possession as to the inefficiency of the day school is from Dr. Crouter, principal of the Pennsylvania School for the Deaf at Philadelphia, and vice-president of the Society for the Promotion of Speech to the Deaf, of which society Dr. Alexander D. Bell is president. Dr. Westervelt, principal of the Rochester school, who is secretary of the same society, is equally pronounced in his unfavorable opinion of the day school. Their arguments, set forth in letters to me, were iterated at the recent National Conference of Superintendents of Institutions for the Deaf at St. Louis.

The special value of Dr. Crouter's evidence lies in the fact that the Pennsylvania Institution for the Deaf made a painstaking effort and under the most favorable circumstances to test the experiment of a day school. A suitable building, removed several blocks from the parent school, was rented; the pure oral system was vigorously enforced; the teachers were competent; there was abundant money for all expenses, and a large city from which to draw its patronage. In spite of all these advantages, after four years of trial the day school was abandoned and a boarding-school established. Commenting upon this action of the board, Dr. Crouter says in his report, dated December 1, 1885: "Among the good results effected by the change are the more regular attendance of the pupils, better health, and a more satisfactory advancement in their studies."

The western Pennsylvania institution, near Pittsburg, was begun as a day school about 1870, and after ten years of trial was changed to a boarding-school, and the Rev. Mr. Brown, who had been its founder and supporter and principal, sadly confessed that his part in the day school was one of the regrets of his life.

The Portland (Maine) day school was opened in 1876, and after twenty years became so deteriorated in morale and educational attainment as to convince the board of education of that city that something must be done to improve its condition. After an exhaustive examination and comparison with other institutions, it was made a boarding-school, conducted on the Combined system, and with most satisfactory results.

I have in my possession documents from nearly every principal in the United States, all testifying to the fact that day schools are not as efficient, and do not and can not prepare the deaf for usefulness and good citizenship, as do boarding-schools. Briefly stated, some of the reasons for this opinion are as follows:

(1st) *Irregular attendance.* Inclement weather, lack of shoes and suitable clothing, illness (fancied or real), need of the child's help at home, an approaching circus parade, a family excursion, a visit from a country cousin, the importunities of the boy or girl for a "day off." and

often the household cares and anxieties of an overworked mother, all tend to interfere with prompt and daily attendance, and it need not be said that such interruptions to consecutive study are a serious hindrance to mental progress.

(2d) *Lack of discipline.* My experience would go to show that there is a deeper tenderness on the part of parents for their deaf child than for his more fortunate brother, but out of this very affection and the inability to make the child understand the reasons of restraint grows a tolerance of waywardness and a laxity of home discipline which quickly disappear under the benign influence of orderly example in an institution where personal rights, even of a child, are protected, and aggressions gently but firmly repressed. A month ago a little six-year-old deaf boy entered school. His first act in response to gentle approaches of the matron was to strike her on the nose with all the force of his tiny fist. "O, that is the way he always does," said the mother, who was looking on.

The first boy who entered the Institution after I took charge of it was a bright little fellow six years old, and of most excellent parentage. One day, not many weeks afterwards, without provocation he knocked off another boy's cap. I happened to come along just then, and I told him to pick up the cap and give it back. He refused. Telling the aggrieved lad to leave his cap on the ground, I led the aggressor to my room and taking him on my knee, I tried to make him understand how naughty he had been, when suddenly he struck me in the face with a long tin pill-box which he held in his hand. I took him by both arms and gave him one severe shake. We glared into each other's eyes for half a minute; when all the muscles of his little body relaxed, and he put up his lips and kissed me. "Now will you pick up the cap?" "Yes." He went out with me, and handed the boy his cap. They embraced each other, and I went about my work. I have no recollection of ever having occasion to discipline him afterwards. The "boy" is now a distinguished sculptor, many of whose works adorn the city of San Francisco.

(3d) *The difficulty of classification.* One of the most serious problems that confront a principal is how to arrange his classes in such a way as to economize the time and strength of the teacher by selecting a sufficient number of pupils of equal grade in intelligence and attainments to profit by class instruction. Less than ten is expensive to the State; more than fifteen is exhausting to the teacher; and yet to get *this* classification requires at least two hundred pupils. But what sort of classification can be obtained in a little day school of *children* between three years and *twenty-one* years of age, made up of the deaf, the semi-deaf, the pupils who have once heard and retain speech, and the added percentage, found in all schools, of children of low mentality? To state the problem ought to suffice for an intelligent teacher.

(4th) *Lack of supervision.* Few families are able to give the care and watchfulness to their deaf children which a well-organized institution provides. Of course there are some parents of means and leisure who can bestow upon their deaf child every protection by aid of attendants and the personal oversight of the mother; but many have not the money for nurses, nor the time to give to one child the attention which has to be divided among several. The teacher of the day school has the child for four or five hours a day, but her responsibility ceases at the sound of the dismissal bell, and then begins the anxiety of the mother, which leads me to speak of

(5th) *The danger of the streets.* I do not refer to the mere physical peril from vehicles, trolley cars, and jostling crowds, but to the more serious danger of evil companionship and vicious example. It is universal testimony that the "street" is where the temptation to wrongdoing begins. The deaf are naturally guileless, and therefore peculiarly liable to evil influence. The "dummy" is generally considered fair game for thoughtless companions, while the fiendishness of some boys, and men as well, is almost incredible. I know whereof I speak.

(6th) *The lack of mental attrition.* It is the unanimous testimony of all principals who have had opportunity for observation that the pupils from day schools who finally go to institutions are much inferior in attainment, and have to take lower grades than their years under instruction would give reason to expect. This is not surprising, and is largely due to the lack of mental attrition among the pupils of day schools. The teachers generally who are wedded to the "pure oral" system and who have little knowledge of the advantages of the Combined system try to repress and abort the natural language of the deaf, with the consequence that the children have no means of communication with each other or their elders, and thus lose half the joy of life during those tender years which should be full of it. I do not speak inadvisedly when I say that for the first three years the campus is worth more than the schoolroom in stimulating mental development. *There* is retailed all their little youthful experiences, their pleasures and their grievances; the news of the day is repeated from hand to hand, the war in Manchuria, the recent presidential campaign, and, without much knowledge of tariff, free trade, and imperialism, or of Russian duplicity and aggression, the small boy, by watching the discussions of his elder companions, soon develops strong partisanship, and, in knowing results is fully abreast with his hearing brothers, and like them can not resist the temptation to get on the band wagon, and, with paper cap, broomstick, and tin pan join the parade in honor of the victor. All this and more of the same sort is education of great value, and is obtained on the campus and at the table, while the work of the classroom is con-

fined to the development of the sentence in such stimulating phrases as "a bird sings," or "how do you do?"

(7th) *Manual training.* A serious and recognized lack in the results of day school education is that no adequate provision is made for training in handicrafts. It need not be said that fitting pupils for self-support after they leave school is held to be of importance second only to their mental equipment. The sloyd work so popular in the public schools affords little preparation for employment, and seems to me to be far inferior to the Russian system as a preliminary study in handicrafts. The great school at Moscow found it advisable to establish in connection with the school a manufacturing department, where articles are made for sale. In California we have done the same thing, not, however, for the purpose of making money, but to give our pupils that skill and expertness which enable them to go out as journeymen. How successful we have been is shown in the fact that I do not know of a graduate from this Institution that is out of work.

I have written somewhat at length on this subject because it seemed to me timely and important. I have tried to deal with it in a spirit of fairness. What I have said is the result of investigation and observation. In 1891-92, I visited the day schools in London, in company with Dr. William Stainer, who was the father of them, and who after fourteen years of experience was impelled to write as follows (see *American Annals*, vol. 34, page 42):

"I do not think that any one thoroughly acquainted with the idiosyncrasy of the deaf and dumb children of the poor (and it must be borne in mind that this is the class we are dealing with, not the well-to-do, who are capable of paying for the education of their children) would venture to assert that they could be sufficiently educated by attending a day school five hours a day, five days a week, like ordinary children, and this, perhaps, for a few years only. If it were so, then all the institutions on the Continent and in America, as well as our own, are spending large sums of money unnecessarily; but if, on the contrary, those noble institutions are essential to the well-being of the class of children for whom they provide, then the School Board system must only be looked upon as a temporary expedient to meet the urgent requirements of large numbers for whom no other means are at present available. The decision of the committee of the School Board on this point is worth recording. In reply to one of the printed questions put to the Board by the Royal Commission, 'Is the day school principle, in your opinion, favorable to the education of the deaf and dumb?' the committee answered in the negative," and gave as reasons most of the points I have made above.

I have visited similar schools in Germany. I have made a special tour through the schools of Wisconsin and Chicago. I have seen the

working of the Boston school, and have been able to judge the results as compared with the results of institution teaching, and my own conclusions coincide with the almost unanimous opinion of my professional brethren: that the deaf are not, and in the nature of things can not be, educated as well in day schools as in boarding-schools supported by the State.

Has, then, the day school no place in the instruction of the deaf? I am not prepared to say so. There are circumstances where they may perform a useful though temporary purpose. In the great States like Illinois, where the institution at Jacksonville had 506 pupils last year, and in Ohio, with its 603 pupils and room for no more, who shall deny to the parent education for his deaf child in a day school when the State, by reason of straitened accommodations, has nothing better to offer?

In communities distant from the State institution and with transportation facilities complex and limited, it might be well if three or four pupils between the ages of five and ten years could be placed under charge of a thoroughly competent teacher and prepared for the larger life and work of the institution. Now and then there is an only child upon whom the affliction of deafness has been laid and whose parents can not bear the thought of separation. I understand and sympathize with the parents. I wish they could look at the self-sacrifice in the light of my experience; but parental love sometimes blurs the eyes and one can not see beyond to-day, forgetting that "weeping may endure for a night, but joy cometh in the morning." To such the day school may afford a present comfort.

If the pupils were limited to an age under, say ten years, and the school was brought under expert supervision and only thoroughly competent teachers were employed, the day school could serve a useful purpose. These are the limitations referred to on page 22.

IMPROVEMENTS.

The board fence erected thirty-four years ago on the north line of the next property had become so infirm by age as to require renewal. It was originally inadequate to protect the orchard from marauders and of late years has been hardly sufficient as a boundary line. It has been replaced with a tight board fence six and a half feet high, every post well braced, and armed on the top with a barbed wire that effectually suggests the knightly legend, *noli me tangere*. The fence is about one thousand feet long, and was entirely built and painted by the boys.

The schoolrooms for the blind have now all been supplied with single desks, and the old "quadruples" have been relegated to the rubbish room. This segregation has not only improved the appearance of the

rooms, but has done away with much of the bickering that often used to occur between deskmates, and tends to peace and quietness in the schoolroom.

Both these improvements have been paid for out of the contingent fund.

FINANCIAL STATEMENTS.

The biennial fiscal period covered by this report has ended not only without a deficit, but with small balances carried to the State Controller's books for the use of the fifty-sixth fiscal year. To make sure of avoiding a deficit we have always endeavored to carry forward to the second half of the two years for which appropriations are made, a saving from the first half, for unexpected expenditures are liable to occur which might force the management to go before the Legislature with a deficiency bill. This has never been done in the history of the Institution, and it is a matter of just pride that the management has always lived within the income provided by the Legislature.

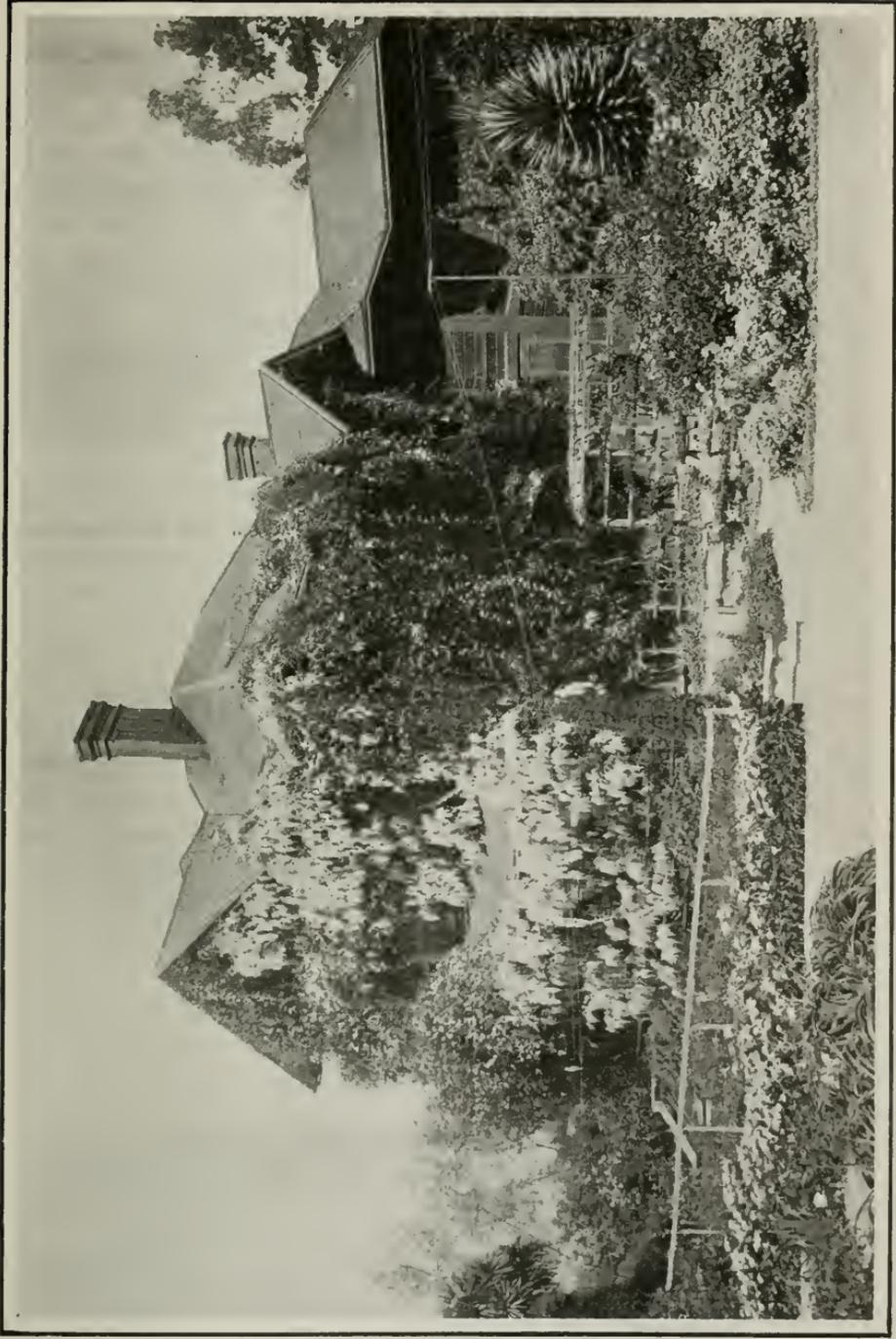
There has been drawn from the State Treasury during the two years under review the sum of \$123,343, and the same has been expended as per vouchers now on file in the Controller's office, and the items of which are set forth in the "dissections" contained in the present report. For the last two years the attendance has been 447 pupils, or an average of 223.5, making a per capita cost to the State of \$275.93—an increase, over the per capita cost of the preceding biennial period, of \$2.85. This increase has been chiefly in the cost of service, though the rise in the price of supplies has in some items been notable.

It is not believed that there will be any material increase in the cost of supplies for the coming two years, but that the present rate of wages will probably be maintained. I do not ask any allowance for buildings or repairs, presuming that the contingent fund will suffice for such expenses. I therefore recommend that, for the efficient conduct of the Institution for the two years ending June 30, 1907, the Board ask an appropriation as follows:

For salaries and wages	\$91,200 00
For support	40,960 00
Total	<u>\$132,160 00</u>

ACKNOWLEDGMENTS.

In behalf of the parents and pupils I desire again to thank the Southern Pacific and the Santa Fé Railroad Companies for the half-fares and passes granted our pupils in going to and coming from their homes. The kindness of General Manager Markham of the Southern Pacific Company, and of Mr. Bissell, General Passenger Agent of the Santa Fé



PRINCIPAL'S RESIDENCE—INSTITUTION FOR THE DEAF AND THE BLIND.

Company, is gratefully remembered in many a household throughout the State.

In extending thanks for the Pasadena News, which has been sent to the pupils gratuitously for the past two years, I can not refrain from alluding to the editor, recently deceased, Mr. Walter S. Melick, who as Secretary of the State Board of Examiners came into official relations with this and other State institutions. I never knew a man more strictly honest, or one more eminently fitted by his sense of justice to deal with the complicated fiscal affairs of the many interests which came under his purview. Kind and charitable in his judgments, warm in his sympathies, full of gentle humor, quick to detect shams, tolerant of an unintentional error in arithmetic, but intolerant of fraud and duplicity, he was an ideal man for the position he occupied, and his untimely death is a distinct loss to the State whose interest he served faithfully as editor, member of the Legislature, and Secretary of the State Board of Examiners.

I desire to acknowledge the services of Mrs. W. L. Mott, of Berkeley, for her weekly readings to the blind pupils, and to thank her in their behalf. For five years this dear lady has given her time and strength as a labor of love and without hope of reward save in the consciousness of making others happy, and it is only right that public reward should be made of such unselfish devotion.

I can not conclude this report without expressing my profound appreciation of the kindness and courtesy extended to me by the Directors in performing the duties of my office. As I look back at the long line of distinguished and unselfish men who have served on the Board, and many of whom have gone to their rest; to the Governors who have appointed them and who have honored me with their confidence; to the many legislators who have befriended the Institution, and back of all to the generous people of California who have been so gracious to me and my work, I am filled with gratitude that thirty-nine years ago I was called to this fair and goodly land and that my lot has been cast among a people who have ever been quick and ready to respond to the claims of the beneficent work I have sought to do.

Respectfully submitted.

WARRING WILKINSON,
Principal.

BERKELEY, November 14, 1904.

DISSECTIONS OF EXPENDITURES.

SALARIES AND WAGES.

Principal and teachers.....	\$41,062 03
Physician, clerk, and matrons.....	14,569 61
Servants and services.....	16,150 24
Treasurer.....	2,000 00
Total.....	\$73,781 88

GROCERIES AND PROVISIONS.

Ammonia, carb., 25 lbs.....	\$4 19	Meat, 77,460 lbs.....	\$6,201 07
Apple butter, 898 lbs.....	83 40	Mince-meat.....	32 82
Bacon, 831 lbs.....	148 45	Molasses, 103 gals.....	43 05
Baking powder, 211 lbs.....	63 50	Mustard.....	8 85
Bath brick, 2 dozen.....	78	Rolled oats.....	30
Beans, bayo, 1,436 lbs.....	45 30	Olive oil, 22¼ doz.....	103 55
Beans, lima, 356 lbs.....	14 54	Peas, split, 600 lbs.....	26 70
Beans, white, 1,744 lbs.....	58 77	Pepper, 146½ lbs.....	27 68
Bread, cakes, etc.....	6 30	Pickles, bottled.....	22 70
Butter, fresh, 12,287 lbs.....	3,190 54	Pickles, keg, 100 gals.....	25 75
Butter, pickled, 159 lbs.....	38 25	Polish.....	26 95
Canned goods.....	446 05	Potatoes, 58,826 lbs.....	823 29
Cheese.....	123 53	Poultry.....	212 96
Chicory, 303 lbs.....	15 66	Raisins, 140 lbs.....	11 50
Chocolate, 119 lbs.....	26 48	Rice, 2,555 lbs.....	119 62
Citron, 45 lbs.....	6 40	Saleratus, 84 lbs.....	4 62
Cocoa, 12½ lbs.....	5 05	Sal soda, 5,400 lbs.....	63 43
Cocoonut, 84 lbs.....	19 86	Salt, coarse, 1,200 lbs.....	9 10
Coffee, 2,044 lbs.....	307 75	Salt, refined.....	32 25
Cooking wine.....	13 15	Saltpetre, 55 lbs.....	4 85
Cornmeal, 3,145 lbs.....	65 40	Salt pork, 976 lbs.....	121 56
Cornstarch, 314 lbs.....	26 40	Sapolio, 68 doz.....	48 37
Crackers, soda, 2,626½ lbs.....	175 26	Sauce, 9 doz.....	24 25
Crackers, Santa Clara, 295 lbs.....	23 94	Silicon, 6 doz.....	4 46
Crackers.....	13 84	Soap, brown, 8,290 lbs.....	330 60
Cream.....	1 75	Soap, Ivory, 18 boxes.....	125 20
Cream of tartar, 24 lbs.....	7 20	Soap, powdered, 600 lbs.....	33 50
Currants, 302 lbs.....	25 62	Soap, toilet.....	8 91
Eggs, 1,624 dozen.....	426 27	Spices.....	27 29
Extracts.....	19 25	Sugar, brown, 667 lbs.....	30 04
Farina.....	10 60	Sugar, cube, 350 lbs.....	18 60
Fish, fresh.....	228 83	Sugar, granulated, 35,300 lbs.....	1,760 35
Fish, salt.....	77 27	Sugar, powdered, 207 lbs.....	11 42
Flour, graham, 8 bbls.....	36 45	Syrup, 290 gals.....	93 59
Flour, rye.....	9 85	Tapioca.....	13 38
Flour, white, 455 bbls.....	1,923 50	Tea, 479 lbs.....	163 75
Fruit, dried.....	228 75	Vegetables.....	85 37
Fruit, fresh.....	526 27	Vinegar, 274 gals.....	47 83
Gelatin, 5 doz.....	6 03	Washing ammonia, 27 doz.....	64 50
Ham, 2,794 lbs.....	418 69	Wheat, rolled, 3,801 lbs.....	82 33
Honey, 2 gals.....	1 80	Yeast.....	69 30
Lard, 2,567 lbs.....	298 73	Total.....	\$20,191 44
Maccaroni.....	56 15		

CLOTHING.

Aprons	\$3 50	Pins and needles	\$18 01
Buttons	12 52	Rubbers	2 90
Clothes brushes	8 00	Seissors and clippers	5 30
Collars	20	Shirts, 1½ doz.	10 50
Combs and brushes	21 33	Skirts, 3	8 70
Corsets	60	Shoes, 45 pair	80 45
Darning cotton	80	Shoe laces	10 15
Dress goods	82 74	Shoe blacking, 35 doz.	17 05
Elastic	9 00	Shoe brushes, 6 doz.	20 63
Gossamers	1 75	Stockings and socks	58 80
Handkerchiefs, 6 dozen	10 50	Suspenders	14 85
Hats	12 00	Tape	1 60
Indelible ink	2 00	Thread	28 40
Linings	12 73	Trimmings	3 64
Nail and tooth brushes	9 45	Underwear	97 25
Neckties	2 50	Valise	3 10
Nightgowns	6 58	Waists	7 27
Overalls, 9½ doz.	55 75		
Pants	1 00	Total	\$641 55

FURNITURE.

Ash barrels, 3	\$13 15	Napkins	\$9 75
Baskets	7 73	Oilcloth	8 30
Blankets, 102 pair	323 25	Oxalic acid	9 00
Bread-cutter	15 00	Pails, etc.	6 15
Brooms, 18 doz.	63 50	Pillows	9 00
Carpets	169 25	Preserve jars	17 45
Carpet cleaning	92 60	Refrigerator	22 28
Chairs and repairs	48 00	Rubber blanket	11 52
Chamois skins	2 00	Scrub brushes	16 35
Clocks and repairs	18 45	Sewing-machine and repairs	17 50
Comforters, 2	3 00	Sponges	13 50
Crockery	289 34	Sheeting	138 87
Cutlery	42 15	Spreads, 3¾ doz.	38 00
Curtains	38 92	String	8 54
Dust and floor brushes	99 65	Tablecloths	45 16
Dustpans	7 25	Table padding	3 60
Enamel ware	33 16	Thread	2 85
Feather dusters	62 00	Tinware	32 43
Kitchen utensils	24 35	Towelng	191 90
Linoleum	4 69	Upholstering	17 51
Mats and matting	43 35	Window shades	4 75
Mattresses and repairs	59 35	Woodenware	17 53
Mirrors	10 60		
Mop cloths, 18 doz.	54 94	Total	\$2,174 73
Mop and brush handles	7 00		

BUILDING AND REPAIRS.

Bricks, 3,000	\$37 00	Paints and oils	\$186 06
Cement work	83 30	Plastering	20 00
Chimney sweeping	10 00	Plumbing and supplies	509 01
Engine and boiler repairs	21 63	Range repairs	46 75
Glass and putty	191 45	Roof repairs	152 50
Glue	3 90	Sewer pipe	20 09
Hardware	190 65	Whitewashing machine	45 00
Heating apparatus	258 60	Wire netting	25 57
Lime, 8 bbls.	16 15		
Lumber	267 67	Total	\$2,170 73
Painting and papering	85 40		

FUEL AND LIGHT.

Candles	\$8 50	Hose	\$15 00
Coal, hard, 15 tons, 1,010 lbs.	162 87	Lamps, etc.	11 95
Coal, soft, 278 tons, 1,400 lbs.	2,359 64	Machine oil, 180 gals.	90 01
Coal, screenings, 461 tons, 540 lbs. .	2,080 43	Matches	9 42
Coal oil, 305 gals.	45 23	Machine repairs	55
Electric lamps, 450	87 85	Wages, engineers	3,660 00
Electric repairs and service	34 16	Waste, 100 lbs.	10 50
Gas	491 98	Wood, 22½ cords	223 50
Gas fixtures	26 04		
Gas regulator, rent	22 00	Total	\$9,356 45
Gasoline, 101½ gals.	16 82		

LAUNDRY.

Bluing, 28 lbs.	\$3 46	Wages	\$2,520 00
Brushes	3 38	Washboard	35
Caustic soda, 840 lbs.	62 70	Wax	6 90
Chlorid of lime, 577 lbs.	22 87		
Starch, 923 lbs.	58 79	Total	\$2,702 55
Tallow	24 10		

STABLE AND DAIRY.

Axle grease	\$0 50	Oats, 2,196 lbs.	\$30 61
Barley, 1,784 lbs.	21 88	Oilcake meal, 9,389 lbs.	138 88
Bran, 71,380 lbs.	786 08	Pails, etc.	17 65
Brooms, 6 doz.	24 75	Plowing	66 00
Buggy and wagon repairs	49 20	Salt	40
Brushes	3 25	Stock	147 50
Corn, 8,458 lbs.	128 98	Veterinary services	18 40
Farm implements	52 35	Wages	1,545 16
Harness and repairs	52 45	Wheat, cracked, 571 lbs.	9 42
Hay, 236,400 lbs.	1,337 08	Wheat, whole, 11,528 lbs.	174 14
Horses	300 40		
Horseshoeing and clipping	134 00	Total	\$5,322 40
Middlings, 20,132 lbs.	283 32		

INDUSTRIAL DEPARTMENT.

<i>Printing Office—</i>		<i>Carpenter Shop—</i>	
Ink	\$9 62	Tools	\$550 41
Machine repairs	2 40	Wages	1,605 00
Paper	79 95		
Type, etc.	54 19	Total	\$2,851 57
Wages	1,050 00		

MISCELLANEOUS.

Blacksmithing	\$1 50	Garden tools	\$33 43
Books, stationery, etc.	672 42	Hose	18 75
Collection charges	94 80	Ice	56 30
Diplomas	45 60	Lye	2 60
Directories	10 25	Music for the blind	42 99
Drugs	530 74	Nursing	32 14
Electric repairs	4 80	Piano and organ tuning and re-	
Expense of pupils going home..	28 20	pairs	416 50
Express charges	187 50	Paper, subscription	1 15
Flags	16 00	Pruning orchard	141 00
Freight	24 47	Rope	2 45

MISCELLANEOUS—Continued.

Scales	\$11 95	Traps and poisons	\$7 93
Seeds and plants	13 00	Typewriter repairs	102 15
Spectacles	3 75	Water	1,048 87
Stamps	117 12	Water sprinkling	15 45
Subscription to Annals	62 05	Wrapping paper, etc.	120 65
Telegrams	8 58		
Telephones	229 23	Total	\$4,150 32
Traveling expenses	46 05		

RECAPITULATION.

Salaries and wages	\$73,781 88
Groceries and provisions	20,191 44
Clothing	641 55
Furniture	2,174 73
Buildings and repairs	2,170 73
Fuel and light	9,356 45
Laundry	2,702 55
Stable and dairy	5,322 40
Industrial department	2,851 57
Miscellaneous	4,150 32
Total	\$123,343 62

CONTINGENT FUND.

Carriage repairs	\$151 00
Christmas expenses	139 45
Clothing	1,697 97
Dentist	450 00
Furniture	462 65
Hay	468 46
Hospital expenses	775 80
Repairs on buildings and grounds	2,801 46
Repairing shoes	566 95
School supplies	580 79
Sundries	537 38
Water	719 48
Total	\$9,351 39

TREASURER'S STATEMENT

FOR THE TWENTY-FOUR MONTHS ENDING JUNE 30, 1904.

STATE APPROPRIATION.

Received from the State Treasurer	\$123,343 62	
<i>Disbursements.</i>		
Payrolls		\$84,016 54
Supplies, as per vouchers		39,327 08
	\$123,343 62	\$123,343 62

CONTINGENT FUND.

To cash from State Treasurer	\$9,351 49	
To miscellaneous receipts	11,981 27	
<i>Disbursements.</i>		
By sundry accounts, as per vouchers		\$9,351 49
By cash sent State Treasurer		11,981 27
	\$21,332 76	\$21,332 76

DURHAM FUND.

July 1, 1902—Cash on hand	\$11,895 64	
June 30, 1904—Interest and dividends	5,301 97	
Received from loans and warrants	14,375 00	
<i>Disbursements.</i>		
June 30, 1904—As per vouchers, including loans		\$15,274 46
Cash on hand		16,298 15
	\$31,572 61	\$31,572 61

LOUIS STRAUSS FUND.

July 1, 1902—To cash on hand	\$4,671 26	
June 30, 1904—To interest and dividends	870 36	
<i>Disbursements.</i>		
June 30, 1904—By disbursements as per vouchers		\$184 35
Cash on hand		5,357 27
	\$5,541 62	\$5,541 62

LIBRARY FUND.

July 1, 1902—To cash on hand	\$125 74	
June 30, 1904—Received from interest and dividends	39 50	
Payment of loan	800 00	
<i>Disbursements.</i>		
June 30, 1904—By disbursements as per vouchers		\$100 98
Cash on hand		855 26
	\$965 24	\$965 24

CASH BALANCE, JUNE 30, 1904.

On deposit with Farmers and Merchants' Savings Bank, account Durham Fund	\$16,298 15
On deposit with the Union Savings Bank, account Strauss Fund	5,357 27
On deposit with the Union Savings Bank, account Library Fund	855 26
	\$22,510 68

ASSETS.

June 30, 1904—Cash on hand	\$22,510 68
Bills receivable	54,414 53
	\$76,925 21

DETAILED STATEMENT OF BILLS RECEIVABLE.

June 30, 1904—Elisabeth Staude	\$7,000 00
E. and L. Mahoney	4,500 00
Elletta M. Brown	5,000 00
Charles Jurgens	20,000 00
Douglas Tilden	2,221 80
Newell Perry	1,990 00
G. T. Redmond	2,065 23
Theo. Grady	450 00
James W. Howson	687 50
Hospital Fund	10,500 00
	\$54,414 53

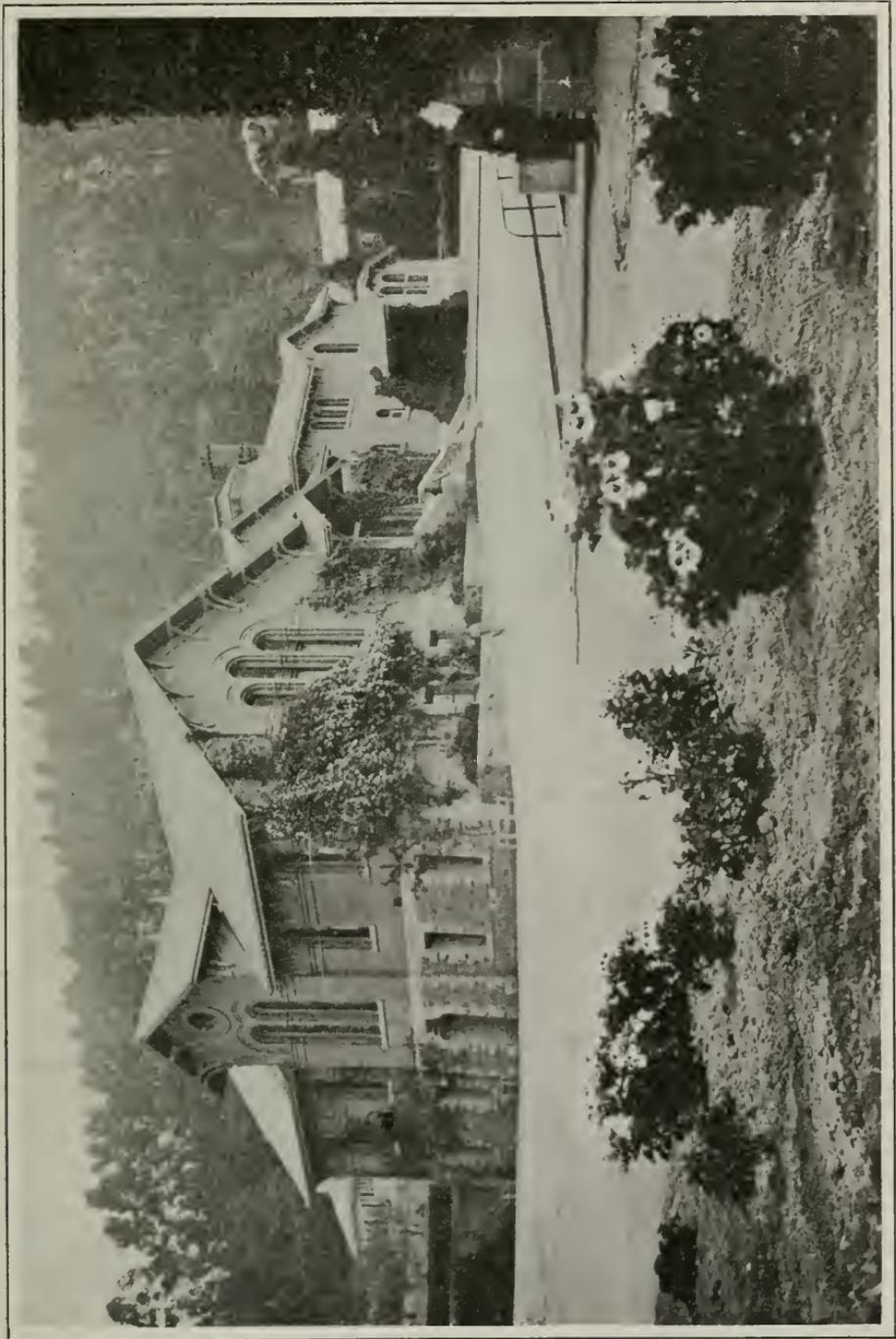
Respectfully submitted.

I. H. CLAY,
Treasurer.

Subscribed and sworn to before me, this 1st day of November, 1904.

[SEAL.]

PETER C. LASSEN,
Notary Public in and for the County of Alameda, State of California.



REFECTORY—INSTITUTION FOR THE DEAF AND THE BLIND

LIST OF PUPILS IN THE INSTITUTION.

DEAF BOYS.

Name.	Town.	County.	Name.	Town.	County.
Abbott, Ashbel	Piney	Monterey	Hawks, Alex.	San Francisco	San Francisco
Akers, Lester	San Francisco	San Francisco	Hill, Vivian	Berkeley	Alameda
Baker, James	Marysville	Yuba	Holcomb, Hugo	San Francisco	San Francisco
Barthe, John	Livermore	Alameda	Hytti, Iljalmar	Sawyer's Bar	Siskiyou
Barwise, William	Pomona	Los Angeles	Issoglio, Arthur	Jerome	Arizona
Beck, Marcus	Vallejo	Solano	Jensen, William	Oakland	Alameda
Beebe, Arthur	Safford	Ter'y of Arizona	Johnson, Wm.	Traver	Tulare
Blanco, Robert	Gonzales	Monterey	Johnson, Martin	San Francisco	San Francisco
Bonar, James	Sacramento	Sacramento	Kett, Robert J.	Tehachapi	Kern
Buker, Raymond	Aromas	San Benito	Kibby, Norman	Cupertino	Santa Clara
Bonzani, Chas.	San Gregorio	San Mateo	Kohrumel, Wm.	Red Bluff	Tehama
Burrell, Fred	Dos Palos	Merced	Kuarston, Jas. J.	Nanaimo	British Columbia
Brodrick, Edw.	Cloverdale	Sonoma	Kramback,		
Campbell, Fred	Rumsey	Yolo	Herman	Santa Cruz	Santa Cruz
Carroll, Philip	San Francisco	San Francisco	Lawton, Wm. C.	San Francisco	San Francisco
Cartwright, Leon-			Lopez, Clemons	West Berkeley	Alameda
ard	San Diego	San Diego	Liddle,		
Christiansen,			Bertrand L.	Bryson	Monterey
George	West Berkeley	Alameda	Matsen, George	San Francisco	San Francisco
Clark, Albert	Oakland	Alameda	Matheis, Melville	San Francisco	San Francisco
Conrad, Alvin	Farmersville	Tulare	McNeilly,		
Cordero, Augus-			Harold A.	Reno	State of Nevada
tin	Santa Barbara	Santa Barbara	Mier, Ralph	San Francisco	San Francisco
Curtiss, Almon	Paradise	Butte	Moore, John	Anderson	Shasta
Curtiss, Oliver	Paradise	Butte	Morris, Manuel	Ignacio	Marin
Curran, William	Gold Hill	State of Nevada	Moynahan, John	Vallejo	Solano
Davis, George	Belmont	San Mateo	Musladine, John	San Francisco	San Francisco
Dwyer, Jolly	Vacaville	Solano	Newman, Wm.	Crockett	Contra Costa
d'Cambri,			Niel, Henry	Pope Valley	Napa
Manuel	Oakland	Alameda	Norton, Ernest E.	St. Helena	Napa
De Grossellier,			Otis, Charles R.	San Francisco	San Francisco
Albert	Carson City	State of Nevada	Page, Claude A.	Tybo	Nevada
Depew, Roscoe	Los Angeles	Los Angeles	Pale, Charles J.	San Francisco	San Francisco
Dick, Arthur	Virginia City	State of Nevada	Patheal, Monroe	Campbell	Santa Clara
Doane, Clarence	Rialto	San Bernardino	Phelps, Geo. E.	Grass Valley	Nevada
Dutra, Jose	Mission San José	Alameda	Phelps, William	Stony Ford	Colusa
Dutton, Clive	Berkeley	Alameda	Phillips, Chas. B.	West Berkeley	Alameda
Elmer, Leslie	San José	Santa Clara	Poole, Earl	Yreka	Siskiyou
Evans, Stuart	Selma	Fresno	Rose, Alex. D.	Sacramento	Sacramento
Fowler, Bret Hart	Oakland	Alameda	Ross, Leslie	San Francisco	San Francisco
Franck, Henry	San Francisco	San Francisco	Rossi, Umberto	Stockton	San Joaquin
Gabrielli, Gui-			Ryden, Edw. G.	Los Angeles	Los Angeles
seppe	Sacramento	Sacramento	Schroyer, Laurel	Oakland	Alameda
Giambruno, Gui-			Sherman,		
seppe	Oakland	Alameda	Daniel E.	Hanford	Kings
Gleason, Thos.	San Francisco	San Francisco	Sherman, John F.	Hanford	Kings
Gliddon, Don	Berkeley	Alameda	Sherman, Wm.	Hanford	Kings
Green, Ray	Oakland	Alameda	Smith, Laban T.	Gonzales	Monterey
Grose, William	Nevada City	Nevada	Smith, Lionel A.	San Francisco	San Francisco
Haley, James	Jamestown	Tuolumne	Songey, Ernest	West Berkeley	Alameda
Hall, Raymond	San Francisco	San Francisco	Spencer, Albert A.	Alameda	Alameda
Hannan, Walter	San Francisco	San Francisco	Stephens, Wm.	Virginia City	Nevada
Hart, William	Princeton	Colusa	Taylor, Chas. F.	Reno	State of Nevada
Hartmann,			Thomas, Rhea	Prunedale	Monterey
Adolph	Hollister	San Benito			

DEAF BOYS—Continued.

Name.	Town.	County.	Name.	Town.	County.
Tillman, Leslie	Florence	Ter'y of Arizona	Woodruff, Albert	San Francisco	San Francisco
Tickner, Gerald	Sacramento	Sacramento	Whitworth,		
Tyhurst, Wm.	San José	Santa Clara	George H.	Newman	Stanislaus
Walker, Wm. H.	Polaski	Fresno	Wimber, John W.	Hanford	Tulare
Wharton, Valley	San Francisco	San Francisco	Winters, Elbie L.	Oakland	Alameda
Wilder, Herman	Farmersville	Tulare	Wood, Golden	Taylor	Shasta

DEAF GIRLS.

Baccus, Celine	Oakland	Alameda	Hogan, Myrtle	Santa Clara	Santa Clara
Baertschieger,			Hopkins, Amy B.	Potter Valley	Mendocino
Anna	Los Angeles	Los Angeles	Kin, May F.	Sacramento	Sacramento
Beaver, Bertha M.	Los Banos	Merced	Jones, Henrietta	Nassau	Calaveras
Beal, Elsie	San Francisco	San Francisco	Kenney, Anna	Yosemite Valley	Mariposa
Bonzani, Paulina	San Gregorio	San Mateo	Keesing, Iizzie	San Francisco	San Francisco
Brodrick, Amy I.	Cloverdale	Sonoma	Keesing, Grace	San Francisco	San Francisco
Bryan, Hattie	San Francisco	San Francisco	Knarston, Helen	Nanaimo	British Columbia
Case, Viola	Paradise	State of Nevada	Larimer, Mildred	Tucson	Ter'y of Arizona
Cloer, Gracie	Santa Rosa	Sonoma	Luddy, Mabel	San Andreas	Calaveras
Cohn, Annie	Hanford	Tulare	Lucy, Mary	Undine	San Joaquin
Cohn, Ida	Hanford	Tulare	Marketta, Pearl	Dunsmuir	Siskiyou
Comacho, Anna	San Leandro	Alameda	Martinez, Ida	Posts	Monterey
Conrad, Goldie	Farmersville	Tulare	Matsuda, Mary	San Francisco	San Francisco
Cota, Del Carmen	Montecito	Santa Barbara	McCarthy, Sadie	Los Angeles	Los Angeles
Cowles, Inez I.	Red Bluff	Tehama	McLean, Maggie	Fresno	Fresno
Cook, Mae Belle	Yreka	Siskiyou	Millar, Irene	Santa Rosa	Sonoma
Crouch, Oma A.	Selma	Fresno	Mitchell, Wildey	Selma	Fresno
Cruz, Hortense	Compton	Los Angeles	Nagiller, Ida	Williams	Ter'y of Arizona
De Large, Irene	Prescott	Ter'y of Arizona	Noll, Martha	Irvington	Alameda
Delmas, Carolina	Sanger	Fresno	Parks, Lulu	Hollister	San Benito
Devendorf,			Phelps Minnie A.	Stony Ford	Colusa
Ethel E.	Berkeley	Alameda	Phillips, May	Winters	Yolo
Dunsmuir,			Pickering,		
Dora L.	Palo Alto	San Mateo	Gladys	San Francisco	San Francisco
Douglass, Mat-			Reese, May	Jackson	Amador
tie O.	O'Neils	Madera	Risher, Mary F.	San Ber'dino	San Ber'dino
Egan, Edna G.	San Francisco	San Francisco	Robles, Louisa	Montecito	Santa Barbara
Fitzgerald,			Roncalli, An-		
Golda M.	San Diego	San Diego	gelina	Occidental	Sonoma
Freel, Ida B.	Collegeville	San Joaquin	Roncalli, Lizzie	Occidental	Sonoma
Freitas, Anna	Haywards	Alameda	Schimonousky,		
Forbes, Ramona	Santa Maria	Santa Barbara	Dora	Willits	Mendocino
Gande, Ida	San Francisco	San Francisco	Shattuck,		
Ghioris, Marie	Stockton	San Joaquin	Phoebe J.	San Francisco	San Francisco
Golden, Algie M.	Modesto	Merced	Shea, Lillian	Los Angeles	Los Angeles
Gregory, Elva	Fresno	Fresno	Simpson,		
Haagensen,			Mollie L.	Coronado	San Diego
Agnes	Oakland	Alameda	Simpson, Nora L.	Coronado	San Diego
Hare, Irene M.	Berkeley	Alameda	Sink, Genevieve	Cloverdale	Sonoma
Harrison, Carme-			Skaine, Alice	San Francisco	San Francisco
lita	Oakland	Alameda	Stacks, Bessie	Elliott	San Joaquin
Hall, Grace Edna	Phoenix	Ter'y of Arizona	Stubbs, Ger-		
Hinman, Bessie	Sheridan	Placer	trude F.	Duarte	Los Angeles
Hoffmann,			Taylor, Helen	Los Angeles	Los Angeles
Martha	St. Helena	Napa	Terrell, Stella	Oroville	Butte
Hoffmann,			Turner, Lorine	Oroville	Butte
Virginia	St. Helena	Napa	Waters, Ava K.	Oakland	Alameda

BLIND BOYS.

Name.	Town.	County.	Name.	Town.	County.
Allen, Murray	Oakland	Alameda	Leslie, Ernest	Berkeley	Alameda
Allen, Walter	Grass Valley	Nevada	Leonard, John	San Francisco	San Francisco
Baker, Henry L.	Sacramento	Sacramento	Lyon, Earl H.	Reno	State of Nevada
Bailey, George	San José	Santa Clara	McDonnell, Carl	Williams	Colusa
Brueyer, Fred W.	Los Angeles	Los Angeles	Miller, Polk W.	Ukiah	Mendocino
Britton, Ray'nd L.	Lawrence	Santa Clara	Miller, Valentine	Ukiah	Mendocino
Caceres, Chas.	San Francisco	San Francisco	Miller, Robert	Los Angeles	Los Angeles
Christian, George	Wheatville	Fresno	Morgan, Edward	Berkeley	Alameda
Clark, Martin D.	Salida	Stanislaus	Oliver, Raymond	Oakland	Alameda
Cook, Jesse F.	Pomona	Los Angeles	Olcese, Frank	Hornitos	Mariposa
David, Benj.	Bakersfield	Kern	Paxton, John A.	San Francisco	San Francisco
David, Willard	Bakersfield	Kern	Pettis, Charles	Saratoga	Santa Clara
Dean, Franklin	Barstow	San Bernardino	Phillips, Owen	Oakland	Alameda
Deckard, Everett	Black Diamond	Contra Costa	Poulsen, Charles	Lompoc	Santa Barbara
Dondero, John	San Francisco	San Francisco	Schoeller, Carl	Capay	Yolo
Evans, Chas. E.	Pomona	Los Angeles	Scurlock, Walter	San Francisco	San Francisco
Forester, Fr'nk W.	Pomona	Los Angeles	Shepherd, James		
Gay, Eben	Gilroy	Santa Clara	W. B.	Arcata	Humboldt
Gonzales, Frank	San Leandro	Alameda	Sheely, Ira	Oakland	Alameda
Grant, Duncan	Sacramento	Sacramento	Starkey, Wilson	Bakersfield	Kern
Greaney, Thos. P.	San Francisco	San Francisco	Stover, Elmer M.	San Francisco	San Francisco
Hammers, George	San Francisco	San Francisco	Svensen, Andrew	San Francisco	San Francisco
Harlan, Leland	Williams	Colusa	Ururchurchtu,		
Henderson, Ray'd	Oakdale	Stanislaus	Rosendo	Los Angeles	Los Angeles
Henderson, St'n'l'y	Oakdale	Stanislaus	Voice, Isaac	Fresno	Fresno
Ingalls, Chester	San Francisco	San Francisco	Wheaton, Donald	Alameda	Alameda
Ingalls, William	San Francisco	San Francisco	Weigert, Ernest	Alturas	Modoc
Juckett, Clarence	Redding	Shasta	Weile, Chas.	Santa Barbara	Santa Barbara
Kloess, Alfred	Pomona	Los Angeles	Watson, John	Stockton	San Joaquin
Kloess, Walter I.	Pomona	Los Angeles	Yong Shu Wah	San Francisco	San Francisco
Kaunitz, Hilbert	San Francisco	San Francisco			

BLIND GIRLS.

Alison, Tillie	Lincoln	Placer	Monterichard,		
Barbee, Laura	San Francisco	San Francisco	Clorinda	San Francisco	San Francisco
Brydges, Ada C.	Oakland	Alameda	Morrison, Cath-		
Cabrillas, Car'lina	Valley Center	San Diego	erine	Skyland	Santa Cruz
Corrieri, Escolina	San Francisco	San Francisco	Muir, Margaret	Berkeley	Alameda
Dawson, Kath'l'n	San Francisco	San Francisco	Murphy, Maud	Rocklin	Placer
Dibitonda,			Ogden, Sarah L.	Armona	Kings
Rimilda	San Francisco	San Francisco	Oliver, Lizzie	Hollister	San Benito
Dixon, Louise	Bakersfield	Kern	Oliver, Rose	Hollister	San Benito
Drummond, Eth'l	Los Angeles	Los Angeles	Philipps, Frances	Winnemucca,	State of Nevada
Finnerty, Ruby	San Francisco	San Francisco	Piper, Hazel	Virginia City,	" " Nevada
Gillespie, May	Stockton	San Joaquin	Prime, Edna P.	Maxwell	Colusa
Graham, Marg'r't	San Francisco	San Francisco	Proedar, Edith	Berkeley	Alameda
Hall, Birdie	San Francisco	San Francisco	Reynolds, Ruth	Oakland	Alameda
Haight, Berna	Little Shasta	Siskiyou	Robertson, Bessie	Berkeley	Alameda
Harris, Charlton	San Francisco	San Francisco	Ruiz, Marie	Tustin	Orange
High, Minnie	Berkeley	Alameda	Schumacher,		
Hilton, Maud	Santa Cruz	Santa Cruz	Annie	San Francisco	San Francisco
Jameson, Mildred	Los Banos	Merced	Tilton, Grace	San Francisco	San Francisco
Jeffrey, Minnie	San Francisco	San Francisco	Waters, Olive	Oakland	Alameda
Keough, Marg'r't	Berkeley	Alameda	Whitton, Alice	Oakland	Alameda
Mesow, Helen	Berkeley	Alameda	Wilber, Leona	Los Angeles	Los Angeles

TERMS OF ADMISSION.

The California Institution for the Deaf and the Blind is located at Berkeley, about four miles north of the city of Oakland.

Between San Francisco and Berkeley, railroads and ferries offer communication every ten minutes of the day, and from Oakland there are two lines of electric cars which land passengers within five minutes' walking distance of the Institution.

The Institution offers its benefits to all deaf or blind persons who are of age suitable for instruction, who are of sound intellect, and free from vicious habits and contagious or offensive diseases.

No charge is made for pupils from this State, except for clothing and traveling expenses.

Pupils from other States or Territories are charged \$300 per annum, payable quarterly in advance. No reduction is made from annual charge, except in case of prolonged absence by reason of sickness.

The session begins on the fourth Wednesday in August, and ends on the second Wednesday in June. Parents are earnestly requested to enter or return their children promptly at the beginning of the term. Only in extreme cases will pupils be permitted to leave before school closes.

Pupils should be provided with comfortable clothing when they enter the Institution, and their wardrobe renewed twice a year.

All moneys designed for pupils should be placed in the hands of the Principal, to whom, also, all letters of inquiry should be addressed. Money orders should be drawn on the Berkeley postoffice, and all letters, packages, trunks, etc., should be addressed "Institution for the Deaf and the Blind, Berkeley, Cal."

Parents or guardians of applicants for admission are requested to furnish answers to the following questions:

1. What is the name of the applicant?
2. When and where was he born?
3. Is his deafness or blindness from birth, or is it from accident or disease? If from accident or disease, at what age and from what cause did he become deaf or blind?
4. Is his deafness or blindness total or partial? If the latter, what is his degree of hearing or sight?
5. Have any attempts been made to remove his deafness or blindness? If so, what were the results?

6. Are there any other cases of deafness, blindness, idiocy, or insanity in the family, or among the collateral branches of kindred? If so, state the relationship?

7. Was there any blood relationship between parents or grandparents?

8. Has the child had smallpox, scarlet fever, mumps, whooping-cough, or measles? Has it been vaccinated?

9. What are the names, nationality, and postoffice address of parents?

10. What is the number of other children?

11. How long have parents lived in California?

FIRST BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES

OF THE

CALIFORNIA POLYTECHNIC SCHOOL,

COMPRISING THE

REPORTS OF THE DIRECTOR AND SECRETARY OF THE BOARD.

1902-1904.

SAN LUIS OBISPO, CALIFORNIA.
NOVEMBER, 1904.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1905.

BOARD OF TRUSTEES.

HIS EXCELLENCY, GEORGE C. PARDEE, - - - - -	Sacramento
Governor of California.	
HON. THOMAS J. KIRK, - - - - -	Sacramento
Superintendent of Public Instruction.	
HON. WARREN M. JOHN, - - - - -	San Luis Obispo
Term expires, 1908.	
F. A. HIHN, ESQ., - - - - -	Santa Cruz
Term expires, 1905.	
PROF. E. J. WICKSON, - - - - -	Berkeley
Term expires, 1906.	
R. M. SHACKELFORD, ESQ., - - - - -	Paso Robles
Term expires, 1906.	
HON. S. C. SMITH, - - - - -	Bakersfield
Term expires, 1907.	

OFFICERS OF THE BOARD.

S. C. SMITH, - - - - -	President
R. M. SHACKELFORD, - - - - -	Vice-President
LEROY ANDERSON, - - - - -	Secretary
COMMERCIAL BANK OF SAN LUIS OBISPO, - - - - -	Treasurer

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NOVEMBER 25, 1904.

To His Excellency GEORGE C. PARDEE, *Governor,*

Sacramento, Cal.:

DEAR SIR: I beg to hand you herewith the report of Prof. Leroy Anderson, Director of the California Polytechnic School, which is submitted as the biennial report of the Board of Trustees of that school.

The Director has covered the history and work of the school so thoroughly that little or nothing could be added by the Board.

There also accompanies this the Secretary's report of the proceedings of this Board, including a statement of the receipts and disbursements in detail.

By order of the Board of Trustees.

S. C. SMITH,
President.

REPORT OF THE DIRECTOR.

To the Board of Trustees:

GENTLEMEN: I have the honor to present the first biennial report of the Director of the California Polytechnic School. The report would naturally close with the fiscal year, June 30, 1904, but the beginning of the present fiscal year is so full of incidents tending to shape the policy of the school that it has seemed best to include this period in the report.

LAYING OF CORNER-STONE.

The corner-stone of our first building was laid on January 31, 1903, under the auspices of the Masonic fraternity. The stone was put in place by Grand Master Orrin S. Henderson, who delivered an appropriate address upon the future usefulness of the school. He was followed by Mr. E. H. Hart, Grand Orator of the Masonic lodge. President Smith presided at the dedicatory exercises held at the pavilion in the evening, at which addresses were given by Mr. F. P. Johnson, County Superintendent of Schools; Director Leroy Anderson; Trustee Wickson; and President Benjamin Ide Wheeler, of the University of California, who was the principal speaker of the evening.

BUILDINGS.

The Recitation and Administration Building is 47 by 100 feet, and has a concrete foundation, with Los Berros stone from the grade line to the first floor. The remainder of the structure is of wood, covered with a metal lath and cement. The roofing is of metal tile. The basement contains a temporary dairy-room, a temporary carpenter shop, storage-room, and a general lavatory for boys. The first floor contains the Director's offices, library, lecture-room, and laboratory for botany and entomology, photographic dark-room, and girls' cloakroom and lavatory. The second floor contains an assembly-room, with dressing-room, two drawing-rooms, and two classrooms.

The Dormitory is constructed in the same manner as the Recitation Building, except that the basement and foundation walls are entirely of concrete. Its dimensions are 40 by 100 feet. Its purpose is to provide a home on the school grounds for a few of the teaching staff and for as many students as can be accommodated. It contains thirty single rooms (each with a closet), a parlor, dining-room, kitchen,

laundry, and four bathrooms. Provision is made for one student in a room.

The Trustees are to be congratulated upon having decided upon so comprehensive a plan for future buildings. This plan provides that the rise of ground upon which the main buildings are now standing shall be reserved for future buildings of the same style. A glance into the future shows that the school will, in the course of time, need at least six more buildings to stand upon this site. When completed they will surround a court some five hundred feet square. One hundred and fifty feet to the rear of the most eastward of these buildings is to be located a row of shops, probably six or seven in number. Still farther to the rear of the shops and centering upon the axis of the main buildings is the site of the school barn; while to the left of the barn is the site of the poultry house, corrals, and pens for small stock. This plan allows for the growth of the institution for many years to come, and promises to be at once beautiful and symmetrical.

During the year just passed we have been enabled to begin the construction of the shops and barn according to the above plan. The shops as mentioned are expected to be of the general size of 40 by 100 feet and one story in height. During the spring and summer of 1904 a portion of the shop for forge work was completed. This portion is 40 by 56 feet, and is well equipped with down-draft forges of the latest type, and with a stock of tools and materials for student work.

The barn plan as adopted calls for a main building two stories in height and 50 by 100 feet in size, flanked on either end by a one-story wing 40 by 80 feet. The main barn is to be used for storage, while the wings are to be used as dairy barn and horse barn, respectively. Our present funds will permit the erection of the dairy wing only. The appropriation by the last Legislature of \$8,000 for the erection of shops, barns, and outbuildings was a most wise provision. It allows the Trustees to erect such buildings as are most needed from time to time, and it is to be hoped that similar appropriations may be made at each session of the Legislature.

GROUNDS.

A step in the right direction was made by the appointment of a landscape gardener, whose especial duty as outlined in the appointment is to make a map of the grounds, showing the location of walks and drives, and indicating the kind of plantings to be made, and the places where they are to be made for the best effects. Mr. Ernest Braunton, who was selected for this work, has made an enviable reputation as landscape gardener in southern California. Since June, 1904, he has been instructor in horticulture and landscape gardener at the Preston School of Industry at Ione. Mr. Braunton has submitted his

first plan showing the drives to the buildings from the entrance to the grounds, and these drives with the contiguous beds are being established. The plans of Mr. Braunton promise to give us an ornamentation which will add much to the beauty and attractiveness of the school.

It is to be regretted that we have been unable to build a substantial road from the city limits to the school. The possession by the school of the right of way of about one half mile in length imposes upon us a burden of roadmaking which our funds at present have been too meager to meet. The citizens of San Luis Obispo have expressed themselves as desiring to assist in building the road, but as yet no satisfactory arrangements have been reached.

THE FARM.

The farm comprises a trifle over 281 acres, about one half of which is arable and the other half either hilly pasture or is to be occupied by buildings and ornamental grounds. The equipment of tools now consists of one two-gang 12-inch plow; one single plow; one road plow; Fresno scraper; harrow, mower, and rake; in addition to a number of small hand tools. The stock consists of two registered Percheron mares, with one colt of the same breed; four Ayrshire cows, with three calves; two Jersey cows, with two calves; two grade cows and calves; one Ayrshire and one Jersey bull; and seven Poland-China swine, including five small pigs. The fencing is for the most part old and badly in need of repair. The farm is large enough for our present equipment, but the time is not far distant when we will need more land.

The school farm should be looked upon as a part of the laboratory in agriculture. It is as essentially a laboratory as though it were inclosed within the four walls of a building. Being so considered, it must be well equipped in order that it may yield the best results in instruction. Since the farm when it came into our hands was in a run-down condition, and since the funds have not been sufficient to equip it, except in a very meager way, it has not thus far filled a high place as a laboratory. The principal crops have been oats and barley, chiefly for hay; potatoes have been grown with fair success. During two seasons some corn has been grown, with such satisfactory results that we feel warranted in erecting a silo. I believe that we can grow a fairly good crop of corn on our low lands without irrigation, and of sufficient good quality to make an excellent silage. With irrigation the yield could be doubled. A small orchard of different varieties of apples, peaches, and plums has been set, and thus far is doing fairly well. The farm does not promise well for fruit-growing, except in restricted portions. Over most of the farm a rock formation is found at a depth of three or four feet, which of course makes fruit-growing a difficult proposition, except with large amounts of water for irrigation.

It is desirable on a school farm to do as much experimentation as is possible. Experimentation as carried on in experiment stations is expensive, and we, having funds only for instructional purposes, can not be expected to do experimentation on a large scale. We can do some, however, in a small way by the students as class instruction, and also to a certain extent in our regular farm crops. But even this can not be begun until we have a larger equipment of tools and more money for labor. Another urgent necessity for experimentation is water for irrigation.

LIBRARY.

The library consists of a total of 241 volumes, which are classified as follows: chemistry and physics, 25; plant industry, 27; animal industry, 79, including 58 volumes of the American Jersey Cattle Club's Herd Registers; irrigation and surveying, 5; domestic science, 11; general works, 6. The library also possesses a complete set of the United States Census Reports of 1900, presented by Congressman Daniels, and three volumes of the proceedings of the Constitutional Convention of 1878-79, presented by Trustee John. Of periodicals we are receiving ten monthly, ten weekly, and one semi-monthly. The library also receives the bulletins and annual publications of the United States Department of Agriculture and of the Agricultural Experiment Stations of the majority of the States.

FACULTY.

The following appointments as instructors have been made during the interval covered by this report:

Mr. Sydney S. Twombly was appointed instructor in agriculture, chemistry, and veterinary science. Mr. Twombly was graduated from the Maine State Normal School in 1881 and from the University of Maine in 1886, with the degree of B.S. During the following year he pursued graduate study in agricultural chemistry at Cornell University. During 1887-89 he was Adjunct Professor of Chemistry and Agriculture at the State University of Arkansas. He later attended the Veterinary College of McGill University, and was graduated therefrom in 1891. The following five years he was Professor of Chemistry and Veterinary Science in the Agricultural College of Utah. After resigning from that institution, he took up his residence in southern California and was instructor in science in the Fullerton High School until coming to us in 1903.

Miss Gwendolyn Stewart was appointed instructor in English and domestic science, and matron of the dormitory. Miss Stewart was graduated from Stanford University in 1900, with the degree of A.B. She immediately entered Pratt Institute, Brooklyn, as a student in the normal course of domestic science, from which she was graduated

in 1902. For part of the following year she was instructor in the School of Domestic Science at Pittsburg, Penn. The latter part of the year she spent in travel in Great Britain, studying the industrial schools. She came to us in the fall of 1903, and resigned at the close of the year to accept the position of housekeeper at the University of North Dakota.

Mr. Oscar Leslie Heald was appointed instructor in drawing, carpentry, sloyd, and iron work. Mr. Heald graduated from the normal training course at Throop Polytechnic Institute in 1903, and came to us in the fall of that year. He had had considerable training in machine work and had been assistant teacher in forging at Throop Institute during a portion of his last year.

Mr. Edwin Walter Yount was appointed instructor in drawing and carpentry, and began his duties in April, 1904. Mr. Yount was graduated from the Wilmerding School of Industrial Arts, San Francisco, in 1903. Both before and after his graduation he was variously employed as journeyman carpenter and in the Oakland Planing Mills. He brings to our school a good combination of the theoretical and practical work of building.

Mr. James Edward Roadhouse was appointed instructor in academic subjects, plant industry, and irrigation. Mr. Roadhouse graduated from the University of California, College of Agriculture, in 1904. While there he added to the agricultural course a large portion of the work given in irrigation and forestry. During two summer vacations he was special agent in charge of irrigation investigation for the United States Department of Agriculture. During the summer of 1904 he had special work in the testing laboratory of the Bureau of Forestry at the University of California. During the year 1904-05 Mr. Roadhouse is teaching English, and a portion of the mathematics, in addition to botany and horticulture. When the school is supplied with special teachers in these subjects, as we hope it may be in 1905, Mr. Roadhouse will devote his time to irrigation, horticulture, forestry, and land surveying, for which he is especially well qualified.

Miss Harriet Howell was appointed instructor in domestic art, vice Miss Stewart, resigned. Miss Howell graduated from the high school at Decatur, Ill., and afterwards was a student in domestic art at Pratt Institute. Following her study there she was successively superintendent of domestic art at Mechanics' Institute, Rochester, N. Y., two years; State Agricultural College, Manhattan, Kan., five years; and Throop Polytechnic Institute, Pasadena, Cal., two years. Miss Howell entered upon her work here in the fall of 1904.

Miss Naomi M. Lake was appointed clerk and librarian. She has been an attendant upon the State Normal School of Iowa and a teacher in the public schools of that State for some years. She graduated from

the Los Angeles Business College in 1903, and in addition to her duties in the office of the school has taught bookkeeping in a very creditable manner.

OPENING OF THE SCHOOL.

Although the corner-stone of the school was not laid until the last of January, 1903, the progress of the buildings was such that we seemed warranted in advertising that the school would open about the middle of September of the same year. By the first of September, however, it was seen that the buildings would not be in readiness, and a postponement was made until September 30th. At that date the dormitory was barely finished for occupancy. Not a single room was finished in the Recitation Building. Recitations, however, were held under the very disagreeable surroundings, and although the mechanics did not finish their labors until six weeks later the work of the school was carried on, and the results of the year's work showed that it was much better to open under the adverse circumstances than to have delayed opening until everything was completed.

The first year closed June 23d, with a very creditable exhibition of the work of the students. A reception was held, to which general invitations were issued, and a large number of the residents of town and country were present. The present school year, as adopted by the Trustees, now calls for three terms of about twelve weeks each, the year beginning the middle of September and closing about the middle of June, with a recess of two weeks at the holidays and one week at Easter.

NUMBER OF STUDENTS.

The total enrollment for the first year was 20, and represented the following counties: San Luis Obispo, 7; Monterey, 1; Santa Barbara, 6; El Dorado, 1; Santa Clara, 1; San Diego, 1; Orange, 1; Tulare, 1; and Ventura, 1. The enrollment for the year 1904-05 has, on November 1st, reached the number of 52, of whom 40 are boys and 12 are girls, which is more than double the first year's enrollment. Fifteen of last year's students have enrolled for the second year. The students are from various sections of the State, and represent the following counties: San Luis Obispo, 23; Santa Barbara, 8; Orange, 3; Riverside, 1; Ventura, 1; Kern, 2; Los Angeles, 2; Santa Clara, 2; Tulare, 4; El Dorado, 1; San Francisco, 2; Alameda, 1; Sacramento, 1; Fresno, 1.

The students are divided as to course of study, as follows: Agriculture, 20; mechanics, 13; domestic science, 12; unassigned, 7. The last number are taking the regular first year work, and will later decide upon their final course of study. It is a notable fact that the large majority of the students have entered with the expectation of completing the regular course of study. This speaks well for the earnestness of the students, and is of much promise for the stability of the insti-

tution. A school is known and largely advertised by its students. Therefore, the larger the number who complete the course in good standing, the more favorably known will be the institution.

COURSE OF STUDY.

We have endeavored to fulfill the declaration of the purposes of the school in so far as is possible in a secondary school. In the words of the Act establishing the school, the purpose is "to furnish to young people of both sexes mental and manual training in the arts and sciences, including agriculture, mechanics, engineering, business methods, domestic economy, and such other branches as will fit the student for the non-professional walks of life." Upon this foundation we have builded courses of study in agriculture, mechanics, and domestic science, believing these three to be the nuclei through which the purposes of the school are to be achieved. For convenience of reference I have added hereto the detailed courses of study as adopted in the spring of 1904, showing the periods per week devoted to each study :

COURSE OF STUDY. (BOYS.)

First Year.

Agriculture	5	English	3
Botany	4	Carpentry	10
Bookkeeping	2	Freehand Drawing	2
Physical Science	4	Mechanical Drawing	4
Algebra	3		

Second Year.

		Agriculture.	Mechanics.
Geometry and Trigonometry	5	5	
Chemistry	6	6	
English	3	3	
Drawing Design	4	4	
Freehand Drawing			2
Carpentry	4		8
Iron Work	4		8
Animal Industry and Dairying	8		
Horticulture and Forestry	4		

Third Year.

Required Work:		
Physics and Agricultural Physics		5
History and Government		5
Elective Work:		
Drawing,—building design		5
Agriculture, Horticulture, Irrigation, Forestry, Animal Industry, Dairying, etc.		
For those who expect to become farmers		15
Mechanics—construction of buildings, plumbing, wiring, iron work, etc. For those who expect to become mechanics		15

COURSE OF STUDY. (GIRLS.)

First Year.

Household Economy	1	Botany	4
Cookery	8	Drawing	2
Sewing	6	Physical Science	4
Housework	8	Sloyd	4
English	3		

Second Year.

Household Economy	1	Chemistry	6
Cookery.....	8	Drawing.....	2
Sewing.....	6	Dairying.....	4
Physiology and Bacteriology	6	Sloyd	4
English	3		

Third Year.

Household Economy	1	Entomology	6
Dietetics	5	Home Nursing and Sanitation	4
Dressmaking and Millinery.....	6	Horticulture and Gardening.....	4
Catering	8	House Construction and Furnishing.....	..
Psychology and Education	2		

A few explanatory words regarding the first two years of the boys' course may lead to a better understanding of its import. All the boys are expected to pursue the same studies during the first year, for the reasons that many are too young to know definitely for what business they are best fitted and that each should give at least one year to a general training before beginning to specialize.

So far as agriculture is concerned, all of the work of the first and second years is essential to one who expects to manage a farm. Botany, physical science, physics, and chemistry are the essential elementary sciences which underlie agricultural practice. The mathematics and drawing are necessary for land surveying, irrigation, and the planning of buildings which good business farmers are called upon to do. Carpentry and iron work are the inseparable accompaniments of the kind of farm engineering in which farmers are more and more expected to engage.

In regard to mechanics, there is nothing which even the novice in educational matters can find not bearing directly along the mechanical lines except agriculture and botany. Agriculture is prescribed because, in this land, where tilling the soil is the chief source of the nation's wealth, every man should know something of the why and the wherefore of the industry. Something of the same virtue belongs to botany, but the study of the subject moreover gives the student those "setting up" exercises in the study of science which are invaluable in after years.

The aim is to make the instruction as practical as is found possible under modern educational methods. In mechanics, the students draw things and build them. In agriculture, the field work thus far has consisted in tree planting, pruning, laying out roads, study of soils and soil conditions, seed testing, scoring and judging cattle, milk testing, and conducting official tests of dairy cows.

The course of study for girls as given above is not being followed in 1904-05, so far as concerns the strictly domestic subjects. The course was planned by Miss Stewart, instructor in domestic science, in 1903-04, who has specialized in domestic science, which, according to modern

usage, includes cookery, housework, household economy, and the like. She is followed by Miss Howell, who is a specialist in domestic art, which includes sewing, dressmaking, millinery, and kindred subjects. The course given by Miss Howell is a very thorough one and contemplates doing trade work in the school for outside parties who may desire to bring orders. The students will thus have actual practice in cutting and fitting. The study of cookery and allied subjects will be taken up again in 1905-06, when another instructor will be needed.

LENGTH OF COURSE.

The faculty is already beginning to feel that the course of study should be increased to four years. Three years is too short a space of time to give to the preparation of a life work, as the majority of the students are looking upon their life in the school. Other schools of the same grade in the State, such as the California School of Mechanical Arts and the Throop Polytechnic Institute, have a course of study four years in length. They pay very little attention to special students who wish for a year or more of individual work. The fact is, that as the student body increases in numbers, and out of proportion to the equipment and teaching staff, as all schools are likely to do, less and less attention can be spent upon special students. The time and energies of the faculty and the equipment of the institution must, perforce, be spent upon those who expect to complete the prescribed course, rather than upon a few special students who wish only a year or so of work, for which they are usually not well prepared. It is to be regretted that distinction is to be made, but as young as we are, we have already been obliged to face the problem.

I would not be understood to advocate that no provision be made for special students. On the contrary, our school should be open to all earnest searchers after knowledge, who are otherwise qualified. But a practical difficulty arises, in that a student who desires instruction in one subject, e. g., carpentry, is in a dilemma. If he takes the subject with the regular class, only a portion of his time is occupied, and he finds the expense of residence too great for what he is getting. If he is permitted to work at the bench continually he is monopolizing the time of the instructor, which is too expensive for the school. I sincerely hope that some satisfactory arrangements may be reached whereby persons may be admitted for study in special lines for a year or more, whether it be in agriculture, mechanics, or domestic science. And I can now foresee that such a goal will be attained only with an enlarged corps of teachers and a greatly augmented equipment.

I am of the opinion that it will not be unwise for us to plan in the future to fit our students for entrance to the universities; at least to the courses in mechanics, engineering, agriculture, and science. If we

can do this without introducing the languages, with the exception of English, I believe that it will redound to the honor and growth of the school and not interfere in any way with the principal objects of its founders.

ENTRANCE REQUIREMENTS.

Students are admitted without examination, upon presenting a diploma of graduation from any grammar school. They are also admitted upon passing a satisfactory examination in English, history, and arithmetic. In some cases and upon urgent appeals from parents or guardians, we have admitted students who have not completed the eighth grade. We have, as a rule, subjected them to the entrance examination, and it is a pleasure to report that the majority of the students so admitted have worked hard, and, while failing in some subjects, still the benefit which they have derived has shown that our action was warranted in admitting them. Unfortunately there are a few cases in which the opposite may be said. The most unfortunate cases are where students show no inclination to work. If the student is industrious and shows that he is trying to do his best, the faculty can excuse a shortage in some of his studies. As the numbers of students increase, however, and as the time of the faculty becomes more and more taxed, it will undoubtedly be necessary to refuse to admit any student without a diploma of graduation from the grammar school. That standard of admission is not too high, for the faculty can not afford to do grammar school teaching.

An industrial school is often asked to take a student who has not shown an adaptability to the academic studies of the public schools. It has been found true, in many cases, that a student who cared nothing for academic work would become interested therein if a few periods of industrial work were added to the daily routine. It has been a source of surprise to us, therefore, that we find this fact not wholly true with our students. On the contrary, we find that a student who does the best academic work is most skillful with his hands, and also that the one who does not do good work in the shops is found lacking in application to academic studies.

STUDENT PROBLEMS.

In an industrial school the question sometimes arises as to the exact line of demarcation between labor as instruction and labor for remuneration. With us the general rule has been adopted that no remuneration shall be expected by the student for manual labor which carries instruction with it. In the work of the shops, many articles of value are made which are equal in workmanship with what might be purchased in the market. This is no reason, however, why the student should be remunerated for such work. The ultimate object of mechan-

ical work is educational. Training of the eye and hand is, in this present day, looked upon as important a part of education as academic instruction. To be of the most educational value, the mechanical work should therefore be systematic, beginning with the small operations and working gradually toward the more complex. Only in this way can the student be most quickly taught to do accurate work.

It has been our desire, and indeed it is a worthy one, that students should do as much as possible of the actual construction of the smaller buildings used by the school. In this manner the student is instructed in practical construction and the school is expected to have its buildings erected more economically. During the first school year the students constructed a poultry house, 12 by 20 feet, with double yards, 20 by 150 feet. The material for completing the building and yards cost a trifle over \$100. The forging shop, mentioned in another portion of this report, was partly constructed by the students. All of the framing of the building, including the trusses for the roof, was done by the students as class instruction. All of the work done by them in this way has been most creditable.

While it may be desirable to erect buildings as instruction in carpentry, still we find a serious difficulty in so doing. The work progresses very slowly, owing to the fact that the students can work thereon only a few hours of the day. In the general plan of instruction the first-year students have eight periods of carpenter work out of a possible forty periods during the week. Moreover, the student should be occupied during the first term upon elementary exercises in the shop. At this rate it would take a much longer time to complete a building than the needs of the school would justify. In these early days of the institution, when buildings are so greatly needed, it will probably not be possible to do much of the construction as class work.

Our school is not an exception to the rule, in that many of the students entering wish to pay part of their way by labor. It is fortunate that we can employ a number about the school. All of the janitor work is done by the students. Two boys wait upon table in the dormitory, for their entire board and lodging. Another student earns half of his board by doing the heavier work of house cleaning. Only two persons are paid for labor in the dormitory, namely, the cook and laundress. The dairy herd and the driving horse of the school are cared for by students. Another student is regularly employed as postboy for carrying mail from town, while two boys are operating the power plant. It is a pleasure to report that all of this work is, as a rule, done with efficiency.

WHERE THE STUDENTS LIVE.

The dormitory originally provided by the State accommodates twenty-eight persons. Inasmuch as a part of the faculty and the two employés reside therein, there are accommodations for but seventeen students. Up to the present time only boys have been admitted to the dormitory. The remainder of the students reside in the city of San Luis Obispo. The majority of the boys living in town are at their own homes. The majority of the girls are boarding in private families or doing light housekeeping. Had there been in attendance upon the school a sufficient number of girls to have filled the dormitory, that building would have been given to them the present year. The prospect is that in another year the boys will be obliged to relinquish the dormitory to the girls and find homes in town. A much larger number of good families offered to take students into their homes than there were applications from students. The life of the students in town has been so acceptable that I see no reason why the question of finding homes for the students may cause any anxiety.

STUDENT ACTIVITIES.

During the first few weeks of the school the students organized an athletic association, which has since held regular bi-weekly meetings. The association is composed of members of the faculty as well as of students. With their own labor and their own funds the students built a tennis court and purchased some athletic apparatus. The faculty encourages athletics among the students, and various members of the faculty take an interest in the association meetings. With the largely increased attendance at the beginning of the school year 1904-05, it seemed that the desire of some to organize teams for competitive games might be realized. The final decision, however, was to give up the attempt to form a football team, and to devote their energies to the formation of a baseball team for games in the spring of 1905. So many students are obliged to do manual labor for a livelihood that the number of boys available for sport is limited.

At the beginning of the second year, the students, with a number of the faculty, formed a choral society. The object of the society is to increase the interest in music and to be prepared to assist in any musical way at socials and entertainments of various kinds. It will enhance very greatly the pleasure of the social life of the school. It is to be hoped that social functions may become more and more common at the school. It is my personal wish that some attractive entertainment might be the feature of our school life every Friday evening.

STATUS OF THE SCHOOL.

It will be of interest to consider that our school is planned after the type of the agricultural and mechanical colleges which were founded

under the Morrill Land Grant Act of 1862. The Morrill Act provided for the establishment of a college in each State, wherein should be taught military science, agriculture, and mechanics, without excluding other subjects. In some States the land-grant college was attached to the State University, as is the case with Wisconsin, Minnesota, Ohio, and some others. Michigan, Iowa, Kansas, Washington, Oregon, and others established the land-grant college as an institution separate from the State university. The three main lines of work in these colleges are agriculture, engineering, and domestic science. I mention these to show that our school is established with the same general lines of work, although of a lower grade. They are of the university or college grade, while ours is of the high school or secondary grade. The same causes which have led to make those colleges so popular will be found true in making our school likewise popular. The majority of young men and women can not for one reason or another graduate from college, which presupposes a high school course. We are therefore offering to the graduate from the grammar school a course of study which will fit him for an active industrial life, although he may not be able, without thereafter attending a university, to attain so high a position in educational or business circles as the college graduate.

AGRICULTURAL HIGH SCHOOL.

One feature of our work requires special attention at this time. It is that our course in agriculture is similar to that of the agricultural high schools. The people of the State are more and more demanding education in agriculture. They are asking that agriculture be introduced into the high schools and the normal schools, and that much larger appropriations be made for the betterment of the Agricultural College of the State University. All of these demands are right and just, as is proven by the results of similar demands in Eastern States. Another kind of agricultural education which has grown very popular in these days is what is found in the so-called agricultural high school. The first one of these to be established was in connection with the University of Minnesota, something more than ten years ago. More recently, similar schools have been added to the Agricultural Colleges of Nebraska, Washington, Rhode Island, Connecticut, and Maine. Separate and individual county high schools of agriculture have been established in Wisconsin. All of these are meeting with most gratifying success. They are the schools which are to turn out the actual farmer, while the university or the college is more particularly turning out the teachers and experimenters. Since there will always be more farmers than teachers, it follows that the agricultural schools of the secondary grade are bound to have a large number of students, and therefore will exert a most powerful and beneficial influence upon the agricultural education of the country.

This institution can not, therefore, pay too much attention to its agricultural course, and it can not spend too much of its funds upon the equipment of the farm and the laboratory which bears upon agricultural instruction. I believe that I am within the bounds of truth when I say that the course of study here established is a more thorough one than that of even the Minnesota School of Agriculture, which has always been looked upon as a model. There the course of study is for three years of six months each; here the course is three years of nine months each. But our equipment is as nothing as compared with theirs. It is a source of deep gratification that one half of our male students are taking the course in agriculture. To keep the students with us and to secure more we must have largely increased equipment. I believe that we can spend more money profitably in this direction than in any other. We need not materially diminish our ideals of mechanical training, but we will gain favor throughout the State and do the State the greater service as we pay more attention to our agricultural development.

In this connection permit me to say a word regarding the matter of appropriations. An industrial school, and above all, an agricultural school, needs a much larger equipment in proportion to the number of students than does a school of an academic nature. In the latter, with the instructors and a good library and a little apparatus and a building, the school is equipped. But an agricultural and industrial school must have shops, with good machinery; large laboratories, with more expensive apparatus; a farm, with up-to-date tools and machinery; and a goodly selection of the various breeds of live stock, with the best specimens that can be obtained of each breed.

A BUILDING (SCIENCE HALL) NEEDED.

The growth of our school in its second year has shown that the pressing need of the institution is for a larger building to accommodate the necessary increase that there must be in laboratories, drawing-rooms, and recitation-rooms. For two years past, the thought has been that the next building which we should need would be one devoted to the study of domestic science and for a girls' home. While these two objects are exceedingly worthy ones, they can be supplied in our present building. The present dormitory may be given to the girls next year and the boys find homes in town. The laboratory instruction in domestic science that is of such a nature that it can not be given in the dormitory may be housed in our present Recitation Building. The present chemical laboratory would make a splendid domestic science laboratory for the teaching of cooking and kindred subjects. The present drawing-rooms are well adapted to sewing and other domestic art work. The sloyd would be given in the basement, which is now occupied by the carpenter shop. Our library and reading-room is outgrowing its quar-

ters, and by another year should be moved into larger rooms. The present botany classroom and laboratory are well suited for library and reading-room purposes. The present building would therefore be entirely utilized if the new building were provided.

By another year the assembly-room of the Recitation Building will be the only one large enough to seat the first-year class. This room is not at all suited for classroom purposes, and should be left in its present condition as an assembly-room. The growth of the work in chemistry and botany demands that larger rooms shall be available; and in addition to that we must next year equip a laboratory for the study of physics and electricity. I would recommend the proposed new building to be about the size of 60 by 150 feet, which will accommodate our classes for several years to come. Without such a building we will be seriously handicapped and the work of the school will be greatly retarded. Our architect, Mr. W. H. Weeks, says that the building suggested would cost about \$70,000. The sum which the State has expended for buildings is about \$50,000, and it will thus be seen that the appropriations made and asked for are small in comparison to what has been expended in founding other State institutions.

OTHER NEEDS.

In addition to Science Hall, the following are imperative needs:

Carpenter shop, 40 by 100 feet, to cost, with equipment, about \$6,000.

Completion of iron-working or forge shop, with equipment, to cost about \$2,500.

Remodeling and enlarging of power-house and adding thereto equipment in machine and electrical work, to cost about \$4,500.

Erection of a dairy wing of the barn, for which money is now available.

Additional poultry houses, to cost about \$200.

Propagation house for botany and horticulture, to cost about \$300.

Corrals and fencing, to cost about \$500.

Construction and equipment of main portion of the barn, to cost about \$7,500.

Construction of a dam in Brizzolero Creek and the necessary piping to provide water for irrigation and fire protection.

The appropriations for these needs should be made available immediately upon the passage of the Act.

NEEDS IN THE REGULAR APPROPRIATIONS FOR THE TWO FISCAL YEARS BEGINNING JULY 1, 1905.

For salaries of instructors and employés, \$48,000; for support, \$22,300; for care and improvement of grounds, \$5,000; for library, \$1,000; for the printing and binding done by the Superintendent of State Printing, \$900; for Trustees' expenses, \$800.

The present year is a critical one in the life of our school. The State has established the institution and we believe that the money appropriated has been wisely expended. Even though it has been so expended we find ourselves lacking in the necessary equipment. Students are coming to us in such numbers as to indicate a rapid increase in our enrollment. To provide for this increase we need the building, shops, and barns, and the funds for operating expenses as above mentioned. I trust that the Legislature at its coming session may see and feel our needs, and make such appropriations as will enable us to carry on the work which has been so well begun. All that we ask for are crying needs.

I believe that the object and work of the school should appeal to those of our citizens who are endowed with more than the usual amount of this world's goods and who have a kindly feeling toward industrial education. Our school would gladly receive donations or bequests, whether they be small or great. Our needs are modest in comparison with the demands made by other institutions. A large part of our work is done in buildings which are small and simple in construction, and therefore a benefaction which would in other institutions seem small, would mean great things to us. I trust that the institution may ever prove itself worthy to receive all the funds that it asks from the State and all that any kind friends may see fit to bestow.

Respectfully submitted.

LERROY ANDERSON,
Director of the California Polytechnic School.

REPORT OF SECRETARY OF BOARD OF TRUSTEES.

To the Board of Trustees:

GENTLEMEN: I have the honor to present the following report as Secretary. Inasmuch as no reports of your Secretaries have heretofore been printed, I have thought best to give a brief summary of the more important transactions of the Board of Trustees since its organization. I have also taken the liberty to include in this report that period covered by the services of Trustee Wickson as your Secretary, my occupancy of the office dating from April, 1903. The report, therefore, includes the period from January, 1902, to June 30, 1904.

BOARD OF TRUSTEES.

EX OFFICIO.

HIS EXCELLENCY, GEORGE C. PARDEESacramento
Governor of California.

HON. THOMAS J. KIRKSacramento
Superintendent of Public Instruction.

APPOINTED TRUSTEES.

HON. WARREN M. JOHNSan Luis Obispo
Term expires, 1908.

F. A. HINN, Esq.Santa Cruz
Term expires, 1905.

PROF. E. J. WICKSONBerkeley
Term expires, 1906.

R. M. SHACKELFORD, Esq.Paso Robles
Term expires, 1906.

HON. S. C. SMITHBakersfield
Term expires, 1907.

OFFICERS OF THE BOARD OF TRUSTEES.

S. C. SMITHPresident
R. M. SHACKELFORDVice-President
LEROY ANDERSONSecretary
COMMERCIAL BANK OF SAN LUIS OBISPOTreasurer

STANDING COMMITTEES OF THE BOARD OF TRUSTEES.

Trustees SMITH, JOHN, SHACKELFORDFinance
Trustees HINN, JOHN, SHACKELFORDSite

**TRANSACTIONS OF THE BOARD OF TRUSTEES REGARDING SITE,
BUILDINGS, AND APPOINTMENTS.**

SITE.

Offers of Site for School.—March 8, 1902, the following offers were read:

1. Edward Lowe: 50 acres anywhere on the Fernandez place for \$2,500, or 100 acres for \$10,000.
2. Dawson Lowe: Westerly portion of Phil Reedy place and 40 acres adjoining—\$4,000 for 100 acres; or 40 acres at \$40 per acre, plus 80 or 100 acres at \$35 per acre.
3. W. F. Wood: Agricultural Society grounds, 97.7 acres, with all improvements, for \$18,000.
4. D. D. Barnard: 205 acres, more or less, on the Chorro Rancho, at \$80 per acre.
5. Goldtree Bros.: 100 acres, more or less, near Southern Pacific depot, at \$125 per acre.
6. Goldtree Bros.: 120 acres ten minutes from courthouse, near City Water Company's reservoir, at \$100 per acre.
7. J. H. Orcutt: 100 acres adjoining city limits along Southern Pacific railway line, \$180 per acre for 100 acres; and more at the same rate.
8. James Crittenden: Dr. Hay's ranch near town, 115 acres, with good house, etc., \$13,000.
9. County Bank: Breed place adjoining city, 70 acres for \$4,200, or 10 acres for \$1.
10. Grant & Vachell: 15 acres free, and 90 acres at \$100 per acre. Later offered to give 20 acres free.
11. J. L. Crittenden: Gregory ranch, 93 $\frac{3}{4}$ acres, on road east and partly in city, \$9,000.
12. F. C. Cherry: Phillips addition, over 100 acres at \$100 per acre.
13. McD. R. Venable: 40 acres north of town known as Spinning place; price \$10,000, perhaps for \$8,000.
14. Luigi Marre: 5 acres free, and 75 acres additional at a price to be fixed by Board.
15. A. McAllister: Carisso Cattle Company. Priest ranch, 330 acres, at \$15,000; 100 acres without the spring, at \$35 per acre.
16. Mr. Fillmore: No description.

Selection of Site.—Ballots upon the sites offered were as follows:

First—	McAllister site	1 vote.
	Phillips Addition site	1 vote.
	Dawson Lowe site	4 votes.
Second—	Grant & Vachell site	3 votes.
	Dawson Lowe site	3 votes.
Third—	Grant & Vachell site	2 votes.
	Dawson Lowe site	4 votes.

Trustee John introduced the following:

Resolved, That the Board of Trustees of the California Polytechnic School, in session March 25, 1902, herewith select as a site for the said institution the so-called Lowe tract, near the City of San Luis Obispo, provided the title to said land is good.

[Adopted unanimously, March 25, 1902, upon a call of ayes and noes.]

Trustees Graves, Hihn, and John were appointed a special committee for final purchase.

Purchase of Site.—The Special Committee on Site reported a deed executed by Dawson Lowe and his wife and Edward Lowe for the tract of land selected for a site, for the consideration of \$7,709.30 (281.04 acres), and recommended its acceptance by the Board. [Concurred in May 26, 1902, upon call of ayes and noes.]

BUILDINGS.

Buildings to be Erected.—Trustee Hihn submitted the following:

Resolved, That this Board deems it necessary and advisable to erect a two-story and basement recitation building and a two-story and basement dormitory building on the school site near San Luis Obispo, and that for the construction of the two buildings there be set aside \$35,000 from the sum appropriated by the Legislature “for the purchase of a site, the construction and furnishing of the necessary buildings and the maintenance of said school.”

[Adopted September 23, 1902, upon call of ayes and noes.]

Advertising for Plans and Specifications.—Trustee Smith submitted the following:

Resolved, That the Secretary of this Board be and is hereby authorized and empowered to advertise for plans and specifications for the buildings heretofore determined by the Board to be erected, such advertisement to be published in the San Luis Obispo Tribune and San Luis Obispo Breeze in each of their respective publications from September 24 to October 3, 1902; such advertisement to contain the information required by law, stating also that the Board will meet at 612 Safe Deposit Building, San Francisco, for the purpose of examining such plans and specifications as may be presented and that a premium of \$10 be paid to the successful competitor.

[Adopted September 23, 1902, upon call of ayes and noes.]

Selection of Architect.—Plans were submitted by Architects Weeks, McDougal, and Tobey.

Trustee Kirk submitted the following:

Resolved, That the plans and specifications of Mr. W. H. Weeks, of Watsonville, for a recitation building, and for a dormitory building, be adopted by the Board; that the premium of \$10 be awarded to him; that he be employed to proceed with the preparation of papers involved in the advertisement for proposals for the construction of the buildings, and to prepare details, drawings, and supervise the construction of the same if the Board should enter into contract therefor.

[Adopted October 4, 1902, upon call of ayes and noes.]

Trustee Shackelford introduced the following motion: That the architect be instructed to insert alternative proposition for the use of stone, with real tile roof, in the advertisement for proposals, and to submit to the Board at its next meeting an estimate of the cost of construction with such materials. [Adopted October 4, 1902.]

Reception of Bids for Buildings.—November 22, 1902, the following bids were received :

	Recitation Building.	Recitation and Dormitory.	Alternative Plan.
1. Masonry work: No bids received.			
2. Iron work: W. E. Green, Watsonville.....	\$95 00	\$145 00	-----
3. Carpenter work: W. E. Green, Watsonville.....	14,520 00	25,997 00	\$14,545 00
J. H. Stevens and Jos. Maino, San Luis Obispo.....	12,956 00	24,223 00	11,011 00
F. W. Hickox, Bakersfield.....	14,400 00	25,900 00	13,300 00
4. Plumbing, etc.: Byrne Bros., Santa Cruz (material only) ...	1,375 00	2,725 00	1,375 00
Byrne Bros., Santa Cruz (material and labor)	1,825 00	3,600 00	1,950 00
Vetterline & Butcher, San Luis Obispo (material and labor).....	1,838 00	3,801 00	1,838 00
E. M. Payne, San Luis Obispo (material and labor).....	1,627 64	3,340 00	1,727 64
5. Heating: W. Morgan & Co., San Francisco.....	1,648 00	1,183 00	1,740 00
6. Tinning, galvanized iron work, and roofing: Vetterline & Butcher, San Luis Obispo.....	1,846 00	3,427 00	3,196 00
7. Painting, tinting, etc.: E. N. Williams, San Luis Obispo.....	1,967 70	3,280 20	1,370 50
J. P. Lynch, San Luis Obispo.....	2,127 00	3,922 00	1,795 00
8. Alternative Plan: E. W. Davis, San Luis Obispo (mason work complete).....	-----	-----	20,354 00

Trustee Hihn introduced the following: That final action on the bids presented be postponed until the next meeting. [Adopted November 22, 1902.]

Reception of Bids for Masonry Work on Buildings.—November 29, 1902, the following bids were received:

Lease Bros.:		
Recitation building.....		\$3,826 75
Both buildings.....		5,992 50
Stevens & Maino:		
Recitation building.....		4,224 00
Both buildings.....		6,556 00

Action on Bids.—Trustee Kirk introduced the following: That the bids of Lease Bros. for masonry work, \$5,992.50; Stevens & Maino, carpenter and iron work, \$24,223; Vetterline & Butcher, tinning and galvanized iron work and roofing, \$3,427, and E. M. Payne, plumbing, gas fitting, and sewers, \$3,340, be accepted. [Adopted, upon call of ayes and noes, November 29, 1902.]

Trustee Hihn introduced the following: That the bids of Morgan & Co. and E. N. Williams be reserved for future consideration, and that all other bids be rejected and ordered returned to the respective bidders. [Adopted November 29, 1902.]

Painting and Heating Buildings.—The Committee on Site reported the following:

That the contract for painting the school buildings be let to E. N. Williams at the price of his bid, \$3,280.20, and that Architect Weeks be instructed to draw contract for same.

That the buildings be heated by steam, direct radiation to be used for the Dormitory and direct and indirect for the Recitation Building, according to the needs of the rooms; and that Architect Weeks be instructed to draw plans and specifications for the same.

That Architect Weeks be authorized to draw plans and specifications and advertise for bids for a heat, light, and power plant.

[Concurred in, May 16, 1903.]

Plans and specifications for heating the school buildings by steam, as submitted by Architect Weeks under instruction of the Committee on Site, were presented and adopted, upon call of ayes and noes.

The Committee on Site reported the following bids for installing the steam radiation: E. D. Hough, \$2,500; E. M. Payne, \$2,575; Mangrum & Otter, \$2,668; and recommended awarding the contract to E. D. Hough. [Adopted, upon call of ayes and noes, July 11, 1903.]

Equipment of Power-House.—Trustee Shackelford submitted the following: That the Board accept the proposition of the Tracy Engineering Company to furnish their complete boiler plant as specified, for \$2,997. [Adopted, upon call of ayes and noes, July 11, 1903.]

Trustee Hihn submitted the following: That the Board accept from the Tracy Engineering Company a 7x7 Bayley engine, with all fixtures complete, for \$895, and a 6½ kilowatt generator, with switchboard, reostat, wiring and all accessories complete, for \$672. [Adopted, upon call of ayes and noes, July 11, 1903.]

Electric Fixtures for Buildings.—The Secretary presented the following bids to furnish and install the electric fixtures in the buildings:

San Luis Supply Co., San Luis Obispo.....	\$291 75
Roberts Manufacturing Co., San Francisco.....	271 85
California Gas and Electric Fixture Co., San Francisco (not hung).....	261 75
Woodhill-Hulse Electric Co., Los Angeles.....	241 00

The Secretary recommended that the contract be awarded to the Woodhill-Hulse Electric Company. [Concurred in, upon call of ayes and noes, September 25, 1903.]

Construction of Barns and Shops.—Director Anderson recommended the following apportionment from the available building fund:

Construction of iron-working shop.....	\$1,300 00
Equipment of iron-working shop.....	1,000 00
Construction of dairy barn.....	2,500 00
Reserve for other construction.....	1,815 17
Total	\$6,615 17

[Concurred in, May 23, 1904.]

APPOINTMENTS.

Election of Director.—Trustee Wickson offered the following:

Resolved, That the management of the institution in accordance with rules and policies approved by the Board of Trustees shall be vested in a principal officer, whose title shall be "Director of the California Polytechnic School," to hold office during the pleasure of the Board. It shall be the duty of said Director to maintain discipline; to supervise instruction, and to participate therein so far as found practicable; to keep accurate account of receipts and expenditures, and conduct the business of the school in accordance with the methods prescribed by the Board; to examine into the qualifications, characters, and suitability of applicants for election as instructors and other employés of the Board; to nominate persons for election to the various positions created by the Board; to temporarily suspend and immediately report to the Board any incumbent of such position guilty of gross dereliction of duty or willful insubordination; to submit to the Board at each regular meeting a detailed report on the operations of the institution, and to make recommendations for its future operation; in short, to do everything within his power for the promotion of the work and interests of the school.

Resolved, That the compensation of said Director shall be \$200 per month, beginning with the date of his acceptance of the position, unless otherwise specified by resolution of the Board.

[Adopted, upon call of ayes and noes, May 26, 1902.]

Trustee Kirk introduced the following motion: That Leroy Anderson be elected to the directorship—his services to date from June 1, 1902, and that the Secretary be instructed to cast the ballot of the Board. [Adopted May 26, 1902, upon call of ayes and noes.]

Election of Treasurer.—Trustee Kirk introduced the following motion: That Mr. Frank Mills, of D. O. Mills Bank, Sacramento, be elected Treasurer, and that the President and Secretary be empowered to execute a power of attorney to the Treasurer to receive funds from the Controller of the State. [Adopted May 26, 1902, upon call of ayes and noes.]

Change in Office of Treasurer.—The Director reported that the present Treasurer, Bank of D. O. Mills & Co., was charging an exchange of 5 cents per \$100, and the Commercial Bank of San Luis Obispo had agreed to act as Treasurer without pay. Recommended, that the Commercial Bank be elected Treasurer in place of Bank of D. O. Mills & Co. [Concurred in, May 16, 1903, upon call of ayes and noes.]

Instructors and Employés.—The following instructors and employés have been appointed:

1903—April 6—Gwendolyn Stewart, Instructor in Domestic Science and Matron of the Dormitory.

Oscar Leslie Heald, Instructor in Drawing, Carpentry, and Sloyd.

Elsie J. Stephens, Clerk and Stenographer.

May 16—Sydney S. Twombly, Instructor in Science, Mathematics, and Agriculture.

Sept. 25—Naomi M. Lake, Clerk and Stenographer.

1904—Feb. 27—James Edward Roadhouse, Instructor in Academic Subjects, Plant Industry, and Irrigation.

Edwin Walter Yount, Instructor in Carpentry.

Walter W. Bradford, Engineer.

1904—May 23—Sydney S. Twombly, Instructor in Agriculture, Chemistry, and Veterinary Science.
 Oscar Leslie Heald, Instructor in Carpentry, Sloyd, Drawing, and Iron Work.
 Edwin Walter Yount, Instructor in Carpentry and Drawing.
 Naomi M. Lake, Clerk and Librarian.

RESIGNATIONS.

Resignation of Elsie J. Stevens. [Accepted, September 25, 1903.]
 Resignation of Gwendolyn Stewart, Instructor in Domestic Science and Matron of the Dormitory. [Accepted, May 23, 1904; resignation to take effect August 1, 1904.]

FINANCIAL STATEMENT.

DISBURSEMENTS FOR THE YEAR ENDING JUNE 30, 1904.

Salaries.

Appropriation for year.....		\$12,250 00
Leroy Anderson, Director.....	\$2,400 00	
S. S. Twombly, Instructor in Agriculture and Chemistry.....	1,500 00	
C. L. Heald, Instructor in Drawing, Carpentry, and Sloyd.....	935 00	
Gwendolyn Stewart, Instructor in Domestic Science and English, and Matron of Dormitory.....	825 00	
E. W. Yount, Instructor in Carpentry. (Appointment began in April, 1904).....	200 00	
Elsie J. Stevens, Clerk and Stenographer (one month).....	50 00	
Naomi M. Lake, Clerk and Librarian (eleven months).....	550 00	
Allan Blaine, Foreman of Farm (three months).....	180 00	
S. C. Griffith, Foreman of Farm (nine months).....	540 00	
W. W. Bradford, Engineer (three months).....	225 00	
Kent S. Knowlton (student), Dairyman.....	166 00	
Henry Wade (student), Janitor.....	122 00	
Gustavus Wade (student), Janitor.....	91 00	
Owen Hollister (student), general work.....	84 00	
Herbert Cox (student), mail and errand boy.....	83 00	
Francis Buek (student), hostler.....	85 00	
		<u>8,036 00</u>
Balance July 1, 1904.....		<u>\$4,214 00</u>

Support.

Appropriation.....		\$2,950 00
Botany apparatus.....	\$17 40	
Carpenter shop and drawing.....	100 88	
1904 catalogue, and advertising.....	80 05	
Dairy glassware.....	1 75	
One driving horse.....	125 00	
Two farm horses.....	400 00	
Repairs and shoeing.....	34 35	
Two cows.....	97 00	
Harness and tools.....	167 02	
Fruit trees and vines.....	21 90	
Entertainments.....	29 70	
		<u>\$1,075 05</u>
Carried forward.....		<u>\$2,950 00</u>

Brought forward	\$1,075 05	\$2,950 00
Heating and lighting Recitation Building	155 00	
Gas machine for chemical laboratory	343 72	
Supplies for chemical laboratory	314 94	
Office expenses	545 57	
Power-house supplies and repairs	62 77	
School supplies and fixtures	131 82	
Veterinary supplies	21 75	
Wire screen and fittings for reservoir	3 66	
Sewing-machine and supplies for domestic art	44 92	
	<hr/>	2,703 90
Balance July 1, 1904		<u>\$246 10</u>

Grounds.

Appropriation		\$1,000 00
Labor grading	\$66 00	
Labor hauling rock, etc.	150 00	
Labor and materials blasting road rock	45 45	
Labor setting water tanks	85 63	
Lumber	16 33	
Water pipe and fittings	42 95	
Copy of topographical map	5 00	
Cartage	2 00	
Digging and curbing wells	127 58	
Seeds and plants	15 15	
20,000-gallon water tank	209 00	
Freight on same	20 65	
Laying 2,000 feet of pipe	94 92	
	<hr/>	<u>1,000 00</u>

Library.

Appropriation for year		\$350 00
Books	\$187 29	
Periodicals	17 00	
Pamphlet cases	7 95	
	<hr/>	212 24
Balance July 1, 1904		<u>\$137 76</u>

Trustees' Expenses.

Appropriation for year		\$400 00
Expenses (traveling and hotel)	\$201 30	
Livery	7 50	
	<hr/>	208 80
Balance July 1, 1904		<u>\$191 20</u>

Printing.

Special appropriation	\$250 00	
Appropriation for year ending June 30	250 00	
	<hr/>	\$500 00
Printing from May 1, 1903, to June 30, 1904		532 25
		<hr/>
Deficit July 1, 1904, to be paid from appropriation of 1904-05		<u>\$32 25</u>

SPECIAL APPROPRIATIONS.

School Buildings.

\$50,000 appropriated in 1901, and \$18,000 appropriated in 1903 for finishing and furnishing the buildings. Total appropriation.....		\$68,000 00
Purchase of site.....	\$7,709 30	
Construction of buildings:		
Carpenter contract.....	\$24,223 00	
Carpenter extras.....	572 73	
Masonry contract.....	5,992 50	
Masonry extras.....	362 20	
Plumbing contract.....	3,340 00	
Roofing and tinning contract.....	3,427 00	
Painting contract.....	3,280 20	
Heating contract.....	2,500 00	
Architect's fee.....	2,321 20	
	<hr/>	46,018 83
Furnishing Dormitory.....	1,618 67	
Furnishing Recitation Building.....	713 75	
Furnishing Carpenter Shop.....	840 53	
Reservoir.....	746 10	
Pipe and piping, and laying pipe.....	1,505 50	
Spring, excavation and curbing.....	149 51	
Fencing and fence materials for farm.....	81 82	
Tools and hardware for farm.....	206 06	
Farm supplies and incidentals.....	132 80	
Drawing Department.....	240 00	
Laboratory Department.....	95 37	
Office furniture.....	208 44	
Farm labor.....	665 05	
Grading road, etc.....	312 50	
Two stone culverts.....	370 00	
Purchase of cattle for farm.....	511 26	
Repairs to farm buildings.....	196 54	
Office rent and supplies.....	174 24	
Freight and cartage.....	137 81	
Livery hire and Trustees' expenses.....	844 40	
Feed for farm stock.....	124 46	
Seed for farm.....	68 80	
Secretary's stenographer.....	232 50	
Expenses, Director's office.....	213 25	
Extra labor, furnishing school.....	257 00	
Sewerage.....	50 45	
Single harness and extras.....	31 10	
Director's salary from June 1, 1903-June 30, 1904.....	2,600 00	
Advertising for bids.....	533 45	
Surveying for building sites.....	270 62	
Hardware for buildings.....	118 40	
	<hr/>	67,978 51
Balance.....		<hr/> <hr/> \$21 49

Barns, Shops, and Outbuildings.

Appropriation available January 1, 1904, for barns, shops, and outbuildings		\$8,000 00
Material for equipping carpenter shop and constructing toolshed	\$297 91	
Shelving for chemical laboratory	35 23	
Door panel	2 00	
Sewers for farm house	14 00	
Farm sheds and fencing	244 32	
Oil and paint materials	39 31	
Construction of iron shop (partial)	678 28	
Shelving for library and office	4 68	
Poultry house and yards	108 78	
Power-house:		
Grading and constructing floor and foundation	\$528 74	
Construction of building	256 32	
	<u>785 06</u>	
Construction of roof on reservoir	66 95	
		<u>2,276 52</u>
Balance July 1, 1904		<u>\$5,723 48</u>

Power-House.

Appropriation available January 1, 1904, for power plant		\$5,000 00
Engine and accessories	\$895 00	
Boiler and accessories	2,997 00	
Boiler supports	80 00	
Generator, wiring, etc.	672 00	
Extra labor and materials	57 50	
	<u>4,701 50</u>	
Balance July 1, 1904		<u>\$298 50</u>

CONTINGENT FUNDS.

Farm.

<i>Receipts</i> for year ending June 30, 1904—		
Sale of hay and corn	\$666 87	
Sale of stock	257 80	
Service of stock	20 00	
Sale of milk	180 45	
Sale of fruit	5 00	
Rent of pasture	6 00	
	<u>\$1,136 12</u>	
<i>Disbursements</i> for year ending June 30, 1904—		
Animal industry and veterinary supplies	\$7 45	
Garden	12 65	
Labor	510 15	
Expressing	3 62	
Feed, seed, and squirrel poison	272 04	
Stock	107 50	
Shoeing and repairs	34 70	
Rent of stock and tools	34 50	
Registry of stock	16 00	
Harness and general supplies	35 35	
Milk supplies, hardware, etc.	50 34	
	<u>1,084 30</u>	
Balance July 1, 1904		<u>\$51 82</u>

Dormitory.

<i>Receipts</i> for year ending June 30, 1904—		
Board from students and faculty	\$2,487 45	
Guests entertained	65 00	\$2,552 45
<i>Disbursements</i> for year ending June 30, 1904—		
Supplies	\$1,790 12	
Service	719 25	2,509 37
Balance July 1, 1904		<u>\$43 08</u>

Laboratory.

<i>Receipts</i> for year ending June 30, 1904—		
Students' laboratory fees for year		\$255 50
<i>Disbursements</i> for year ending June 30, 1904—		
Animal industry	\$1 50	
Carpentry and sloyd	35 42	
Chemical laboratory	20 35	
Botanical laboratory	5 10	
Domestic science department	18 06	
Drawing department	16 00	96 43
Balance July 1, 1904		<u>\$159 07</u>

LEGISLATION.

The following laws regarding the school were enacted by the Legislature at its sessions of 1901 and 1903:

An Act to establish the California Polytechnic School in the County of San Luis Obispo, and making an appropriation therefor.

[Approved March 8, 1901.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. There is hereby established in the County of San Luis Obispo, at or near the City of San Luis Obispo, a school to be known as the California Polytechnic School. The purpose of this school is to furnish to young people of both sexes mental and manual training in the arts and sciences, including agriculture, mechanics, engineering, business methods, domestic economy, and such other branches as will fit the students for the non-professional walks of life. This Act shall be liberally construed, to the end that the school established hereby may at all times contribute to the industrial welfare of the State of California.

SEC. 2. Within thirty days after this Act goes into effect the Governor shall appoint five persons, who, with the Governor and the Superintendent of Public Instruction, shall constitute the Board of Trustees of said school.

SEC. 3. The said Trustees, as provided for in section two of this Act, are hereby appointed and created Trustees of said California Polytechnic School, with full power and authority to select a site for the permanent location of said school. Said Trustees shall, within ninety days after passage of this Act, examine the different sites offered by the people of San Luis Obispo County for the location of said school; and the site selected by them shall be and remain the permanent site for said school. But no money shall be expended for or on said site, until a deed in fee simple has been made for land so selected to the State of California.

SEC. 4. The term of office of the Trustees shall be four years, except that, in appointing the first Board of Trustees, the Governor shall appoint two members for one year, one for two years, one for three years, and one for four years. They shall be governed and regulated by the laws governing and regulating the normal schools of this State, in so far as the same are applicable to an institution of this kind.

SEC. 5. The sum of fifty thousand dollars is hereby appropriated out of any moneys belonging to the State not otherwise appropriated, for the purchase of a site, the construction and furnishing of the necessary buildings, and the maintenance of said school.

SEC. 6. The Controller of the State is hereby authorized to draw warrants from time to time, as the work shall progress, in favor of said Board of Trustees, upon their requisition for the same, and the State Treasurer is directed to pay the same.

SEC. 7. The moneys hereby appropriated shall be expended under the direction of the said Board of Trustees.

SEC. 8. This Act shall take effect and be in force from and after January first, nineteen hundred and two.

An Act making an appropriation for the California Polytechnic School.

[Approved March 18, 1903.]

The People of the State of California, represented in Senate and Assembly, do enact as follows :

SECTION 1. There is hereby appropriated out of any money in the State Treasury not otherwise appropriated the sum of eighteen thousand (\$18,000) dollars, to be used in the construction and furnishing of the buildings and the maintenance of the California Polytechnic School.

SEC. 2. The Controller is hereby authorized to draw warrants from time to time, as the work shall progress, in favor of the Board of Trustees of said California Polytechnic School upon its requisition for the same, and the Treasurer is hereby directed to pay the same; *provided*, that not more than one half of said amount shall be available before the first day of July, nineteen hundred and three.

SEC. 3. The moneys hereby appropriated shall be expended under the direction of said Board of Trustees, but all requisitions shall be audited and allowed by the State Board of Examiners before payment.

SEC. 4. This Act shall take effect and be in force from and after its passage.

An Act to provide for certain improvements at the California Polytechnic School and making an appropriation therefor.

[Approved March 18, 1903.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The sum of thirteen thousand (\$13,000) dollars is hereby appropriated out of any money in the treasury not otherwise appropriated, to be paid to the order of the Board of Trustees of the California Polytechnic School as follows, to wit:

For the purchase and installation of a power, heating, and lighting plant, five thousand (\$5,000) dollars.

For the erection of barns, shops and outbuildings, eight thousand (\$8,000) dollars.

All bills for materials, machinery or in payment, in whole or in part, of any contract, shall be audited by the Board of Trustees of said school, and approved by the State Board of Examiners before being paid.

SEC. 2. The Controller is hereby authorized to draw warrants from time to time in favor of said Board of Trustees upon its requisition for the same, and the Treasurer is hereby directed to pay the same.

SEC. 3. This Act shall take effect and be in force on and after January 1, 1904.

Respectfully submitted.

LEROY ANDERSON,
Secretary of Board of Trustees.

ANNUAL REPORT

OF THE

BOARD OF RAILROAD COMMISSIONERS

OF THE

STATE OF CALIFORNIA.

DECEMBER 31, 1903.



SACRAMENTO :

W. W. SHANNON, - - - SUPERINTENDENT STATE PRINTING.

1904.

BOARD OF RAILROAD COMMISSIONERS.

A. C. IRWIN, *President* - - - - - First District.
ADAM ANDREW - - - - - Second District.
ORRIN S. HENDERSON - - - - - Third District.
JUDSON C. BRUSIE, - *Secretary.*

ANNUAL REPORT OF THE BOARD OF RAILROAD COMMISSIONERS.

STATE OF CALIFORNIA—BOARD OF RAILROAD COMMISSIONERS,
SAN FRANCISCO, December 31, 1903.

To the HON. GEORGE C. PARDEE,
Governor of California:

SIR: In accordance with the law creating the Railroad Commission, and defining the duties of the Commissioners, we have the honor to transmit to you herewith the annual report of the work of this department for the year ending December 31, 1903.

Yours respectfully,

A. C. IRWIN, First District,
ADAM ANDREW, Second District,
ORRIN S. HENDERSON, Third District,
Commissioners of Railroads.

The permanent organization of the Board of Railroad Commissioners was effected on the 5th day of January, 1903, the following Commissioners being present: A. C. Irwin, Marysville, of the First District; Adam Andrew, San Francisco, of the Second District; and Orrin S. Henderson, Stockton, of the Third District. A. C. Irwin was elected President, Judson C. Brusie was appointed Secretary, and J. W. Cavis, Bailiff. The regular monthly meetings of the Board have been held upon the second Tuesday of each month since its organization.

RAILROAD MILEAGE IN CALIFORNIA.

The total number of miles of railroad operated in the State of California on the 30th of June, 1902, as reported by the various companies, aggregated 5,288.52, and on June 30, 1903, the aggregate was 5,496.34, an increase of 207.82 miles over the previous year. The Atchison, Topeka & Santa Fé Railway Company shows a gain of 74.66 miles; the Southern Pacific Company, 29.44 miles; the San Pedro, Los Angeles & Salt Lake extension from Los Angeles to Ontario Wye, a distance of 40 miles, is now in operation, and the California Northwestern

reports the completion of the road from Ukiah to Willits, a distance of 30.05 miles. The only decrease in mileage, as shown in the report, is by the California Southern, a total of 21.04 miles.

CAPITAL STOCK.

For the year ending June 30, 1903, the par value of capital stock authorized amounted to \$253,205,400, and the total amount issued and outstanding aggregated \$233,793,736.14, exclusive of the Atchison, Topeka & Santa Fé and the Crescent City & Smith River Railroads. Compared with the year ending June 30, 1902, this is an increase of \$29,045,000 in authorized capital stock and of \$70,573,698.64 in the amount issued and outstanding. (*Note*—The Atchison, Topeka & Santa Fé Railway Company reported to the Interstate Commerce Commission for the year ending June 30, 1902, lines west of Kansas City, stock issued and outstanding, \$129,614,815, or \$29,849 per mile of line. Its mileage in California on June 30, 1903, was 526.50.)

EARNINGS AND EXPENSES.

The gross passenger earnings for the year ending June 30, 1902, amounted to \$22,506,081.11; freight earnings, \$41,612,789.68; other earnings, \$879,940.52; a total of \$64,998,811.31 for the year.

Ending June 30, 1903, the passenger earnings were \$26,789,057.07; freight earnings, \$49,043,814.31; other earnings, \$1,165,464.20; aggregating \$76,998,335.58; a gross increase over the year previous of \$11,999,524.27, as shown in the accompanying reports.

During the same period the total expenses of all the roads in the State increased from \$37,055,092.98 in 1902 to \$41,078,163.92 in 1903, a gain of \$4,023,070.94. The report of the Atchison, Topeka & Santa Fé Railway would bring the totals up to \$40,390,637.04 in 1902 and \$48,392,243.57 in 1903. Comparisons from the reports of this road would be misleading, for the reason that they reported on lines in California in 1902 and on lines from Point Richmond to Albuquerque, New Mexico, in 1903.

ROLLING STOCK, RAILS AND TIES.

On June 30, 1903, there were in use on all the railroads in the State 1,284 locomotives and 36,397 cars of all classes, the railroad companies expending for new equipment during the year \$813,478. The expenditures for betterments amounted to \$14,088,681; 82,524 tons of new steel rails and 1,999,068 new ties having been purchased and relaid.

ACCIDENTS TO PERSONS.

The total number of passengers, trespassers, and employés killed during the year ending June 30, 1903, was 329; injured, 1,792. The killed and injured were classified as follows: Passengers—killed 46,

injured 374; trespassing—killed 167, injured 173; not trespassing—killed 14, injured 34; trainmen—killed 60, injured 857; switchmen, flagmen, and watchmen—killed 6, injured 63; other employes—killed 36, injured 291. Compared with the year ending June 30, 1902, this is an increase of 226 killed and 1,247 injured.

TARIFF CHANGES.

The Atchison, Topeka & Santa Fé Railway and the Southern Pacific Company submitted amendments to their tariff on lumber, lath, shingles, box materials and other lumber products, providing for charges to be computed on scale weights instead of maximum of $3\frac{1}{2}$ pounds per foot, which had heretofore prevailed. The Santa Fé amendment was approved by the Board on September 8th, and that of the Southern Pacific on the 12th of October, 1903.

IMPORTANT CHANGES DURING THE YEAR.

Atchison, Topeka & Santa Fé Railway.—Extension Goffs to Ivanpah, 45.44 miles, and Kramer to Johannesburg, 29.65 miles, put in operation. Decrease in mileage by adjustment, 0.44 mile.

Eureka & Klamath River Railroad Company.—Main line from Little River Junction to Luffenholtz (not operated), 4 miles; Fieldbrook spur, operated June 30, 1903, 0.50 mile.

McCloud River Railroad Company.—Mileage between McCloud and Upton shortened 0.53 mile by taking out Big Cañon switchback.

Nevada-California-Oregon Railway Company.—New bonds to the amount of \$146,000 were issued, of which \$80,000 were sold and \$66,000 were placed in the treasury. Bonds purchased for account of sinking fund and canceled, \$4,000.

North Shore Railroad Company.—Road between Sausalito and Mill Valley and Sausalito and San Rafael being changed to electric line for passenger service.

Sierra Railway Company of California.—Line from Jamestown to Angels put in operation September 15, 1902. Stock issued, \$468,000 par value; first mortgage \$69,000 and second mortgage \$69,000 increase bonds issued; \$9,000 first mortgage bonds paid out of cash in sinking fund.

Sierra Valleys Railway Company.—Extension of 5.98 miles of road from Clairville to Mohawk opened for traffic May 4, 1903.

San Pedro, Los Angeles & Salt Lake Railroad Company.—Los Angeles to Ontario Wye, 40 miles, put in operation.

Southern Pacific Company.—Old Beach to Imperial, 28.639 miles, put in operation; Sacramento to Placerville, increase 0.804 mile; Soledad to Santa Margarita, decrease 0.011 mile. New bonds issued: \$600,000 4% gold bonds Central Pacific collateral, two five-year 4½% gold bonds, \$5,000,000. Retired: Southern Pacific 6% steamship bonds, \$71,000 purchased and canceled.

Southern Pacific Railroad Company.—New bonds issued: \$530,000 S. P. R. R. first consolidated mortgage of 1893. Retired: \$76,000 face value S. P. R. R. first consolidated mortgage of 1893 and \$1,025,000 face value S. P. R. R. first mortgage 6% bonds of 1875, purchased and canceled.

Central Pacific Company.—Stock issued for betterments and additions during three years ending August 1, 1902, \$600,000; face value first refunding 4% mortgage bonds, \$4,000,000. Retired: \$550,000 3½% mortgage bonds purchased and canceled; \$24,000 face value first refunding 4% mortgage bonds purchased and canceled; \$617,000 old C. P. R. R. bonds satisfied of mortgage. Balance of principal of note of Central Pacific Railroad Company in favor of the United States of America, due August 1, 1902, \$918,744.93; note due February 1, 1903, \$2,940,633.78 face value old Central Pacific Railroad Company bonds deposited with trustee and canceled.

COMPLAINTS.

Complimentary, it may be said, to the retiring Board, the members of the present Board assumed the duties of the office of Railroad Commissioners in the face of an absolutely clean calendar, with the exception of the Fresno rate case, which has passed beyond the jurisdiction of the Commission and is now before the Supreme Court.

For the period under review, there is an absence of change in the schedule freight and passenger rates of the various lines operating within the State, while the relations between shippers and carriers are manifestly amicable, the complaints lodged with the Board having been entirely of an informal character, and were either adjusted to the satisfaction of the complainants, or allowed to remain in embryo by reason of appellant failing to proceed as required by law and the Board's rules and regulations governing the filing of complaints.

A. C. IRWIN, President,
ADAM ANDREW,
ORRIN S. HENDERSON,

Board of Railroad Commissioners.

JUDSON C. BRUSIE, *Secretary.*

SUMMARY OF REPORTS.

RAILROADS REPORTING FOR 1903.

	Gauge of Road.
Arcata & Mad River Railroad Company.....	3 ft. 9½ in.
Atchison, Topeka & Santa Fé Railway Company.....	4 " 8½ "
California Northwestern Railway Company.....	4 " 8½ "
Colusa & Lake Railroad Company.....	3 "
Crescent City & Smith River Railroad Company.....	4 " 8½ "
Eel River & Eureka Railroad Company.....	4 " 8½ "
Eureka & Klamath River Railroad Company.....	4 " 8½ "
Iron Mountain Railroad Company.....	3 "
Lake Tahoe Railway & Transportation Company.....	3 "
McCloud River Railroad Company.....	4 " 8½ "
Mill Valley & Mount Tamalpais Scenic Railway.....	4 " 8½ "
National City & Otay Railroad Company.....	4 " 8½ "
Nevada-California-Oregon Railway Company.....	3 "
Nevada County Narrow-Gauge Railroad Company.....	3 "
North Shore Railroad Company.....	3 "
Pacific Coast Railroad Company.....	3 "
Pajaro Valley Consolidated Railroad Company.....	3 "
Randsburg Railroad Company.....	4 " 8½ "
San Diego, Pacific Beach & La Jolla Railroad Company.....	4 " 8½ "
San Diego, Cuyamaca & Eastern Railroad Company.....	4 " 8½ "
San Pedro, Los Angeles & Salt Lake Railway Company.....	4 " 8½ "
Sierra Railway Company of California.....	4 " 8½ "
Sierra Valleys Railway Company.....	3 "
Southern California Railway Company.....	4 " 8½ "
Southern Pacific Company.....	4 ft. 8½ in. and 3 ft.
Sunset Railroad Company.....	4 ft. 8½ in.
Yreka Railroad Company.....	4 " 8½ "

CAPITAL STOCK—1903.

Name of Company.	No. Shares Authorized.	Par Value.	Total Authorized.	Total Issued and Outstanding.
Arcata & Mad River.....	15,000	\$20	\$300,000	\$187,740 00
Atchison, Topeka & Santa Fé.....	(No re	port.)		
California Northwestern.....	60,000	100	3,000,000	1,566,000 00
Colusa & Lake.....	4,000	100	400,000	100,500 00
Crescent City & Smith River.....	(No re	port.)		
Eel River & Eureka.....	12,000	100	1,200,000	480,000 00
Eureka & Klamath River.....	5,000	100	500,000	500,000 00
Iron Mountain.....	1,000	100	100,000	100,000 00
Lake Tahoe.....	5,000	100	500,000	500,000 00
McCloud River.....	3,600	100	360,000	360,000 00
Mill Valley & Mount Tamalpais.....	2,000	100	200,000	122,000 00
National City & Otay.....	13,000	100	1,300,000	700,000 00
Nevada-California-Oregon.....	14,500	100	1,450,000	1,450,000 00
	(Common			
	Preferred			
	7,500	100	750,000	750,000 00
Nevada County Narrow-Gauge.....	4,000	100	400,000	250,200 00
North Shore.....	60,000	100	6,000,000	6,000,000 00
Pacific Coast.....	13,704	100	1,370,400	1,370,400 00
Pajaro Valley.....	11,000	100	1,100,000	360,000 00
Randsburg.....	5,400	100	540,000	540,000 00
San Diego, Pacific Beach & La Jolla.....	2,750	100	275,000	275,000 00
San Diego, Cuyamaca & Eastern.....	70,000	100	7,000,000	769,000 00
San Pedro, Los Angeles & Salt Lake.....	25,000	100	2,500,000	2,500,000 00
Sierra.....	50,000	100	5,000,000	3,248,000 00
Sierra Valleys.....	15,000	100	1,500,000	942,100 00
Southern California.....	93,600	100	9,360,000	6,752,000 00
	(Common			
	Preferred			
	80,000	100	8,000,000	6,072,000 00
Southern Pacific.....	2,000,000	100	200,000,000	197,849,258 64
Yreka.....	4,000	25	100,000	49,537 50
Totals.....	2,577,054	-----	\$253,205,400	\$233,793,736 14

MILEAGE—1902—1903.

Name of Company.	1902.			1903.		
	Main Line.	Spurs and Branches	Total, Exclusive of Sidings.	Main Line.	Spurs and Branches	Total, Exclusive of Sidings.
Alameda & San Joaquin	Miles. 36.10	Miles.	Miles. 36.10	Miles. 36.10	Miles.	Miles. 36.10
Arcata & Mad River	14.00	6.75	20.75	14.00	6.75	20.75
Atchison, Topeka & Santa Fé	383.44	68.40	451.84	458.27	68.23	526.50
Boca & Loyalton	38.60		38.60	38.60		38.60
California Northwestern	106.20	59.32	165.52	136.25	59.32	195.57
Colusa & Lake	22.00		22.00	22.00		22.00
Crescent City & Smith River	15.25		15.25	15.25		15.25
Eel River & Eureka	25.00	5.00	30.00	34.00	5.00	39.00
Eureka & Klamath River	20.00	8.00	28.00	20.00	8.50	28.50
Iron Mountain	11.00		11.00	11.00		11.00
Lake Tahoe	16.00		16.00	16.00		16.00
McCloud River	18.32	12.31	30.63	30.63		30.63
Mill Valley & Mount Tamalpais	8.19		8.19	8.19		8.19
National City & Otay	18.70	8.20	26.90	18.70	8.20	26.90
Nevada-California-Oregon	115.70		115.70	115.70		115.70
Nevada County Narrow-Gauge	22.50		22.50	22.50		22.50
North Shore	80.75	3.75	84.50	84.25	3.75	88.00
Pacific Coast	76.10	8.78	84.88	76.10	8.78	84.88
Pajaro Valley	34.50		34.50	33.63	2.50	36.13
Randsburg	29.00	.66	29.66	29.66		29.66
San Diego, Pacific Beach & La Jolla	13.54		13.54	13.54		13.54
San Diego, Cuyamaca & Eastern	25.37		25.37	25.37		25.37
San Pedro, Los Angeles & Salt Lake	47.90	1.72	49.62	87.90	1.50	89.40
Sierra	56.30	15.40	71.70	56.50	19.30	75.80
Sierra Valleys	30.50		30.50	36.48		36.48
Southern California	320.31	178.80	499.11	320.31	157.76	478.07
Southern Pacific	3,318.66		3,318.66	3,348.10		3,348.10
Sunset				30.29		30.29
Yreka	7.50		7.50	7.50		7.50
Totals	4,911.43	377.09	5,288.52	5,146.82	349.52	5,496.34

Mileage, 1902 ----- 5,288.52
Mileage, 1903 ----- 5,496.34

Increase over 1902 ----- 207.82

GROSS AND NET EARNINGS—1902-1903.

Name of Company.	1902.		1903.	
	Gross Earnings.	Net Earnings.	Gross Earnings.	Net Earnings.
Arcata & Mad River.....	\$82,651 06	\$6,809 52	\$85,495 35	\$19,915 63
Atchison, To- (S. F. & S. J. V. peka, etc.) A. T. & S. F.	2,405,089 22	284,167 03}	11,730,969 39	4,002,238 28
California Northwestern.....	2,250,217 81	180,036 54}		
California Northwestern (S. F. & N. P.).....	1,132,579 23	35,171 65	1,299,279 23	38,029 55
Colaşa & Lake.....	319,644 95	94,922 23	98,402 03	*34,663 27
Crescent City & Smith River.....	24,759 74	8,851 35	30,775 36	4,768 98
Ecl River & Eureka.....	24,300 29	2,658 96	22,037 90	2,250 62
Eureka & Klamath River.....	174,765 38	28,128 09	212,696 01	56,169 56
Iron Mountain.....	117,318 82	48,205 62	151,283 55	66,624 50
Lake Tahoe.....	93,786 09	5,800 73	76,289 37	3,609 45
McCloud River.....	(No re port.)	9,691 43	31,668 29	9,313 52
Mill Valley & Mt. Tamalpais.....	128,358 02	8,821 22	146,854 08	*18,200 92
National City & Otay.....	37,274 85	5,163 24	43,606 70	14,324 81
Nevada-California-Oregon.....	31,383 40	12,451 10	34,265 09	*1,270 50
Nevada Co. Narrow-Gauge.....	158,656 91	25,633 03	195,438 38	53,392 94
North Shore.....	114,510 96	22,805 75	119,328 23	22,355 54
Pacific Coast.....	298,087 93	41,431 28	586,620 31	*1,483,579 61
Pajaro Valley.....	106,108 55	28,385 67	116,307 23	23,188 37
Randsburg.....	98,158 85	10,127 90	98,434 11	25,576 76
San Diego, Pacific Beach & La Jolla.....	50,921 04	*1,838 90	43,554 50	10,968 74
San Diego, Cuyamaca & Eastn San Pedro, Los Angeles & Salt Lake.....	15,372 29	*29,144 29	20,316 76	2,560 73
Sierra.....	261,814 31	79,728 02	54,141 62	*21,033 12
Sierra Valleys.....	268,359 91	74,405 10	384,005 80	103,991 01
Southern California.....	28,461 15	*13,956 12	373,413 79	120,555 84
Southern Pacific.....	3,559,870 98	374,638 23	32,572 23	*10,503 76
Sunset.....	53,462,956 31	*2,118,798 59	3,862,257 01	262,538 60
Yreka.....	(No re port.)	2,555 18	57,097,606 33	*2,457,925 86
Totals.....	16,526 65		26,593 19	11,665 65
	\$65,304,124 22	*\$1,341,478 09	18,429 70	3,446 45
			\$76,992,641 54	\$806,977 19

*Deficit.

PASSENGER, FREIGHT, AND

Name of Company.	Earnings—1902.		
	Passenger.	Freight and Other Earnings.	Total.
Arcata & Mad River	\$12,285 04	\$70,366 02	\$82,651 06
Atchison, Topeka & Santa Fé	446,077 55	{ 1,796,940 96 7,199 30}	2,250,217 81
Atchison, Topeka & Santa Fé (S. F. & S. J. V.)	717,011 63	{ 1,674,194 88 13,882 71}	2,405,089 22
California Northwestern	580,746 67	{ 540,407 83 11,424 73}	1,132,579 23
California Northwestern (S. F. & N. P.)			
Colusa & Lake	9,702 20	15,057 54	24,759 74
Crescent City & Smith River	475 00	23,825 29	24,300 29
Eel River & Eureka	50,519 87	{ 105,664 58 18,580 93}	174,765 38
Eureka & Klamath River	20,267 02	{ 93,437 89 3,613 91}	117,318 82
Iron Mountain	1 00	93,785 09	93,786 09
Lake Tahoe	(No report.)		
McCloud River	2,506 79	{ 125,787 46 63 77}	128,358 02
Mill Valley & Mount Tamalpais ..	37,223 85	{ 41 00 4,322 04}	41,596 89
National City & Otay	16,163 66	{ 15,052 36 167 38}	31,383 40
Nevada-California-Oregon	44,923 41	{ 108,642 37 5,091 13}	158,656 91
Nevada County Narrow-Gauge	48,718 66	{ 65,642 30 150 00}	114,510 96
North Shore	211,797 30	86,290 63	298,087 93
Pacific Coast	21,551 79	{ 84,314 15 242 61}	106,108 55
Pajaro Valley	1,612 70	96,546 15	98,158 85
Randsburg	13,183 23	37,737 81	50,921 04
San Diego, Pacific Beach & La Jolla ..	12,250 02	3,122 27	15,372 29
San Diego, Cuyamaca & Eastern ..	17,104 74	{ 34,996 83 97 95}	52,199 52
San Pedro, Los Angeles & Salt Lake ..	97,311 54	{ 158,857 48 12,190 89}	268,359 91
Sierra	96,796 67	165,017 64	261,814 31
Sierra Valleys	7,167 63	{ 21,131 21 162 21}	28,461 15
Southern California	1,274,377 40	{ 2,225,175 63 60,317 95}	3,559,870 98
Southern Pacific	18,755,525 30	{ 33,964,998 00 742,433 01}	53,462,956 31
Sunset	(No report.)		
Yreka	10,770 44	5,756 21	16,526 65
Totals	\$22,506,081 11	\$42,492,730 20	\$64,998,811 31

OTHER EARNINGS—1902-1903.

Earnings—1903.			Increase, 1903 over 1902.	Name of Company.
Passenger.	Freight and Other Earnings.	Total.		
\$14,307 56	\$71,187 79	\$85,495 35	\$2,844 29	Arcata & Mad River.
2,912,291 72	{ 8,710,808 94/ 107,868 73}	11,730,969 39	-----	Atchison, Topeka & Santa Fé.
660,368 29	{ 626,508 83/ 12,402 11}	1,299,279 23}	165,101 83	California Northwest- ern.
25,386 44	{ 73,014 79/ 80}	98,402 03}			California Northwest- ern (S. F. & N. P.)
13,249 24	17,526 12	30,775 36	6,015 62	Colusa & Lake.
448 75	21,589 15	22,037 90	2,262 39*	Crescent City & Smith River.
76,027 60	{ 124,050 00/ 12,618 41}	212,696 01	37,930 63	Eel River & Eureka.
24,938 00	{ 123,393 48/ 2,952 07}	151,283 55	33,974 73	Eureka & Klamath River.
50	76,288 87	76,289 37	17,496 72*	Iron Mountain.
16,234 82	{ 12,626 17/ 2,807 30}	31,668 29	(No report 1902)	Lake Tahoe.
4,022 26	{ 142,661 46/ 170 36}	146,854 08	18,504 06	McCloud River.
43,586 35	{ 20 35/ 5,694 04}	49,300 74	7,703 85	Mill Valley & Mount Tamalpais.
18,226 62	{ 15,529 38/ 509 09}	34,265 09	2,881 69	National City & Otay.
57,053 77	{ 132,959 65/ 5,424 96}	195,438 38	36,781 47	Nevada-California-Or- egon.
52,352 58	66,975 65	119,328 23	4,817 27	Nevada County Nar- row-Gauge.
420,546 67	{ 143,821 45/ 22,252 19}	586,620 31	288,532 88	North Shore.
26,271 59	{ 84,796 42/ 5,239 22}	116,307 23	10,198 68	Pacific Coast.
1,511 85	96,922 26	98,434 11	275 26	Pajaro Valley.
11,709 59	31,844 91	43,554 50	250 00	Randsburg.
15,993 30	{ 4,263 46/ 60 00}	20,316 76	4,944 47	San Diego, Pacific Beach & La Jolla.
18,371 82	{ 35,723 35/ 46 45}	54,141 62	1,942 10	San Diego, Cuyamaca & Eastern.
133,450 33	{ 221,349 96/ 29,205 51}	384,005 80	115,645 89	San Pedro, Los Ange- les & Salt Lake.
128,488 48	{ 244,745 31/ 180 00}	373,413 79	111,599 48	Sierra.
6,911 29	{ 25,526 70/ 134 24}	32,572 23	4,111 08	Sierra Valleys.
1,339,608 73	{ 2,447,642 24/ 75,006 04}	3,862,257 01	302,386 03	Southern California.
20,746,155 81	{ 35,468,698 86/ 882,751 66}	57,097,606 33	3,634,650 02	Southern Pacific.
9,073 95	{ 17,378 22/ 141 02}	26,593 19	(No report 1902)	Sunset.
12,469 16	5,960 54	18,429 70	1,903 05	Yreka.
\$26,789,057 07	\$50,209,278 51	\$76,998,335 58	\$4,773,235 27	

* Decrease.

EXPENSES—1902-1903.

Name of Company.	1902.	1903.
Arcata & Mad River	\$70,091 31	\$70,439 15
Atchison, Topeka & Santa Fé	1,809,737 48	7,314,079 65
Atchison, Topeka & Santa Fé (S. F. & S. J. V.)	1,525,807 48	
California Northwestern	782,149 13	949,002 52
California Northwestern (S. F. & N. Pac.)		88,331 95
Colusa & Lake	11,406 94	14,271 63
Crescent City & Smith River	14,862 16	13,063 66
Eel River & Eureka	117,567 18	127,451 34
Eureka & Klamath River	66,064 81	79,666 56
Iron Mountain	99,586 82	72,679 92
Lake Tahoe	No report.	18,466 31
McCloud River	100,086 69	145,327 47
Mill Valley & Mount Tamalpais	32,775 67	34,975 95
National City & Otay	35,366 01	34,310 63
Nevada-California-Oregon	103,579 66	105,049 21
Nevada County Narrow-Gauge	74,453 05	70,806 73
North Shore	246,977 99	365,869 67
Pacific Coast	70,475 27	86,156 19
Pajaro Valley	66,005 59	70,680 31
Randsburg	23,235 03	17,962 34
San Diego, Pacific Beach & La Jolla	16,122 75	17,011 39
San Diego, Cuyamaca & Eastern	46,925 68	41,187 40
San Pedro, Los Angeles & Salt Lake	178,446 73	268,958 10
Sierra	111,035 69	167,027 96
Sierra Valleys	23,253 87	24,012 59
Southern California	1,974,826 45	2,300,083 24
Southern Pacific	32,778,857 29	35,901,804 06
Sunset	No report.	18,544 00
Yreka	10,941 22	11,933 75
Deduct A., & S. F. R'y	\$40,390,637 04 3,335,544 96	\$48,392,243 57 7,314,079 65
Total, exclusive of A., T. & S. F. R'y	\$37,055,092 98	\$41,078,163 92

ROLLING STOCK, AND RAILS AND TIES—1903.

Name of Company.	Locomotives in Service.	Cars.	New Rails.	New Ties.
			<i>Tons.</i>	
Alameda & San Joaquin	2	78		
Arcata & Mad River	5	237		
Atchison, Topeka & Santa Fé	114	2,479	4,906.90	256,524
Boca & Loyalton	4	34		
California Northwestern	28	747	229.00	45,715
Colusa & Lake	3	37		
Crescent City & Smith River	2	77		
Eel River & Eureka	4	105		14,425
Eureka & Klamath River	9	214	462.40	19,462
Iron Mountain	5	95		
Lake Tahoe	2	68		
McCloud River	8	227	829.00	11,872
Mill Valley & Mount Tamalpais	3	13		
National City & Otay	5	44		
Nevada-California-Oregon	8	103	18.50	6,571
Nevada County Narrow-Gauge	5	68		5,127
North Shore	15	381	3,181.50	74,894
Pacific Coast	4	196	50.27	9,952
Pajaro Valley	7	282	38.00	7,009
Randsburg	1	1		
San Diego, Pacific Beach & La Jolla	2	15		500
San Diego, Cuyamaca & Eastern	3	39		5,210
San Pedro, Los Angeles & Salt Lake	16	579	34.00	1,780
Sierra	7	105		
Sierra Valleys	2	29		2,219
Southern California	35	212	507.00	53,834
Southern Pacific	983	29,908	72,267.14	1,481,614
Sunset	(Reported by		Santa Fé)	37
Yreka	2	4		2,323
Totals	1,284	36,397	82,523.71	1,999,068

ACCIDENTS TO PERSONS—1903.

Name of Company.	Passengers.		Trespassing.		Not Trespassing.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Arcata & Mad River						
Atchison, Topeka & Santa Fé	4	42	19	33		1
California Northwestern		2	1			
Colusa & Lake						
Crescent City and Smith River						
Eel River & Eureka						
Eureka & Klamath River						
Iron Mountain						
Lake Tahoe						
McCloud River						
Mill Valley & Mount Tamalpais		1				
National City & Otay						
Nevada-California-Oregon						
Nevada County Narrow-Gauge						
North Shore	3	28				
Pacific Coast						
Pajaro Valley						
Randsburg						
San Diego, Pacific Beach & La Jolla						
San Diego, Cuyamaca & Eastern						
San Pedro, Los Angeles & Salt Lake		1	3			1
Sierra						
Sierra Valleys						
Southern California		6	14	25		2
Southern Pacific	39	294	130	115	14	30
Sunset						
Yreka						
Totals, 1903	46	374	167	173	14	34
Totals, 1902	15	94	5	6		

ACCIDENTS TO EMPLOYEES—1903.

Name of Company.	Trainmen.		Switchmen, Flagmen, Watchmen.		Other Employés.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Arcata & Mad River						2
Atchison, Topeka & Santa Fé	20	389			2	3
California Northwestern		12		1		1
Colusa & Lake						
Crescent City & Smith River						
Eel River & Eureka						
Eureka & Klamath River						1
Iron Mountain		1				
Lake Tahoe						
McCloud River		1				
Mill Valley & Mount Tamalpais						
National City & Otay						
Nevada-California-Oregon						
Nevada County Narrow-Gauge						1
North Shore	1	35		2	6	
Pacific Coast					1	1
Pajaro Valley						
Randsburg						
San Diego, Pacific Beach & La Jolla						
San Diego, Cuyamaca & Eastern						
San Pedro, Los Angeles & Salt Lake		2	1			
Sierra	1					
Sierra Valleys						
Southern California	5	71		1	2	193
Southern Pacific	33	346	5	59	25	89
Sunset						
Yreka						
Totals, 1903	60	857	6	63	36	291
Totals, 1902	39	212	4	36	40	197

COMPARATIVE GENERAL BALANCE SHEETS.

ARCATA & MAD RIVER RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road -----	\$180,597 98	\$191,013 35	\$10,415 37	-----
Cost of equipment -----	54,269 02	56,840 42	2,571 40	-----
Water works -----	1,732 74	1,518 76	-----	\$213 98
Lands owned -----	15,361 00	15,987 06	626 06	-----
Cash and current assets -----	234 15	157 96	-----	76 19
Tools -----	4,909 37	1,420 00	-----	3,489 37
Wood -----	-----	3,250 16	3,250 16	-----
Telephone -----	-----	625 00	625 00	-----
Total assets -----	\$257,104 26	\$270,812 71	\$17,487 99	\$3,779 54

ATCHISON, TOPEKA & SANTA FÉ RAILWAY COMPANY. (COAST LINES.)

<i>Assets.</i>				
Cost of road -----	\$8,176,411 55	\$8,176,411 55	-----	-----
Cost of equipment -----	752,342 22	752,342 22	-----	-----
Cash and current assets -----	244,010 02	1,870,598 05	-----	-----
Materials and supplies -----	22,849 20	1,245,663 14	-----	-----
Sundries -----	90,874 14	103,698 73	-----	-----
Profit and loss -----	911,702 91	-----	-----	-----
Total assets -----	\$10,198,190 04	\$12,148,713 69	-----	-----
<i>Liabilities.</i>				
Current liabilities -----	No report.	\$3,112,994 14	-----	-----
Rail renewal fund -----	-----	84,372 45	-----	-----
Tie renewal fund -----	-----	22,593 33	-----	-----
Total liabilities -----	-----	\$3,219,959 92	-----	-----

CALIFORNIA NORTHWESTERN RAILWAY COMPANY.

<i>Assets.</i>				
Cost of road -----	-----	\$2,316,000 00	-----	-----
Cash and current assets -----	-----	35,098 38	-----	-----
Profit and loss -----	-----	45,927 65	-----	-----
Total assets -----	-----	\$2,397,026 03	-----	-----
<i>Liabilities.</i>				
Capital stock -----	-----	\$1,566,000 00	-----	-----
Funded debt -----	-----	748,000 00	-----	-----
Current liabilities -----	-----	83,026 03	-----	-----
Total liabilities -----	-----	\$2,397,026 03	-----	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

SAN FRANCISCO & NORTH PACIFIC RAILWAY COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road and equipment.....	\$10,437,096 31	\$10,290,000 00	-----	\$147,096 31
Cash and current assets.....	50,440 49	51,040 49	\$600 00	-----
Materials and supplies.....	21,047 36	21,047 36	-----	-----
Total assets.....	\$10,508,584 16	\$10,362,087 85	-----	\$146,496 31
<i>Liabilities.</i>				
Capital stock.....	\$6,000,000 00	\$6,000,000 00	-----	-----
Funded debt.....	3,970,000 00	3,948,000 00	-----	\$22,000 00
Sinking fund paid on first mortgage bonds.....	320,000 00	342,000 00	\$22,000 00	-----
Profit and loss.....	218,584 16	72,087 85	-----	146,496 31
Total liabilities.....	\$10,508,584 16	\$10,362,087 85	-----	\$146,496 31

CALIFORNIA NORTHWESTERN COMPANY. (LESSEE OF S. F. & N. P. R'y.)

<i>Assets.</i>				
Cash and current assets.....	\$246,002 46	\$169,343 51	-----	\$76,658 95
Materials and supplies.....	87,642 76	149,333 21	\$61,690 45	-----
Total assets.....	\$333,645 22	\$318,676 72	-----	\$14,968 50
<i>Liabilities.</i>				
Current liabilities.....	\$249,873 57	\$196,875 52	-----	\$52,998 05
Accrued rental.....	48,600 00	48,600 00	-----	-----
Profit and loss.....	35,171 65	73,201 20	\$38,029 55	-----
Total liabilities.....	\$333,645 22	\$318,676 72	-----	\$14,968 50

COLUSA & LAKE RAILROAD COMPANY.

<i>Assets.</i>				
Cost of road.....	\$165,024 83	\$165,024 83	-----	-----
Cost of equipment.....	34,046 27	34,046 27	-----	-----
Cash and current assets.....	7,758 22	12,527 20	-----	-----
Total assets.....	\$206,829 32	\$211,598 30	-----	-----
<i>Liabilities.</i>				
Capital stock.....	\$100,500 00	\$100,500 00	-----	-----
Funded debt.....	66,000 00	66,000 00	-----	-----
Profit and loss.....	40,329 32	45,098 30	-----	-----
Total liabilities.....	\$206,829 32	\$211,598 30	-----	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

EEL RIVER & EUREKA RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road	\$658,156 71	\$687,716 18	\$29,559 47	-----
Cost of equipment	94,381 09	110,573 09	16,194 90	-----
Cash and current assets	49,652 98	61,220 64	11,567 66	-----
Materials and supplies	4,525 17	3,875 00	-----	\$650 17
Profit and loss	146,551 55	90,385 99	-----	56,165 56
Total assets	\$953,267 50	\$953,771 80	\$57,322 03	\$56,815 73
Net increase	-----	-----	\$506 30	-----
<i>Liabilities.</i>				
Capital stock	\$480,000 00	\$480,000 00	-----	-----
Funded debt	462,000 00	462,000 00	-----	-----
Current liabilities	11,265 50	11,771 80	\$506 30	-----
Total liabilities	\$953,265 50	\$953,771 80	\$506 30	-----

EUREKA & KLAMATH RIVER RAILROAD COMPANY.

<i>Assets.</i>				
Cost of road . . . \$592,414.26	} \$724,323 77	\$923,502 83	\$199,179 06	-----
Cost of equipm't, 131,909.51				
Cash and current assets .....					19,641 12	24,256 33	4,615 21	-----
Materials and supplies	20,204 97	38,656 67	18,451 70	-----
Total assets	\$764,169 86	\$986,415 83	\$222,245 97	-----
<i>Liabilities.</i>				
Capital stock	\$500,000 00	\$500,000 00	-----	-----
Current liabilities	190,994 38	346,615 85	\$155,621 47	-----
Profit and loss	73,175 48	139,799 98	66,624 50	-----
Total liabilities	\$764,169 86	\$986,415 83	\$222,245 97	-----

IRON MOUNTAIN RAILWAY COMPANY.

<i>Assets.</i>				
Cost of road	\$229,002 04	\$229,002 04	-----	-----
Cost of equipment	53,535 80	53,535 80	-----	-----
Profit and loss	*5,800 73	†3,609 45	-----	-----
<i>Liabilities.</i>				
Capital stock	\$100,000 00	\$100,000 00	-----	-----

* Deficit. † In excess.

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

LAKE TAHOE RAILWAY AND TRANSPORTATION COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road and equipment.....	\$600,329 98	\$859,797 16	\$169,467 18	-----
Property.....	92,500 00	-----	-----	\$92,500 00
Cash and current assets.....	32,062 14	11,748 74	-----	20,313 40
Materials and supplies.....	10,934 11	12,706 74	1,772 63	-----
Total assets.....	\$825,826 23	\$884,252 64	\$171,239 81	\$112,813 40
Net increase.....	-----	-----	58,426 41	-----
<i>Liabilities.</i>				
Capital stock.....	\$500,000 00	\$500,000 00	-----	-----
Funded debt.....	300,000 00	300,000 00	-----	-----
Current liabilities.....	7,621 78	23,028 54	\$15,406 76	-----
Accrued interest on funded debt not yet payable.....	-----	3,750 00	3,750 00	-----
Profit and loss.....	18,204 45	57,474 10	39,269 65	-----
Total liabilities.....	\$825,826 23	\$884,252 64	\$58,426 41	-----

MCCLOUD RIVER RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$681,190 29	\$693,632 36	\$12,442 07	-----
Cost of equipment.....	191,467 40	193,245 46	1,778 06	-----
Cash and current assets.....	19,655 56	7,570 35	-----	\$12,085 21
Materials and supplies.....	76,227 74	140,180 11	63,952 37	-----
Total assets.....	\$968,540 99	\$1,034,628 28	\$78,172 50	\$12,085 21
<i>Liabilities.</i>				
Capital stock.....	\$360,000 00	\$360,000 00	-----	-----
Funded debt.....	216,000 00	216,000 00	-----	-----
Current liabilities.....	349,923 99	435,730 14	\$85,806 15	-----
Profit and loss.....	42,617 00	22,898 14	-----	\$19,718 86
Total liabilities.....	\$968,540 99	\$1,034,628 28	\$85,806 15	\$19,718 86

MILL VALLEY & MOUNT TAMALPAIS SCENIC RAILWAY COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$143,134 04	\$144,563 67	\$1,429 63	-----
Cost of equipment.....	31,330 24	31,801 63	471 39	-----
Other permanent investm'ts.....	49,055 49	58,097 57	9,042 08	-----
Land's owned.....	9,363 58	9,380 17	16 59	-----
Cash and current assets.....	2,617 31	3,822 11	1,204 80	-----
Materials and supplies.....	3,429 30	4,907 66	1,478 36	-----
Sinking fund.....	6,000 00	8,000 00	2,000 00	-----
Sundries.....	478 47	799 63	321 16	-----
Total assets.....	\$245,408 43	\$261,372 44	\$15,964 01	-----
<i>Liabilities.</i>				
Capital stock.....	\$122,000 00	\$122,000 00	-----	-----
Funded debt.....	100,000 00	100,000 00	-----	-----
Current liabilities.....	3,696 85	6,216 05	\$2,519 20	-----
Bills payable.....	-----	4,000 00	4,000 00	-----
Profit and loss.....	19,711 58	29,156 39	9,424 81	-----
Total liabilities.....	\$245,408 43	\$261,372 44	\$15,964 01	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

NATIONAL CITY & OTAY RAILWAY COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road	\$1,060,636 61	\$1,064,228 94	\$3,952 93	-----
Cost of equipment	77,563 99	77,675 11	111 12	-----
Quarry equipment	2,298 93	2,298 93	-----	-----
Cash and current assets	4,176 16	9,127 96	4,951 80	-----
Materials and supplies	11,436 00	9,166 11	-----	\$2,269 89
Profit and loss	4,442 36	5,712 86	1,270 50	-----
Total assets	\$1,160,554 05	\$1,168,209 91	\$7,655 86	-----
<i>Liabilities.</i>				
Capital stock	\$700,000 00	\$700,000 00	-----	-----
Funded debt	451,000 00	451,000 00	-----	-----
Current liabilities	9,554 05	17,209 91	\$7,655 86	-----
Total liabilities	\$1,160,554 05	\$1,168,209 91	\$7,655 86	-----

NEVADA COUNTY NARROW-GAUGE RAILROAD COMPANY.

<i>Assets.</i>				
Cost of road	\$572,655 11	\$572,655 11	-----	-----
Cost of equipment	93,518 63	93,518 63	-----	-----
Cash and current assets	30,382 67	48,530 10	\$18,147 43	-----
Materials and supplies	16,320 08	10,229 85	-----	\$6,090 23
Total assets	\$712,876 49	\$724,933 69	\$12,057 20	-----
<i>Liabilities.</i>				
Capital stock	\$250,200 00	\$250,200 00	-----	-----
Funded debt	238,000 00	234,000 00	-----	\$4,000 00
Current liabilities	21,132 77	14,834 43	-----	6,298 34
Profit and loss	203,543 72	225,899 26	\$22,355 54	-----
Total liabilities	\$712,876 49	\$724,933 69	\$12,057 20	-----

NEVADA-CALIFORNIA-OREGON RAILWAY COMPANY.

<i>Assets.</i>				
Cost of road	\$2,723,819 70	\$2,724,105 30	\$285 60	-----
Cost of equipment	62,688 23	88,855 29	26,167 06	-----
Stocks owned	700 00	700 00	-----	-----
Bonds owned	37,000 00	103,000 00	66,000 00	-----
Cash and current assets	180,320 70	252,506 48	72,185 78	-----
Materials and supplies	14,291 27	5,851 06	-----	\$8,440 21
Total assets	\$3,018,819 90	\$3,175,018 13	\$156,198 23	-----
<i>Liabilities.</i>				
Capital stock	\$2,200,000 00	\$2,200,000 00	-----	-----
Funded debt	487,000 00	629,000 00	\$142,000 00	-----
Current liabilities	258,206 88	231,054 19	-----	\$27,152 69
Accrued interest on funded debt not yet payable	3,750 00	4,383 32	633 32	-----
Profit and loss	69,863 02	110,580 62	40,717 60	-----
Total liabilities	\$3,018,819 90	\$3,175,018 13	\$156,198 23	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

NORTH SHORE RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road	\$21,405 69	\$998,156 99	\$976,751 30	
Cost of equipment	44,719 03	554,154 16	509,435 13	
Right of way and franchises	4,950,000 00	4,950,000 00		
Investment account	3,344,645 14	3,167,348 86		\$177,296 28
Cash and current assets	201,343 13	27,313 85		174,029 28
Materials and supplies	8,324 06	33,649 40	25,325 34	
Sinking fund		4,167 51	4,167 51	
Profit and loss		1,439,065 03		
Total assets	\$8,570,437 05	\$9,734,790 77	\$1,164,353 72	
<i>Liabilities.</i>				
Capital stock	\$6,000,000 00	\$6,000,000 00		
Funded debt	2,348,000 00	3,348,000 00	\$1,000,000 00	
Current liabilities	226,388 61	530,707 98	304,319 37	
Accrued interest on funded debt not yet payable	8,178 73	109,016 18	100,837 45	
Profit and loss	44,514 58			
Total liabilities	\$8,582,567 34	\$9,987,724 16	\$1,405,156 82	

PACIFIC COAST RAILWAY COMPANY.

<i>Assets.</i>				
Cost of road	\$2,146,796 99	\$2,146,451 99		\$345 00
Cost of equipment	207,214 96	207,214 96		
Cash and current assets	6 57	351 57	\$345 00	
Profit and loss	386,381 48	386,381 48		
Total assets	\$2,740,400 00	\$2,740,400 00	\$345 00	\$345 00
<i>Liabilities.</i>				
Capital stock	\$1,370,400 00	\$1,370,400 00		
Funded debt	1,370,000 00	1,370,000 00		
Total liabilities	\$2,740,400 00	\$2,740,400 00		

PAJARO VALLEY CONSOLIDATED RAILROAD COMPANY.

<i>Assets.</i>				
Cost of road	\$336,611 11	\$348,415 63	\$11,804 52	
Cost of equipment	149,119 26	149,119 26		
Cash and current assets	28,638 27	9,532 18		\$19,106 09
Profit and loss	134,368 64	159,945 40	25,576 76	
Total assets	\$648,737 28	\$667,012 47	\$37,381 28	\$19,106 09
<i>Liabilities.</i>				
Capital stock	\$360,000 00	\$360,000 00		
Current liabilities	20,000 00	9,532 18		\$10,467 82
Profit and loss	134,368 64	159,945 40	\$25,576 76	
Total liabilities	\$514,368 64	\$529,477 58	\$25,576 76	\$10,467 82

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

RANDSBURG RAILWAY COMPANY.

Items.	April 30, 1902.	April 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$840,000 00	\$840,000 00	-----	-----
Cost of equipment.....	3,500 00	3,500 00	-----	-----
Cash and current assets.....	30,981 20	45,981 20	\$15,000 00	-----
Profit and loss.....	-----	15,000 00	15,000 00	-----
Total assets.....	\$874,481 20	\$904,481 20	\$30,000 00	-----
<i>Liabilities.</i>				
Capital stock.....	\$540,000 00	\$540,000 00	-----	-----
Funded debt.....	300,000 00	300,000 00	-----	-----
Total liabilities.....	\$840,000 00	\$840,000 00	-----	-----

SAN DIEGO, CUYAMACA & EASTERN RAILWAY COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$1,293,331 34	\$1,299,368 47	\$6,037 13	-----
Cost of equipment.....	51,348 82	51,448 82	100 00	-----
Stocks owned.....	220 00	220 00	-----	-----
Cash and current assets.....	6,425 51	16,600 94	10,175 43	-----
Materials and supplies.....	860 33	3,122 79	2,262 46	-----
Profit and loss.....	427,415 31	448,418 53	21,003 22	-----
Total assets.....	\$1,779,601 31	\$1,819,179 55	\$39,578 24	-----
<i>Liabilities.</i>				
Capital stock.....	\$769,000 00	\$769,000 00	-----	-----
Funded debt.....	550,000 00	550,000 00	-----	-----
Current liabilities.....	460,601 31	500,179 55	\$39,578 24	-----
Total liabilities.....	\$1,779,601 31	\$1,819,179 55	\$39,578 24	-----

SAN DIEGO, PACIFIC BEACH & LA JOLLA RAILWAY COMPANY.

<i>Assets.</i>				
Cost of road.....	\$151,014 72	\$151,014 72	-----	-----
Cost of equipment.....	40,006 91	40,006 91	-----	-----
Due on capital stock.....	86,654 54	86,654 54	-----	-----
Cash and current assets.....	659 64	3,066 85	\$2,397 21	-----
Materials and supplies.....	2,697 92	2,887 98	190 06	-----
Profit and loss.....	7,351 90	4,791 17	-----	-----
Total assets.....	\$288,385 63	\$288,422 17	\$2,587 27	-----
<i>Liabilities.</i>				
Capital stock.....	\$275,000 00	\$275,000 00	-----	-----
Current liabilities.....	13,385 63	13,422 17	\$36 54	-----
Total liabilities.....	\$288,385 63	\$288,422 17	\$36 54	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

SAN PEDRO, LOS ANGELES & SALT LAKE RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$5,442,821 23	\$5,576,907 85	\$134,086 62	-----
Cost of equipment.....	616,299 48	725,257 87	108,958 39	-----
Cash and current assets.....	80,682 41	40,895 60	-----	\$39,786 81
Materials and supplies.....	43,745 65	38,703 88	-----	5,041 77
Total assets.....	\$6,183,548 77	\$6,381,765 20	\$243,045 01	\$44,828 58
<i>Liabilities.</i>				
Capital stock.....	\$2,501,600 00	\$2,500,000 00	-----	\$1,600 00
Funded debt.....	2,500,000 00	2,500,000 00	-----	-----
Current liabilities.....	47,902 18	65,369 62	\$17,497 44	-----
Due Empire Construct'n Co.	1,041,519 40	1,119,853 90	78,334 50	-----
Profit and loss.....	92,527 19	196,511 68	103,984 49	-----
Total liabilities.....	\$6,183,548 77	\$6,381,765 20	\$199,816 43	\$1,600 00

SIERRA RAILWAY COMPANY OF CALIFORNIA.

<i>Assets.</i>				
Cost of road and equipment.....	\$5,485,801 96	\$6,152,709 86	\$666,907 90	-----
Cash and current assets.....	19,446 69	53,128 08	33,681 39	-----
Materials and supplies.....	12,499 73	12,881 13	381 40	-----
Sinking fund.....	5,563 73	703 73	-----	\$4,860 00
Total assets.....	\$5,523,312 11	\$6,219,422 80	\$696,110 69	-----
<i>Liabilities.</i>				
Capital stock.....	\$2,780,000 00	\$3,248,000 00	\$468,000 00	-----
Funded debt.....	2,385,000 00	2,514,000 00	129,000 00	-----
Current liabilities.....	112,641 09	90,340 94	-----	\$22,300 15
Accrued interest on funded debt not yet payable.....	15,369 00	16,224 00	855 00	-----
Profit and loss.....	230,302 02	350,857 86	120,555 84	-----
Total liabilities.....	\$5,523,312 11	\$6,219,422 80	\$696,110 69	-----

SIERRA VALLEYS RAILWAY COMPANY.

<i>Assets.</i>				
For adjustment.....	\$1,116,317 58	\$1,246,256 28	-----	-----
Cost of road.....	118,792 47	218,264 37	-----	-----
	\$1,235,110 05	\$1,464,520 65	\$229,410 60	-----
Cost of equipment.....	11,146 23	11,146 23	-----	-----
Cash and current assets.....	1,220 40	5,199 87	3,979 47	-----
Profit and loss.....	13,856 12	24,100 03	10,243 91	-----
Total assets.....	\$1,261,332 80	\$1,504,966 78	\$243,633 98	-----
<i>Liabilities.</i>				
Capital stock.....	\$942,100 00	\$942,100 00	-----	-----
Funded debt.....	300,000 00	300,000 00	-----	-----
Current liabilities.....	19,232 80	262,866 78	\$243,633 98	-----
Total liabilities.....	\$1,261,332 80	\$1,504,966 78	\$243,633 98	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

SOUTHERN CALIFORNIA RAILWAY COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....	\$25,910,837 98	\$26,340,170 76	\$429,332 76	-----
Cost of equipment.....	527,260 47	528,516 47	1,256 00	-----
Stocks owned.....	30 46	30 46	-----	-----
Lands owned.....	200,686 47	40,489 63	-----	\$160,196 84
Cash and current assets.....	357,655 13	715,144 67	357,489 54	-----
Materials and supplies.....	68,734 56	7,323 63	-----	61,410 93
Sundries.....	1,188 78	2,968 22	1,779 44	-----
Total assets.....	\$27,066,393 85	\$27,634,643 84	\$568,249 99	-----
<i>Liabilities.</i>				
Capital stock.....	\$12,824,000 00	\$12,824,000 00	-----	-----
Funded debt.....	12,284,740 00	12,284,740 00	-----	-----
Current liabilities.....	511,600 87	549,157 24	\$37,556 37	-----
Canceled bond account.....	50,000 00	50,000 00	-----	-----
Rolling stock replacement fund.....	12,804 52	8,874 52	-----	\$3,930 00
Rail renewal fund.....	39,457 17	177,452 05	137,994 88	-----
Tie renewal fund.....	-----	30,602 80	30,602 80	-----
Profit and loss.....	1,343,791 29	1,709,817 23	366,025 94	-----
Total liabilities.....	\$27,066,393 85	\$27,634,643 84	\$568,249 99	-----

SOUTHERN PACIFIC COMPANY.

<i>Assets.</i>				
Stocks owned.....	\$245,094,022 40	\$247,642,939 21	\$2,548,916 81	-----
Bonds owned.....	5,016,503 87	9,625,296 04	4,608,792 17	-----
Other perman't investm'ts:				
Steamships.....	\$3,659,761.75	-----	-----	-----
Wood preserv- ing plant.....	135,953.92	-----	-----	-----
Real estate and other property.....	3,083,456.02	-----	-----	-----
Rolling stock.....	4,778,714.67	-----	-----	-----
	11,657,886 36	18,559,127 77	6,901,241 41	-----
Lands owned.....	291,931 85	219,344 68	-----	\$72,587 17
Cash and current assets.....	7,352,688 66	14,447,125 97	7,094,437 31	-----
Materials and supplies.....	5,820,960 42	7,500,913 21	2,219,952 79	-----
Individuals and companies.....	225,621 69	240,532 66	14,910 97	-----
Advance for steamships.....	2,262,728 26	3,513,223 30	1,250,495 04	-----
Discount and bonds.....	495,000 00	-----	-----	-----
Total assets.....	\$277,677,343 51	\$301,748,502 84	\$24,071,159 33	-----
<i>Liabilities.</i>				
Capital stock.....	\$197,849,227 40	\$197,849,258 64	\$31 24	-----
Funded debt.....	46,033,500 00	51,562,500 00	5,529,000 00	-----
Current liabilities.....	16,604,377 64	35,592,876 88	18,988,499 24	-----
Accrued interest on funded debt not yet payable.....	2,473,875 32	2,570,590 18	96,714 86	-----
Taxes, estimated to June 30.....	216,000 00	226,000 00	10,000 00	-----
Wells, Fargo & Co.'s contract	400,000 00	368,000 00	-----	\$32,000 00
Individuals and companies.....	104,647 36	385,540 53	280,893 17	-----
Marine insurance fund.....	973,693 09	1,149,924 63	176,231 54	-----
Replacement fund.....	39,916 00	1,101,621 49	1,061,705 49	-----
Steamship insurance fund.....	1,243,776 91	1,603,686 91	359,910 00	-----
Unadjusted accounts.....	1,562,020 67	265,955 64	-----	1,296,065 03
Profit and loss.....	10,176,309 12	9,072,547 94	-----	1,103,761 18
Total liabilities.....	\$277,677,343 51	\$301,748,502 84	\$24,071,159 33	-----

COMPARATIVE GENERAL BALANCE SHEETS—CONTINUED.

SUNSET RAILROAD COMPANY.

Items.	June 30, 1902.	June 30, 1903.	Increase.	Decrease.
<i>Assets.</i>				
Cost of road.....		\$760,969 21		
Cost of equipment.....		336 57		
Cash and current assets.....		36,299 91		
Profit and loss.....		5,045 49		
Total assets.....		\$802,651 18		
<i>Liabilities.</i>				
Capital stock.....		\$500,000 00		
Funded debt.....		284,000 00		
Current liabilities.....		15,502 73		
Accrued interest on funded debt not yet payable.....		2,840 00		
Other liabilities (sundries).....		308 45		
Total liabilities.....		\$802,651 18		

YREKA RAILROAD COMPANY.

<i>Assets.</i>				
Cost of road.....	\$103,910 44	\$103,720 44		\$190 00
Cost of equipment.....	15,423 87	15,613 87	\$190 00	
Cash and current assets.....	3,803 72	2,557 08		1,246 64
Total assets.....	\$123,138 03	\$121,891 39		\$1,246 64
<i>Liabilities.</i>				
Capital stock.....	\$49,537 50	\$49,537 50		
Funded debt.....	43,200 00	39,000 00		\$4,200 00
Current liabilities.....	1,571 60	1,078 51		493 09
10% assessment, May, 1890.....	8,990 00	8,990 00		
Profit and loss.....	19,833 93	23,285 38	\$3,446 45	
Total liabilities.....	\$123,138 03	\$121,891 39		\$1,246 64

NINETEENTH ANNUAL REPORT

OF THE

BOARD OF DIRECTORS

OF THE

Industrial Home of Mechanical Trades
for the Adult Blind

FOR THE

YEAR ENDING JUNE 30, 1904.



SACRAMENTO :

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING,
1904.

REPORT.

To HON. GEORGE C. PARDEE,

Governor of the State of California.

SIR: The organic law of the Home for the Adult Blind requires that the President of the Board of Directors shall make report of the condition, needs, and affairs of the Home, to the Governor, annually in the month of December. Such report is now submitted.

The Home came under the management of the Board of Directors appointed by your predecessor, Governor Gage, on June 1, 1899. The Board immediately replaced Superintendent Sanders in charge, and with his able assistance began getting order out of the chaos into which the institution had fallen. The inmates were in distress, for the shops had long been closed and their earnings were stopped. A deficit of several thousand dollars had accumulated, and the books and accounts were in confusion. The retiring Board of Directors gave it as their opinion that the shops could not be reopened and the manufactures and trade of the institution restored. Had this opinion been justified it would have been necessary to abolish entirely the institution, since its purpose, its only legitimate purpose, is to teach to the adult blind such handicrafts as it is possible for them to learn, to the end that they may not only have their capacity for self-support partly restored, but that they may have employment, the greatest and highest of all blessings to the blind. If it were impossible for the institution to teach the blind trades and enable the inmates to apply their knowledge in the shops, the institution had no purpose and no excuse for its existence. This explanation of the crisis in which Superintendent Sanders found the institution is necessary in order to bring out clearly the fact that its usefulness has been restored and that it has been rescued from the wreck in which he found it.

The receipts for the first fiscal year, 1899-1900, were nominal, only one industry, that of chair-seating, being reinstated during that year. During the next fiscal year the broom shops were reopened and the lost commerce of the institution was sought for successfully. The blind inmates all found work, earned wages, and cheer and happiness took the place of the gloom and despair which had fallen upon them. From July 1, 1899, to October 31, 1904, the receipts of the Home from the sale of the products of the blind mechanics, paid into the Adult Blind

Fund in the State Treasury, amount to \$61,761.12. The rate of progress made in the restoration of the institution by Mr. Sanders is shown by the increase in the annual receipts, which were:

For the fiscal year ending June 30, 1900.....	\$658 27
For the fiscal year ending June 30, 1901.....	3,978 15
For the fiscal year ending June 30, 1902.....	13,250 21
For the fiscal year ending June 30, 1903.....	16,363 77
For the fiscal year ending June 30, 1904.....	19,877 90

During the first four months of the present fiscal year the receipts have been as follows:

July.....	\$1,801 66
August.....	1,730 30
September.....	1,918 88
October.....	2,181 98

As orders for the Home products are already booked far ahead, it is believed that the receipts of the present fiscal year will reach the high average of \$2,000 per month. For a detailed statement of the finances and transactions of the Home for the last fiscal year, the Board refers to the very able report of the Superintendent, which is appended.

LEGISLATIVE NEEDS.

The institution imperatively requires a new shop. The present shop is a loose board structure, in which the inmates are exposed to the elements in the rainy season, and the property of the State to loss at all seasons. Part of the shop fell down during the past year, inflicting a considerable loss, which would have had the mournful addition of loss of life had not the wreck occurred on a holiday, when the blind mechanics were not at work. The rest of the building is liable to fall at any time, and is wholly unfit for use. The Board urgently presents this to the consideration of the Governor and the Legislature as the first and most pressing need of the Home.

Next in order of importance is a new dormitory. The present dormitory accommodations are crowded to the limit, and there is a large waiting list of applicants for admission, who are blind and by law entitled to the benefits of the institution, which are denied to them because the State does not expand its facilities with the increasing need for their use.

Under the present law the officers of the institution are limited to a period of sixty days in which they can go into the open market for supplies after the rejection of bids at a regular letting. The experience of the institution is that such resort to the open market has been invariably beneficial and productive of economy. The Board recommends that the limit be extended to six months.

The present law requires that all bequests made to the institution shall be paid into the Adult Blind Fund. Under this impolitic require-

ment bequests are of necessity used in paying the current expenses of the institution, instead of going into some permanent form useful to the blind and a memorial of the charitable people who would bestow them. It is known to the Directors that if the law were changed, so that bequests would not be absorbed in paying current expenses, the friends of the blind would remember them by endowing buildings (or in other permanent form). The President of the Board is administrator of a small estate left to the institution, the distribution of the estate being withheld in the hope that the Legislature will change the law.

During the year the city of Oakland and the property owners on Telegraph Avenue combined in paving that thoroughfare with bitumen. The extensive property frontage of the Home on the avenue would have left an unsightly gap in the improvements, if it were not paved at the same time. The matter was referred to the State Board of Examiners, and the Directors of the Home were authorized to enter into a contract for the paving in front of the State property, provided the contractors were willing to wait for their pay until the Legislature appropriated the money. The contract amounts to \$2,310, which should be provided for.

To these recommendations the Board invites the interest and attention of the Legislature, to the end that this most necessary and beneficial and humane of our public institutions may be made to fulfill entirely the splendid purpose to which it is dedicated.

JOHN P. IRISH,
President of Board of Directors.

Subscribed and sworn to before me, this 11th day of November, 1904.

[SEAL.]

HARRY L. HORN, Notary Public.

REPORT OF SUPERINTENDENT.

OAKLAND, CAL., June 30, 1904.

To the Honorable the Board of Directors of the Industrial Home for the Adult Blind.

GENTLEMEN: In accordance with the provisions of Section 4, subdivision eleventh, of the Act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1904.

The year just ending is the nineteenth of the Home's existence and the fifth in which it has been under the control and management of your present Superintendent since his reinstatement by your body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Board.

		Salary.
Superintendent	Joseph Sanders	\$2,100 00
Physician	G. H. Derrick, M.D.	1,200 00
Secretary	Geo. S. Meredith	600 00

Employees of the Home, and their Rate of Compensation per Month.

		Per Month.
Clerk of the Home	T. A. Williston	\$65 00
Matron and Teacher	Mrs. A. Sanders	35 00
Assistant Matron	Miss O. B. Smith	30 00
Attendant in Charge of Women	Mrs. C. B. Goodrich	30 00
Watchman and Carpenter	M. Hansen	40 00
First Cook	J. J. Meyers	50 00
Second Cook	C. Turner	30 00
Janitor and Nurse	J. H. Wulzen	33 00
Janitor	G. Calvert	22 50
Waitress	Miss W. Andrews	22 50
Waitress	Miss E. Houseman	22 50
Waitress	Mrs. J. Robbins	22 50
Waitress	Miss M. Lusk	17 50
Laborer	W. McCarty	20 00
Driver of Wagon	Paul Fallon	22 50
Reader	W. McKee	7 50
Total		\$470 50
Gardener	W. Gustafson, when employed, per day	2 50

Inmates Employed by the Month.

Shop Assistant	D. Weider	\$35 00
Shop Assistant	W. Plowman	27 50

Employees of the Shop, and their Rate of Compensation per Month.

Shop Assistant	J. P. Snell.....	\$27 50
Shop Boy	S. Lusk.....	6 00
Teacher in girls' shop.....	Miss E. Eads	15 00
Total		\$48 50

Names of Inmates Present during the Year ending June 30, 1904.

Name.	Date of Admission.	Age when Admitted.	Native of.
1. Elisha Andrews	Jan. 14, 1904	29	California
2. Daniel D. Aherns	June 13, 1890	68	Germany
3. Maggie Aitkens	Oct. 1, 1887	28	Michigan
4. Thomas Allen *	Dec. 7, 1899	44	Washington, D. C.
5. Luke Andrews	May 23, 1895	37	California
6. Geo. Allman	Aug. 25, 1902	52	Boston, Mass.
7. Samuel Brown	Aug. 17, 1901	42	Connecticut
8. F. M. Bowman	May 23, 1902	23	California
9. Paul Balitz *	Feb. 1, 1894	25	Alaska
10. P. M. Behan	Mar. 23, 1896	34	Ireland
11. Adolph Bellisle	Jan. 2, 1888	42	Canada
12. Asa Berdrow	Nov. 29, 1899	39	New York
13. Louisa Brewster	Nov. 30, 1887	29	California
14. Anna Bressell	Mar. 30, 1888	38	New York
15. William Brooks †	June 5, 1899	21	California
16. Thomas Bulger	June 17, 1897	20	California
17. E. N. Beckwith	Sept. 24, 1903	49	Pennsylvania
18. William Crossfield	Aug. 9, 1901	22	California
19. J. L. Chamblin	Nov. 25, 1899	73	Kentucky
20. Kate Clement *	Sept. 22, 1887	23	California
21. Isabel Cinega	Feb. 9, 1890	29	California
22. Margaret Clifford	Oct. 25, 1898	25	California
23. John Coffey	Dec. 1, 1890	20	California
24. Kate Carroll	Jan. 4, 1901	47	Ireland
25. J. H. Craig	July 31, 1902	41	Massachusetts
26. Benjamin Daniels	June 24, 1890	60	Pennsylvania
27. George Davis †	Dec. 11, 1899	23	England
28. John Didier	April 17, 1896	38	Illinois
29. Edward Donohuet	Nov. 22, 1899	34	Nevada
30. George Dudley	Nov. 30, 1885	33	California
31. Oscar Darnell	Dec. 17, 1902	20	Oregon
32. Alex. W. Derrick	Mar. 14, 1903	20	Arizona
33. Viola Doudell	Mar. 16, 1903	37	Virginia
34. James Eaton	Aug. 31, 1903	26	Scotland
35. Alex. Fales	Sept. 20, 1893	50	Michigan
36. Sarah L. Fryberg	Jan. 25, 1904	27	Germany
37. William Flannigan	Dec. 9, 1896	35	New York
38. Alice E. Fields	Jan. 12, 1895	25	Maine
39. Fred Folsom †	Oct. 30, 1894	25	Indiana
40. W. E. Gill †	Apr. 13, 1901	28	Missouri
41. John H. Gafferney	Jan. 9, 1886	32	California
42. Clara E. Haight	Oct. 12, 1903	44	California
43. Lizzie Hannah	Sept. 7, 1887	41	England
44. Thomas Henderson *	Feb. 7, 1887	45	Scotland
45. Patrick Hoban	Sept. 25, 1893	44	Ireland
46. Henry Hodges	May 23, 1896	40	England
47. Benjamin Holmes †	Apr. 25, 1894	32	Illinois
48. Pauline Howe	Feb. 2, 1889	29	California
49. Thomas Jones	Oct. 29, 1903	32	Kansas
50. T. M. Jensen	Mar. 23, 1902	35	Denmark
51. William Johnston	Feb. 16, 1899	49	North Carolina
52. J. W. Judson	Nov. 10, 1902	22	Tennessee
53. Frank King	June 13, 1890	17	Massachusetts
54. Daniel Kraskey	June 16, 1890	18	Minnesota
55. M. Kouper	Sept. 28, 1900	38	Germany
56. Herman Lutz	Jan. 24, 1902	46	Germany
57. A. LaMott	Dec. 23, 1899	53	New York
58. John Lannigan	Apr. 29, 1891	53	Massachusetts
59. Joseph Le Fever	Sept. 11, 1895	53	Belgium

Names of Inmates Present during the Year ending June 30, 1904—Continued.

Name.	Date of Admission.	Age when Admitted.	Native of.
60. James Lippt.....	Jan. 7, 1895	20	California
61. Eliza O. Logan †.....	Oct. 7, 1891	22	California
62. Edward Lundbeck.....	Feb. 18, 1898	37	Sweden
63. James Lyall *.....	Feb. 18, 1893	31	Scotland
64. Charles Martin.....	Sept. 3, 1903	44	Norway
65. Rose McComb †.....	Apr. 24, 1902	37	Utah
66. William H. Massey.....	Oct. 24, 1901	33	Texas
67. A. McGregor.....	Oct. 24, 1901	39	New York
68. Joseph Martinez*.....	Nov. 26, 1900	34	Chile
69. Richard Miller †.....	Mar. 22, 1901	45	New York
70. A. McGuinness.....	Aug. 9, 1895	51	England
71. Henry Mahnke.....	Mar. 15, 1894	41	Germany
72. Joseph Marks.....	Nov. 29, 1895	41	New Brunswick
73. M. Marmalejo.....	Mar. 9, 1899	24	California
74. Emma Mast.....	Sept. 22, 1887	24	California
75. W. E. Mast †.....	June 16, 1891	21	California
76. Peter Miller.....	Feb. 1, 1886	44	Iowa
77. Eliza J. Matlock.....	Dec. 16, 1899	35	Virginia
78. Louis Moulzen.....	Dec. 3, 1894	49	Germany
79. John Moore.....	Aug. 27, 1885	29	California
80. Dorinda C. Mullaney.....	Nov. 14, 1889	27	New York
81. Bryan Nelson.....	May 12, 1888	48	New York
82. John Nolan.....	May 18, 1902	48	Ireland
83. N. P. Nelson.....	July 28, 1903	31	Sweden
84. J. I. Nall.....	Nov. 3, 1903	21	Illinois
85. Frank C. Ross.....	Aug. 12, 1903	56	Massachusetts
86. Cathern O'Rourke.....	Feb. 7, 1889	51	Ireland
87. Louis Orth.....	Sept. 2, 1895	37	California
88. W. R. Organ.....	July 8, 1902	38	England
89. Benjamin Oakland.....	Apr. 15, 1903	55	Sweden
90. Eliza Parker.....	Apr. 30, 1893	46	California
91. William Peterson.....	Jan. 14, 1895	21	Missouri
92. William Plowman.....	Oct. 19, 1899	46	Kansas
93. Edward Porter †.....	Sept. 22, 1885	28	California
94. Thomas Powers.....	Oct. 19, 1885	40	Ireland
95. E. P. Rosenthal.....	Feb. 7, 1902	42	California
96. George Richville.....	Apr. 27, 1896	19	Mississippi
97. Jos. Riley.....	June 19, 1890	47	Ireland
98. John Silva.....	Sept. 24, 1894	21	California
99. Aston Silva *.....	Mar. 12, 1901	52	Portugal
100. W. H. Smith.....	Sept. 5, 1901	59	New York
101. Mrs. B. M. Sherman.....	Apr. 29, 1904	31	California
102. Henry Salmon.....	Apr. 21, 1890	21	California
103. John Sexton.....	Aug. 27, 1885	42	Ireland
104. William Sheakley.....	Aug. 19, 1893	44	Pennsylvania
105. Mary Slattery.....	Aug. 27, 1892	48	Ireland
106. William Staggs.....	Nov. 1, 1889	23	California
107. Richard Sublett.....	May 12, 1887	35	California
108. Vincent Swortellis.....	Dec. 27, 1887	51	Russia
109. James Twaddels *.....	Aug. 20, 1902	48	Utah
110. James Thompson.....	May 13, 1895	66	Scotland
111. J. M. Thompson.....	May 23, 1900	48	Tennessee
112. Elisha B. Taylor.....	June 9, 1892	--	Maine
113. Peter Tipps.....	Oct. 11, 1894	48	Holland
114. Herbert Tuck *.....	Oct. 11, 1889	32	Maine
115. H. Wickers.....	Feb. 9, 1901	54	Germany
116. H. Ward †.....	June 29, 1895	54	Illinois
117. Viola Whipple.....	Sept. 11, 1895	22	Minnesota
118. Daniel Weider.....	Nov. 1, 1901	36	Iowa
119. W. W. Wight.....	Oct. 25, 1902	40	Pennsylvania
120. Kate Zimmer.....	Mar. 4, 1901	21	California

† Inmates on leave of absence, 14. * Left the Home during the year, 8. Inmates admitted during the year, 10. Inmates on the roll July 1, 1903, 109. Inmates on the roll June 30, 1904, 111.

Inventory of Raw Material on Hand June 30, 1904.

Broomcorn, 70 tons, at \$90 per ton	\$6,300 00
Broom handles, maple, 2,300, at \$30 per 1,000.....	69 00
Broom handles, assorted, cedar, 37,000, at \$20 per 1,000	740 00
Broom bands, 2,000, at \$11.75 per 1,000.....	23 50
Tin locks, 276 gross, at 32 cents per gross	66 72
Wire, 1,869 pounds, at 6 cents per pound.....	112 14
Rattan, 150 pounds, at 11 cents per pound	16 50
Twine, assorted, 438 pounds, at 28 cents per pound	125 64
Twine, brush, 36 pounds, at 45 cents per pound.....	16 20
Whisk rods, 1,000, at \$15 per 1,000	15 00
Twine, assorted colors, 221 pounds, at 31 cents per pound	68 51
Toy handles, 4,500, at \$13.75 per 1,000.....	61 87
Whisk caps, 72 gross, at 20 cents per gross.....	14 40
Velvet, 125 yards, at 24½ cents per yard	30 65
Broom dye, 8 pounds, at \$1 per pound.....	8 00
Broom sacks, 100, at 4 cents each	4 00
Broom staples, 30 pounds, at 10 cents per pound.....	3 00
Nails, 130 pounds, at 4½ cents per pound.....	5 85
Burlap, 200 yards, at 5½ cents per yard	11 00
Sulphur, 448 pounds, at 3¾ cents per pound	16 80
Chair cane, 210,000 feet, at 40 cents per 1,000 feet	84 00
Coir, 1 bale, at \$17.40 per bale	17 40
Mattress supplies (estimated).....	40 00
Total	\$7,850 16

Inventory of Manufactured Stock on Hand June 30, 1904.

Brooms, 44½ dozen, at \$2.25 per dozen.....	\$100 13
Toys and whisks, 16½ dozen, at 80 cents per dozen	12 95
Mattresses, 10, at \$4.25 each	42 50
Hammocks, 2, at \$3 each.....	6 00
Total	\$161 58

Brooms Manufactured, Sold, and Delivered.

Brooms on hand July 1, 1903	3,512
Brooms manufactured from July 1, 1903, to June 30, 1904	92,944
Total	96,456
Brooms sold and delivered from July 1, 1903, to June 30, 1904	95,922
Brooms on hand July 1, 1904.....	534

Toys and Whisks Manufactured, Sold, and Delivered.

Toys and whisks on hand July 1, 1903	1,101
Toys and whisks manufactured during the above period	17,149
Total	18,250
Whisks sold and delivered from July 1, 1903, to June 30, 1904.....	18,056
Toys and whisks on hand June 30, 1904	194

Manufacturing Statement for the Year ending June 30, 1904.

Brooms manufactured.....	92,944
Toys and whisks manufactured	17,149
Chairs recaned.....	1,421
Mattresses manufactured.....	149
Pillows manufactured	52
Toy hammocks manufactured	14
Hammocks manufactured	9
Broom sacks manufactured	4,385

Summary of Expenditures for the Year ending June 30, 1904.

Month.	Provisions.	Furniture.	Wages.	Wages of Inmates.	Drugs.	Build'g and Improvements.	Washing.	Raw Material.	Miscellaneous
1903.									
July	\$670 63	\$110 64	\$895 07	\$332 40	\$29 65	\$149 41	\$125 00	\$1,722 54	\$90 43
Aug.	853 94	8 21	934 36	443 50	29 25	171 23	125 00	1,201 39	54 73
Sept.	841 49	58 55	917 49	400 05	28 70	123 75	125 00	1,524 39	98 69
Oct.	762 09	191 45	919 61	448 00	28 75	65 70	125 00	375 38	100 11
Nov.	735 47	28 10	909 39	380 60	26 95	86 28	125 00	1,246 04	77 21
Dec.	811 43	132 99	915 25	436 30	28 95	68 83	125 00	2,615 20	70 84
1904.									
Jan.	750 00	19 70	919 78	437 35	27 60	3 70	125 00	1,006 76	54 45
Feb.	813 53	21 75	915 00	369 50	27 15	31 86	125 00	361 05	50 25
Mar.	791 43	25 83	915 99	417 60	25 55	19 87	125 00	357 13	66 80
Apr.	727 40	6 50	922 00	420 80	29 45	45 65	125 00	725 43	71 87
May	744 21	43 80	905 20	455 75	29 75	99 14	125 00	2,142 06	86 52
June	920 55	65 41	930 25	474 60	26 00	65 22	125 00	1,376 68	28 25
Total.	9,422 17	712 93	10,999 39	5,016 45	337 75	930 64	1,500 00	14,654 05	850 15

Receipts and Collections for the Year ending June 30, 1904.

1903—July	\$1,252 55
August	1,801 00
September	1,975 91
October	1,445 41
November	1,775 48
December	1,892 67
1904—January	1,210 03
February	1,238 66
March	1,480 27
April	1,466 20
May	2,101 97
June	2,237 73
Total	\$19,877 90

Total Expenditures for the Year ending June 30, 1904.

1903—July	\$4,125 77
August	3,821 61
September	4,118 11
October	3,016 09
November	3,615 04
December	5,204 79
1904—January	3,344 34
February	2,715 09
March	2,745 20
April	3,074 10
May	4,631 43
June	4,011 96
Total	\$44,423 53

The total expenditures for the year, segregated, are as follows:

Provisions.....	\$9,422 17
Furniture.....	712 93
Wages and salaries.....	10,999 39
Wages of inmates.....	5,016 45
Medicine.....	337 75
Building and improvements.....	930 64
Washing.....	1,500 00
Raw material.....	14,654 05
Miscellaneous.....	850 15
Total.....	<u>\$44,423 53</u>

The current expense for the year, after deducting the following items:

Furniture.....	\$712 93
Building and improvements.....	930 64
Raw material.....	14,654 05

amounts to \$16,297.62. The average number of persons residing at the Home during the year was 120. The yearly cost of maintenance for each person was, therefore, \$234.38; the weekly cost was \$4.51. The cost of provisions alone for the year was \$9,422.17. The cost per capita for provisions was, therefore, \$78.52 per year; cost per week, \$1.51; cost per day, about 22 cents.

The cost of maintenance for the year 1903-04 was greater than for the year 1902-03. This was due to the increased cost of provisions, laundry, etc.; and also because we paid out in wages to the inmates, the sum of \$5,016.45, which was an increase of \$548.07 over that of the year 1902-03.

Value of Stock, Raw Material, etc., on Hand June 30, 1904.

Value of stock on hand.....	\$161 58
Value of raw material.....	7,850 16
Bills receivable.....	3,650 42
Amount in the Adult Blind Fund.....	2,081 17
Total.....	<u>\$13,744 53</u>

The above sum of \$13,744.53 represents the assets of the broom shop on the 30th day of June, 1904, which is an increase of \$3,086.89 since the 30th day of June, 1903.

I regret that I am unable, owing to the organic act, to purchase broomcorn and manufacturing supplies in the open market. Some of our bidders have been unable to supply material equal to the sample submitted with their bid last October. This has caused me a great deal of trouble and annoyance, and forced me to buy material of an inferior quality at reduced cost. Even at the reduced cost the material furnished was not at all times satisfactory. This condition was more marked with the broomcorn supplied to the Home. Coming as it does in carload lots, it is almost impossible to arrive at a correct estimate of

its value. But I can assure you, owing to my arrangements with the contractors, W. C. Price & Co., that after the corn was sized I have found that not in a single instance did I pay more than its actual value. You will see by the monthly bills, that I seldom paid as high as the contract price; however, I would much rather pay the contract price, were I to receive corn equal to the sample submitted. This condition should not exist, as it is, in my judgment, detrimental to the interests of the Home. Were I permitted to purchase in the open market, I would be prepared to buy at the right time, as other manufacturers are, thereby saving in the cost of material and adding materially to our Adult Blind Fund.

Owing to the very many applications that we are receiving, there is an imperative need for additional dormitory facilities. The greatest number of those applying for admittance are aged and infirm; those who could not be admitted, even had we room for them, owing to the organic act. In many cases the condition of those applying is most sad; therefore, I would earnestly request your honorable body to call upon the Legislature for sufficient funds to erect the necessary buildings. There are at least one hundred blind people waiting for such a building, the maintenance of which would add but little to the present cost of the institution, as we have sufficient ground upon which it could be built, and it could be under the supervision and control of the present management.

I would again call your attention to the need of a new shop. Our present shop is a disgrace, by reason of the fact that it is in a most dilapidated condition. Part of our shop fell down last winter, entailing a loss to the State of about \$400. This accident would have been most serious, had it not occurred on a Sunday, as it would have injured, if not killed, some of our inmates or employés. At times we carry, besides machinery and tools, several thousand dollars' worth of raw material; and as the State does not insure, the loss of the shop by fire would be a vital injury to the institution, and would retard the good work in which we are engaged. In the winter time the blind workmen are frequently forced to discontinue their labors, on account of the cold and damp. It is a firetrap and a constant menace to life and limb.

I have cause to thank the Governor and the State Board of Examiners for the great interest which they have manifested toward this institution and its labors. Their effort in increasing our output has been successful, and I am now pleased to state that nearly all of the State institutions order their brooms direct from us.

The inmates, as a rule, deserve great credit for the manner in which they have conducted themselves during the year. As a rule, they have been faithful and conscientious in the labor assigned to them, and have done all in their power to make the institution a model one. Many of them have learned to make hammocks, and derive considerable from

their sale. These hammocks they make during their idle hours, thus adding some hundreds of dollars to their income. The Home supplies them with the material at cost.

It is with sincere regret that I record the death of Director N. W. Spaulding. I personally feel his loss, as he was at all times very much interested in the blind and made a special study of their needs. It was a pleasure for him to lend his services and advice at any time. He was a frequent visitor to the institution and always manifested a kindly regard for its success.

During the year we have had but little sickness and no deaths have occurred. This is largely owing to the faithfulness and care of our physician, Dr. G. H. Derrick. He deserves the greatest credit for the health conditions of the Home, especially when we consider that a great many of our inmates are aged and infirm; therefore, they require special care and constant medical attention.

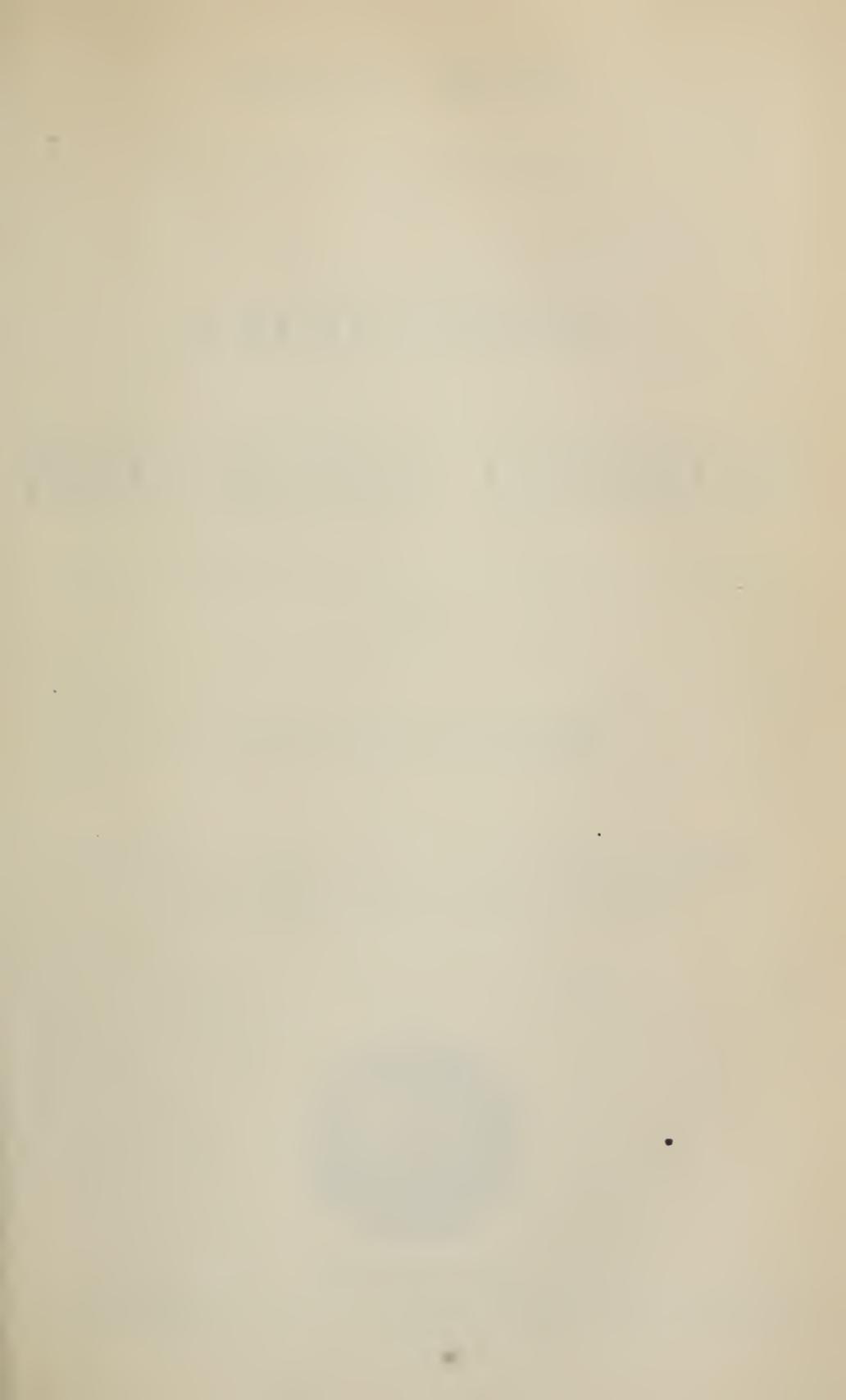
It is gratifying to record the fact that many commissions, appointed by the Governors of various States to inquire into the needs of the blind, have written to me, asking for information and advice, as they are about to establish institutions similar to our own. They desire data from an institution that has demonstrated what sound and economical management can accomplish, in order that their institution may start upon a basis which will insure success. They express, in highly complimentary terms, the high esteem in which this institution is held, wherever it is known; and they assure me that they consider it the model institution of its kind in the United States. In one or two instances I have been urged by these commissions to come East and start their institutions, informing me at the time of the great regard which they have for our methods, and thanking us for the noble efforts which we are putting forth to ameliorate the condition in which the blind find themselves, by lifting them from despondency and idleness to usefulness and content.

The officers and employés of the institution have been attentive and faithful to their duties during the year that has just passed. I believe that I have as good a corps of employés as are to be found in any institution in the State, and I take this opportunity of thanking them for their efficient service.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS,
Superintendent.





OFFICIAL REPORT

OF THE

TWENTY-EIGHTH

FRUIT-GROWERS' CONVENTION

OF THE

STATE OF CALIFORNIA

HELD UNDER THE AUSPICES OF THE STATE HORTICULTURAL COMMISSION,
AT LOS ANGELES, COMMENCING TUESDAY, MAY 5th, AND
ENDING FRIDAY, MAY 8th, 1903.



SACRAMENTO:

W. W. SHANNON : : : : : SUPERINTENDENT OF STATE PRINTING
1903

CALIFORNIA STATE HORTICULTURAL COMMISSION.

ELLWOOD COOPER, - - - *Horticultural Commissioner.*

ALEXANDER CRAW, - *Deputy Horticultural Commissioner.*

JOHN ISAAC, - - - - - *Clerk.*

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AN ACT TO CREATE A STATE COMMISSION OF HORTICULTURE.

[Approved March 25, 1903]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The office of State Commissioner of Horticulture of California is hereby created. It shall be the duty of the Governor, within forty days after the passage of this Act, to appoint a citizen and resident of this State to hold said office of State Commissioner of Horticulture, who must at the date of his appointment be a skilled horticulturist and entomologist. The term of office shall be for four years, and until a successor is appointed and qualified. The Governor may remove such Commissioner from office at any time, upon filing with the Secretary of State a certificate of removal signed by the Governor. In case of a vacancy in said office by death, resignation, removal from office, or other cause, the Governor shall fill the vacancy for the unexpired term. The salary of said Commissioner shall be two hundred and fifty dollars per month, and he shall be allowed in addition a sum not to exceed five hundred dollars yearly for traveling and incidental expenses necessary in the discharge of his duties herein provided for. Such Commissioner may appoint a clerk at a salary of one thousand five hundred dollars per year, who shall perform the duties required of him by such Commissioner. In appointing such Commissioner and his successor or successors, it shall be the duty of the Governor to disregard political affiliations, and be guided in his selection entirely by the professional and moral qualifications of the person so selected for the performance of the duties of said office. The office of said Commissioner shall be kept open every day except holidays, and shall be in charge of the clerk during the absence of such Commissioner. The main office of such Commissioner shall be at the City of Sacramento. The Secretary of State shall furnish and set aside in the capitol a room or rooms suitable for offices for said Commissioner, and if the Secretary of State shall make and file an affidavit with the said Commissioner stating that it is not possible for him, as such Secretary of State, to provide and set aside an office for said Commissioner in the capitol, or in any State building under his control, because there is no such office room or rooms available, then, and after the making and delivery of such affidavit to such Commissioner, the said Commissioner may rent rooms convenient and suitable for his offices under this Act, at a rental not to exceed five hundred dollars per year. Said Commissioner may also keep and maintain an office in the City and County of San Francisco at a yearly rental not to exceed the sum of five hundred dollars, and may appoint a Deputy Commissioner who shall be an expert entomologist and horticulturist, to have charge of said office under said Commissioner, and to perform any and all duties which said Commissioner may require of him under this Act, and shall fix the monthly compensation of such deputy at \$200 per month. Such deputy shall hold his position during the pleasure of such Commissioner, and may be removed from his office or position at any time by said Commissioner filing with the Secretary of State a certificate signed by said Commissioner so removing such deputy. Said Commissioner may also appoint, by and with the approval of the Governor, such temporary deputies from time to time as may be required for quarantine purposes under this Act, and such temporary deputies shall receive such compensation per diem as may be specified in the writing so approving such appointment. If there be not sufficient furniture and office appliances turned over to such Commissioner by the State Board of Horticulture heretofore existing, to furnish and equip properly the office or offices for such Commissioner at Sacramento and San Francisco aforesaid, the said Commissioner may, by and with the approval of the Governor, purchase for the use of his said office or offices such furniture and appliances as may be necessary therefor, and from time to time, at an expense not to exceed a sum to be mentioned in such approval,

which expense, together with all other expenses authorized by this Act, is hereby allowed for the purposes specified.

SEC. 2. Upon taking office under this Act such Commissioner shall be entitled to receive and have turned over to him as such Commissioner all the books, records, and property in the possession, charge, custody or control of the State Board of Horticulture heretofore existing, and all such property shall be delivered to such Commissioner upon demand. Such Commissioner shall be deemed for such purposes the successor of said board.

SEC. 3. Such Commissioner shall collect books, pamphlets and periodicals and other documents containing information relating to horticulture, and shall preserve the same; collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; correspond with horticultural societies, colleges and schools, and with the County Boards of Horticulture existing or that may exist in this State, and with all other persons necessary to secure the best results to horticulture in this State. He shall require reports from County Boards of Horticulture in this State, and may print the same or any part thereof as he may select, either in the form of bulletins or in his annual report, or both, as he shall deem proper. He shall issue and cause to be printed and distributed to County Boards of Horticulture in this State, and to all other persons whom he may deem proper, bulletins or statements containing all the information best adapted to promote the interest and protect the business and development of horticulture in this State. Such Commissioner shall be deemed to be the State horticultural quarantine officer mentioned in chapter seventy-six of the laws of eighteen hundred and ninety-nine, for the purpose of that Act, and shall be empowered to perform the duties which under that Act are to be performed by the State horticultural quarantine officer; *provided*, that any inspection therein authorized, when made by such Commissioner, must be with the approval of the Governor, and as provided by this Act.

SEC. 4. Said Commissioner may, by and with the approval of the Governor, establish, maintain and enforce such quarantine regulations as may be deemed necessary to protect the nurseries, trees, shrubs, plants, vines, cuttings, grafts, cions, buds, fruit-pits, fruit, vegetables, or other articles of horticulture, against contagion or infection by injurious disease, insects or pests, by establishing such quarantine at the boundaries of this State or elsewhere within the State, and he may make and enforce, with the approval of the Governor, any and all such rules and regulations as may be deemed necessary to prevent any infected stock, tree, shrub, plant, vine, cutting, graft, cion, bud, fruit-pit, fruit, vegetable, or other article of horticulture, from passing over any quarantine line established and proclaimed pursuant to this Act, and all such articles shall, during the maintenance of such quarantine, be inspected by such Commissioner or by a deputy appointed in writing by said Commissioner with the approval of the Governor, and he or the deputy so conducting such inspection shall not permit any such article to pass over such a quarantine line during such quarantine, except upon a certificate of inspection signed by such Commissioner or in his name by such a deputy who has made such inspection, unless such article has been immediately prior to such passage inspected by an officer or agent of the United States entitled to inspect the same, and such officer or agent has granted permission for such passage. All approvals by the Governor given or made pursuant to this Act shall be in writing and signed by the Governor in duplicate, and one copy thereof shall be filed in the office of the Secretary of State, and the other in the office of said Commissioner before such approval shall take effect.

SEC. 5. Upon information received by such Commissioner of the existence of any infectious disease, insect or pest, dangerous to any such article, or to the interest of horticulture within this State, or that there is a probability of the introduction of any such infectious disease, insect or pest into this State or across the boundaries thereof, he shall proceed to thoroughly investigate the same, and may, by and with the approval of the Governor, establish, maintain and enforce quarantine as hereinbefore provided with such regulations as may be necessary to circumscribe and exterminate or eradicate such infectious diseases, insects or pests, and prevent the extension thereof, and is hereby authorized to enter upon any grounds or premises, and inspect any stock, tree, shrub, plant, vine, cutting, graft, cion, bud, fruit-pit, fruit, vegetable, or other article of

horticulture, or implement thereof, or box or package pertaining thereto, or connected therewith, or that has been used in packing, shipping or handling the same, and to open any such package, and generally to do, with the least injury possible under the conditions to property or business, all acts and things necessary to carry out the provisions of this Act.

SEC. 6. Upon the discovery of any such infectious disease, insects or pests, such Commissioner shall immediately report the same to all County Boards of Horticulture, together with a statement as to the best known means or method for circumscribing, exterminating or eradicating the same, and shall state therein specifically what treatment or method should be applied in each case, as the matter may require, with a detailed statement or prescription as to the method of making or procuring, and of applying any preparation or treatment so recommended therefor, and the times and duration for such treatment, and if chemicals or articles be required other than those usually obtainable at any town, the place or places where they are most readily to be obtained; and upon the receipt of such statement by any County Board of Horticulture, or any member thereof, it shall be the duty of such County Board of Horticulture to distribute such statement in printed form to every person owning or having charge or possession of any orchard, nursery stock, tree, shrub, or article of horticulture within their county, where it is supposed by said County Board there is any danger to the interests of horticulture, and such a statement must be served with or be a part of the notice to be given to the owner or owners, or person or persons, in possession of any orchard, nursery, tree, shrub, or article of horticulture, referred to, provided for, and required to be served in and by section two of chapter one hundred and eighty-three of the laws of eighteen hundred and ninety-seven, or any amendments which have been or may be made thereto.

SEC. 7. Whenever it shall become necessary to establish quarantine under this Act, if there be any authorities or officers of the United States having authority to act in such matter, or any part thereof, the said State Commissioner of Horticulture shall notify such authority or officers of the United States, and co-operate as far as possible with such authorities or officers of the United States wheresoever the jurisdiction of the United States extends and is being exercised, and shall obtain, whenever desirable and possible, the assent of the proper authority or officers of the United States to the establishment or change of quarantine lines, so as to most effectively and speedily accomplish the purposes of this Act. The said Commissioner shall at once notify the Governor of all quarantine lines established under or pursuant to this Act, and if the Governor approve or shall have approved of the same or any portion thereof, the Governor shall issue his proclamation proclaiming the boundaries of such quarantine, and the nature thereof, and the orders, rules or regulations prescribed for the maintenance and enforcement of the same, and shall publish such proclamation in such manner as he may deem expedient to give proper notice thereof.

SEC. 8. The said State Commissioner shall be ex officio a member of all County Boards of Horticulture existing or that may be created or exist in this State pursuant to law, whenever he is present and acting with said County Board within the county, where such County Board exists, but when he is not so present in such a county, acting with such County Board, then the said County Board shall have all the power and authority conferred on it by law, and may exercise such power by the action of the members of such County Board or a majority thereof. The reports which County Boards of Horticulture are required by law to make, or which they may desire to make, shall, after the passage of this Act, be made to the State Commissioner of Horticulture.

SEC. 9. It shall be the duty of the Superintendent of State Printing to print and deliver to the State Commissioner of Horticulture, upon the written request of said Commissioner, all such bulletins, orders, rules, regulations, statements, reports, and other printed matter, as the said Commissioner may deem necessary to have and use for carrying out the purposes of this Act, and it shall be the duty of the Secretary of State to cause to be prepared and furnished to such State Commissioner all stationery, paper, blank forms, envelopes, and writing material needful and convenient for use in the office of such Commissioner.

SEC. 10. It shall be the duty of said State Commissioner to report in the month of January in each even-numbered year to the Governor, and in each odd-numbered year

to the Legislature of this State, such matters as he may deem expedient or as may be required either by the Governor or Legislature, and to include a statement of all the persons employed, and of moneys expended under this Act, by itemized statement thereof.

SEC. 11. Any person willfully refusing to comply with orders lawfully made under and pursuant to this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not to exceed five hundred dollars.

SEC. 12. All moneys paid under this Act shall be paid by the State Treasurer from moneys appropriated for the support of the State Commissioner of Horticulture, and expenses other than the salary of the Commissioner, the compensation of his clerk and Deputy Commissioner, as allowed and provided by this Act, must be certified by the said Commissioner and be approved by the State Board of Examiners before being audited or paid. Any moneys remaining of any appropriation heretofore made or that may be appropriated for the use or support of the State Board of Horticulture are hereby appropriated to the support of the State Commission of Horticulture, and are directed to be applied to the payment of claims and expenses under this Act.

SEC. 13. The sum of four thousand dollars is hereby appropriated for the use and support and to pay the expenses of the State Commission of Horticulture for the fiscal years commencing July first, nineteen hundred and three, and July first, nineteen hundred and four, under this Act.

SEC. 14. Chapter sixty-three of the laws of eighteen hundred and eighty-three, chapter seven of the laws of eighteen hundred and eighty-five, chapter eighty-six of the laws of eighteen hundred and eighty-nine, and chapter one hundred and ninety-four of the laws of eighteen hundred and ninety-one, are hereby repealed.

SEC. 15. This Act shall take effect immediately.

SYNOPSIS OF THE PROCEEDINGS

OF THE

Twenty-eighth State Fruit-Growers' Convention,

HELD UNDER THE AUSPICES OF THE

STATE HORTICULTURAL COMMISSION,

LOS ANGELES, MAY 5-8, 1903.

TUESDAY, May 5, 1903.

Pursuant to call, the Convention met in the assembly room of the Los Angeles Chamber of Commerce at 9:30 A. M., May 5, 1903.

President ELLWOOD COOPER, State Horticultural Commissioner, called the Convention to order.

REV. C. J. K. JONES, of Los Angeles, opened the proceedings with prayer.

ADDRESS OF WELCOME.

HON. FERD K. RULE, President of the Los Angeles Chamber of Commerce, delivered an address of welcome, as follows:

As President of the Chamber of Commerce of Los Angeles, as well as a citizen, it is a great pleasure to welcome you to our city. We realize in this part of the country that the fruit interest is the really great interest, or the greatest interest of our State. Therefore it is all the more a pleasure to appear before gentlemen representing that interest. I feel very sure that your deliberations and your discussions will be not only interesting but also profitable, and therefore I regret all the more that the very many duties that I have before me this week will prevent my attending many of your sessions. You all know that we are in the midst of preparations for a big celebration here in anticipation of the coming of our President. Unfortunately I happen to be mixed up in it more or less and am at this time kept going from place to place. But I will do my best to get around here, and we will do our best to see that you are properly taken care of. We have our local committee, who will

be here, and I hope you will feel that you can call upon any of them, or upon our good friend downstairs, Frank Wiggins, Secretary of the Chamber of Commerce, or myself, for anything you want. I want you to feel that you are welcome to our city, and when you go away I want you to feel that you will be glad to return. Gentlemen, I thank you.

A. P. GRIFFITH, of Azusa, was chosen Vice-President.

PRESIDENT COOPER'S ADDRESS.

This will be the twenty-eighth Fruit-Growers' Convention, and the first held under the auspices of the State Horticultural Commission.

At the Convention held in December last a desire was expressed by northern fruit-growers for a spring meeting, to be held in Los Angeles. The great prosperity of this region attracts the intelligent fruit-grower from localities less sought after by the incoming settlers.

I remember well the condition of Los Angeles and its surroundings in the spring of 1868, when I was a visitor in California. There was no apparent enterprise; and the wonder was to the stranger, that with such a delightful climate, such beautiful surroundings, which a bountiful nature had bestowed upon this region, there was not more enterprise and a greater number of people. Many things have led up to its present prosperous condition: The great beauty of the San Gabriel Valley; the salubrious climate; the summer heat modified by the gentle ocean breezes; the proximity to the sea and the surrounding mountains, offering protection from the winter cold; but more than all—its orange groves.

Its great attraction for Eastern people has built up its industries and made possible what it is to-day. May this prosperity continue and nothing mar the progress of the great future that is before this region. The one thing needful, however, is the saving or preserving of the flood waters of the winter rains.

One great danger is that orange-growing will be overdone. Large enterprises are being fostered in Mexico to grow oranges. Our advent into the West Indies makes possible extensive plantations of oranges in those islands, where soil, climate, water, and cheap labor will offer great competition; and especially cheaper freight rates. In this alone there will be a difference in favor of the West Indies to New York of about 70 cents a box. I have already received inquiries from New York for the work on the citrus by the late B. M. Lelong, published by the State Board, showing that orange-growing is in contemplation.

Five years ago this month a convention of the fruit-growers was held in this district—two days in Los Angeles and two days in Riverside. At the Riverside meeting an essay was read sounding an alarm as to the

further planting of the orange. It pointed out the difficulties in harvesting at that time, at a profit, the crops then produced, and gave the acreage of a large area then planted, not in bearing. At that same meeting a resolution was passed discouraging further planting.

It seems to me, therefore, that the orange-growers should organize so as to have a bureau of information to ascertain the probable output, the probable market at a fair profit to the grower, and the probable increase in foreign places, and from the data thus obtained decide upon the encouragement or discouragement of further planting. While we can organize to prevent competition among ourselves, we can not control importations that might prove our greatest competitors.

It is not alone that the newcomer would make an unprofitable investment, but in producing an over-supply would depreciate the value of all the orchards now planted. It is not the purpose of this paper to depreciate values, but on the contrary to save the industry in all sections of the State. It was demonstrated at the Convention held in San Francisco, December last, that the deciduous fruit shipments from the northern districts had caused serious losses to the growers and that further planting of such fruits should be discouraged; and not only this, but that if something could not be done to save from bankruptcy those engaged in the growing of deciduous fruits the alarm should be sounded so as to counteract the efforts made by railroad companies and land-boomers to bring here Eastern people to go into the business of growing deciduous fruits. A resolution to this effect was passed. It is to be hoped, however, that better organization, better railroad facilities, will remedy the disasters of the past season. Californians have the reputation of being hospitable and generous, which they are certainly entitled to. We have given to the public the results of our efforts, withholding nothing, so that newcomers and new planters could profit by our experience; and while I do not wish my remarks to be considered pessimistic as to the fruit situation, I believe in the adage that "self-preservation is the first law of nature," and that we should not follow a course to destroy ourselves.

Labor.—The labor question, which has so much to do with fruit-growing, was discussed at length at our last Convention. From nearly every section statements were made that the crops could not be gathered in a manner that would make fruit-growing profitable. Sufficient help could not be had. In some cases as high as \$2.50 per day was paid for common labor. It was conceded by all that a large increase in the labor population was necessary to save the fruit crops. The Chinese Exclusion Act was very generally discussed pro and con, and a resolution, asking the United States Congress to repeal the Exclusion Act, passed by a vote of over three fifths of the Convention, the sentiment

being in favor of a restricted immigration law. In order to meet the impending danger of insufficient labor, a committee was appointed to organize a plan to secure laborers from the Northwest and Middle West. H. P. Stabler, of Yuba City, is chairman of this committee. The effort is to be made only in the direction of securing young men brought up in the country and accustomed to farm work. A report of progress will no doubt be made at this Convention.

Insect Pests.—I call your attention to my remarks at the Convention held in San Francisco, December, 1901 (Official Report, page 9). I stated that the annual expense of combatting noxious insects by artificial remedies in this State amounted to \$300,000, and that there was no decrease from year to year, but rather an increase; and that there had been expended for the investigation and in the search for parasitic insects by the United States Government \$2,200, and by California less than \$12,500, total expense less than \$15,000, during a period of thirteen years. This expenditure resulted in the saving of at least \$15,000,000 to the fruit interests of California, or of over \$1,000 for every dollar expended. In an article published in the Sunday "Record Herald," of Chicago, March 1st—author Renè Bache—it is stated that twelve insects cost the United States \$350,000,000 a year. The article names the insects and gives the probable loss by each. The author, after making the detailed statement, said: "How absurd it seems that this Government, with an army of 65,000 men, 234 warships, and more money in its treasury than any nation ever before possessed, should be helpless in a fight against twelve objectionable bugs." Can you, as intelligent citizens, comprehend "how absurd" this loss and devastation, when nature has furnished the remedy, practically costless, that would prevent serious loss by the so-called "twelve objectionable bugs"?

Every civilized government has had agricultural departments and entomological departments. States have followed in the same line, the object being to economize labor and save the products of the soil. Yet in these thousands of years, or from the time of the first fruit orchard in the garden of Eden, this common-sense idea was not developed. Dr. Hamilton said, in speaking of Sir Isaac Newton's discovery of the law of gravitation, "that it took the world six thousand years to create a thinker." Therefore, we must not reflect on the past, or on the inability of those having these subjects in charge, for not comprehending the natural law.

Now, what I want to impress upon you is the fact that this discovery was made by the California fruit-growers, who were the first to demonstrate this principle—the principle of overcoming the ravages of insect pests by their natural enemies. We have now on our "borders," I might say, as communication overcomes distances, four pests that can not be reached by sprays or fumigation. The gypsy moth in Massa-

chusetts, the Morelos orange maggot in Mexico, within two hundred miles of California, the melon maggot in Hawaii, and the fruit-fly in Australia.

The citrus-growers of Southern California certainly have not forgotten the hopeless struggle they had in trying to eradicate the *Icerya purchasi*, commonly known as the white scale. One citrus-grower in the San Gabriel Valley told me that from his trees, before the advent of the above pest, he had shipped fifty cars of oranges a year, which sold at a profitable price, and that afterward the product was reduced to one car and to nothing. The fact was that all the orange-growing districts of Southern California were approaching bankruptcy, and were saved by the introduction of the ladybird, *Vedalia cardinalis*. I beg to call your attention to my presentation to Albert Koebele (Report of 1891, page 290).

What was the effect of the *Icerya* in South Africa? (See Report of 1887-88, page 160.) At Cape Colony orange trees more than two hundred years old were cut down; in fact, rosebushes, all plants and shrubs were rooted out. Fire and devastation were resorted to, in order to get rid of this pest; and yet, this insect was found in the forests two hundred miles distant. Afterward, when they learned what we had accomplished in California, an appropriation was made and an agent employed to come to California and take back an ample supply of *Vedalia* to save that country. They replanted orange groves and are now shipping oranges to London.

I understand that the fruit-fly is there. I am sorry to say that they may have to resort to fire and devastation, as in the former case.

Last year 25,000 cars of oranges and lemons were shipped from California. If either the gypsy moth, or the Morelos orange maggot, or the fruit-fly gets a foothold in the orange district, you may not ship 25 cars.

The fruit-fly is the most alarming pest known. It attacks all kinds of fruits and will live in the berries of nightshade. There is no hope except in securing the natural enemy. For further information I refer you to an interview published in the San Francisco "Chronicle" of January 23d, and to an article in the Sunday "Examiner" of February 8th.

At the twenty-sixth Fruit-Growers' Convention a resolution was passed asking the Legislature to appropriate \$10,000 to search for parasitic and predaceous insects. (See Report, page 13.) At the twenty-seventh Fruit-Growers' Convention a similar resolution was passed. (See Report, page 311.) This important matter was unanimously urged. It was the earnest prayer of the fruit-growers. The result, a bill, No. 475 in the Assembly, presented by F. A. Duryea, went to the Committee on Fruit and Vines, with recommendation "do pass." It was referred to the Committee on Ways and Means, with recommendation "do not

pass." There it ended. I had anticipated that this appropriation would be made, and wrote fully to the Governor the object and purpose of such an investigation that he might not veto it. I am happy to state that I found the Governor in full accord with the importance of this work.

Food Adulteration.—I have called the attention of fruit-growers to this subject at every Convention for many years past. So much has been said that it is almost worn threadbare. Very urgent resolutions have been passed, but, like the parasite question, it has not received the serious consideration of our lawmakers. Bill No. 293, amending Section 382 of the Penal Code, relating to adulterated foods, drinks, and drugs, was decisive, but no provision made to have violators prosecuted. I had hoped that the last Congress would do something to protect producers and consumers from the villainous substances put on the market under false labels. A most excellent bill passed the House of Representatives and went to the Senate committee. Its passage was recommended by a unanimous vote. I herewith present some of the reasons given by the Senate committee why the bill should become the law of the land :

During the last quarter of the century the growth of commercial frauds, of adulterations in foods and dairy products, and in drugs and liquors, has become so alarming that both the State and Federal Governments have been called upon for legislation to protect the public health from harmful and deleterious foods and the people from frauds and cheats.

To one unacquainted with commercial dishonesty the facts established by the hearings before the Senate and House committees and brought to light by the zealous efforts and labors of the Agricultural Department are appalling. There is scarcely a known commodity of food which has not been seized upon by unscrupulous manufacturers and dealers and adulterated to an extent sufficient to compete with and undersell the genuine article.

Senate Document No. 181, Fifty-seventh Congress, prepared at the request of this committee by the Agricultural Department, will show the most common articles of consumption in the United States which are adulterated, the adulterants commonly used, the extent thereof as shown by examinations, and other data in reference thereto. Our canned meats are often a guess; the fat of our milks and cheeses may be extracted; our butter deodorized and colored by fats and greases; the cream may be extracted from the milk which makes our cheese and lard substituted, and our lard in turn be composed of beef stearin or cotton-seed oil, while the latter comes to our table labeled "pure olive oil." Colored glucose does enormous duty in supplying the demand for molasses, syrups, and honeys. Probably more glucose is sold in one year for "pure Vermont maple syrup," than that State produces in ten years.

This staple article, pure and wholesome in itself, is the most clever impersonator of all food products. With a little coloring and a little flavoring added it is convertible into honey; with a dash of darker coloring matter and another flavoring material it is instantly converted into any kind of fruit jelly or jam. Copper mines furnish the material for preserving the natural color of canned vegetables, and which enters into many of our preserves. Asparagus is bleached with sulphates. Coconuts and chocolates are manufactured from wheat, corn, rice, potatoes, cocoa husks, and low-grade sugars. Pepper, cinnamons, allspice, cloves, ginger, nutmegs, and mustards, when ground, are manufactured from almost any cereal or flour. Pure vinegar is extremely scarce. Almost any brand of wine is drawn from the same tank and priced in the market according to the value of the wine it is colored to imitate.

Equally serious is the demoralizing effect on the commerce of the country. As long as these spurious nostrums are sold at enormous profits, which enrich the unscrupulous and dishonest, the fair, honest goods are forced by this competitor to go begging for meager profits, and in many instances are forced out of the markets and the honest dealer compelled to quit business.

Both producer and consumer suffer. The producers of food products—the entire agricultural population—suffer immeasurable hardships and wrongs when their honest, home-made products, their butter, their fruits and jellies, their syrups and sugars, come into competition with counterfeits whose cost is but slight and whose selling price is 95 per cent clear profit.

The other half of the community suffer the imposition of this continuous stream of spurious frauds upon their stomachs and purses. And all this is for the benefit of only a few hundred manufacturers, whose sole objection to the proposed legislation is that it will injure their business.

In the opinion of your committee, Congress owes to our producers the duty of protection against counterfeit articles of production, and to our consumers a protection against fraudulent and deceptive articles of consumption. It is the belief of your committee that, whenever commerce in this country is readjusted upon a proper plane, so that every article shall be sold for what it is, no heathful product will be despoiled of a market, but that all products will find more ready consumption, each on its own merits, and each reaping a fair and legitimate profit when it comes into the field of competition under its own true color and its true name.

It gives a fair and honest article a fair and honest opportunity in the competitive field of commerce.

It will have the effect of readjusting commerce of food and drug products upon a proper plane, where each product will be sold for just what it actually is, will reap a fair and legitimate profit, and no article will be despoiled of its market by a spurious competitor.

Believing that counterfeit goods which are traded for honest dollars should be placed under the same ban as counterfeit dollars traded for honest goods, this committee recommends that the bill H. R. 3109 do pass.

The latest adulterant to which my attention was called was taken from the "Cosmos," Paris, February 14th, written by Paul Combres: "That ordinary sawdust has for several years been a favorite ingredient of cheap flours and cereal foods—that these suspected articles contained no less than 40 per cent of wood sawdust."

That our Legislature in California should continue making laws governing the labels on foods, drugs, and drinks, without any provision for the enforcement, is farcical; and proves conclusively that they have neither the comprehension nor ability to cope with this evil.

The vast capital and accumulated fortunes that have been made by this system of fraud are too great perhaps for us to hope for any relief in our struggle, and we may be doomed for the time being to servitude to ill-gotten gains.

Distribution of Fruits.—This subject concerns the growers to a greater degree than all others. With proper distribution, we will have success. With improper distribution, we will have failure.

I have understood that the Southern California Citrus Fruit Exchange has merged with other shippers and associations and that the merger controls 87 per cent of all the citrus fruits. Under these conditions it

will not be my purpose to discuss the marketing of the citrus product, but rather to wait and see the result of this experiment.

In the examination before the Interstate Commerce Commission, in this City of Los Angeles, in the early part of last month, terminating on the 11th, there is much furnished the orange and lemon growers for reflection. The testimony adduced as to the condition of this industry and the statements made by railroad officials should be carefully compiled and printed in pamphlet form for distribution among the growers of these fruits and the prospective planters of new orchards. As a result of this examination—to sum up briefly—the losses occur from the following causes: Delayed service by fault of transportation; the shipment of unsound and bad fruit; too great a quantity at times to one market; and extraordinary expenses in fighting insect pests.

We pay to transportation companies for fruits and vegetables about \$18,000,000 annually. One would suppose that this traffic was of sufficient importance to warrant every facility that would insure our prosperity. On the other hand, if we do not so act in our business affairs as to protect ourselves, we can not expect transportation companies to keep up or look after our end of the business.

We should exhaust our every effort in performing our part, then we will be in a position to command transportation companies to do their part. The fact is, the most sensible view would be that the interests are mutual and that we should work in harmony for the advantage of both parties. The sooner we realize that it is a cold business proposition the better. There is no longer any sentiment or denunciation necessary to be made in the controversy.

The Shipment of Unsound and Bad Fruits.—I have been urging, for many years, the necessity for an inspection law that would prevent this. Nothing has been done.

Flooding Eastern Markets.—This has been discussed time and again, but has not decreased the terrible sacrifice and losses to the growers, and can only be remedied by our selling our own fruits through a central organization which can control shipments to every Eastern market.

Fighting insect pests should be eliminated by securing the natural enemies to do the fighting.

With the foregoing I will close my remarks. I recommend that a committee be appointed to draft resolutions to express our appreciation of the consistent and persistent efforts of our Hon. Senator T. R. Bard in opposing the reciprocity treaty with Cuba.

MR. DORE. I move that the Vice-President appoint a committee of three, to consist of Southern California fruit-growers, to whom shall be referred the President's address. I make the motion for Southern

California fruit-growers, because vast interests are involved and it is peculiarly a question that has brought this Convention to Los Angeles.

Adopted.

PRESIDENT COOPER. It will be in order to nominate a committee to thank our Senator Bard.

Mr. John Isaac, clerk of the Horticultural Commission, will act as secretary of this Convention.

I will state to the Convention that owing to the change in the law by the last Legislature, many people have been under the impression that the Convention would not be held. Of course you know that the State Board of Horticulture was abolished and a new horticultural bill passed. I qualified as Commissioner of Horticulture on the 27th of April, and was necessarily detained in Sacramento to organize and commence the business there, and I did not have time to incorporate many things in my opening address that I should have desired to do. On my way down I made some notes, and I will now read them if there is no objection.

Orange-Growing.—Wm. C. Allen, a Philadelphia gentleman, in an article written for the "Friend," April 11, 1903, states that he bought large oranges in San Juan, Porto Rico, three for one cent. We have much to fear from competition with the West Indies. Both orange and lemon growing, to be successful, will depend largely on by-products; but while turnips, squashes, and other vegetables containing glucose can be turned into so-called orange marmalade, orange jelly, lemon jelly, etc., it will be impossible to utilize the real product. This will be the case, also, with berry-growing, and with the by-products of the deciduous fruits. You can not rely upon the intelligence of the consumers, for the reason that with the assurance of the dealers and the cheaper price, they will buy the substitute.

Olive-Growing.—A recent number of the "Atlanta Constitution" says: "In December we shipped 2,909 tons of cotton-seed oil to Marseilles, France, and it will soon come back to us as pure olive oil." This tonnage, allowing 10 per cent off for the weight of the barrels, would fill 4,833,000 bottles, or in round numbers 400,000 cases. The cost of refined cotton-seed oil is ten times cheaper than what it costs to make olive oil; therefore, if the olive-growers can not get relief by a law compelling a true label on food products, they might as well root out their trees.

Archbishop Nugent, when visiting my place some two months ago, stated that while on a recent visit in Italy, large olive trees were being cut down and rooted out by the growers, as the product did not reward them, and the land was wanted for other purposes more remunerative. In France proper, *i. e.*, from the Pyrenees on the west to Toulon, a region once famous for its olives, one finds but few olive trees left—scarcely enough to supply the local demands for cooking purposes.

Even this remnant of once extensive plantations exists, on sufferance only, in the midst of wheat fields or of some other equally thirsty crop that drinks all the moisture from the soil before the poor olive tree is in blossom. In the eastern part of this region, *i. e.*, east of the River Rhone, things improve. Cultivation is a little more rational, and one finds the circle around the roots of the tree picked up with a grub hoe a little larger. Pruning is a trifle more regular, but somewhat more severe. Nature having endowed the land with less richness, the olive is retained, for the simple reason that nothing else will grow there.

Ellwood Rancho.—There are seven different olive orchards, a half to one mile apart; three persimmon orchards, walnut orchards, chestnut orchards, deciduous fruits, orange, lemon, and lime trees. In the flower garden there are about one thousand different kind of plants, and numerous vines and thickets; among these are oleanders and acacia trees, which are particularly attractive to the black and white scales. We have on this ranch the white scale, black scale, soft orange scale, red spider, walnut aphid, green aphid, and other noxious pests. I have not fumigated or sprayed for ten years, except for the codling-moth, and for two years I have not sprayed for the codling-moth. Last year we had 90 per cent of our apples free from worms. I am not certain but that a parasite for the codling-moth is at work in the orchard. I will report on this at the Fall Convention. Considering the great number and variety of plants and trees, I have less injury from pests than any other ranch. The oranges and lemons are clean. The olives are beautiful. All this was brought about by the parasites collected in Australia by Albert Koebele.

The Woolly Aphis on Apple Trees.—I tried the experiment of fighting the apple aphid with caustic soda, and by neglect on the part of a man whose business it was to apply it, about half the apple trees in the orchard were killed by not sufficiently diluting the caustic soda.

MR. BERWICK. What proportion was used—how much to the gallon?

PRESIDENT COOPER. I do not remember now. It was many years ago. But I followed the formula. I tried experiments with the common California ladybirds—the brown, the red, and the seven black spotted. I gathered those ladybirds and placed them on the trees in the orchard, and the moment they were liberated they flew away. I failed. I went to the walnut orchard and gathered the leaves where they had deposited their eggs. I found that they deposited their eggs on the under side of the walnut leaf, near the trunk, where there was the most shade, about twenty-five to thirty eggs in a clump. I took those leaves off and tied the stems at the foot of the apple trees, where the woolly aphid was most numerous, and on the limbs, where a limb had been cut off,

around the recent cut. I tied those leaves at those places so that the wind could not blow them away. The eggs hatched into the larvæ of the ladybirds and they did the work; the larvæ did the work, and we never had any trouble with the woolly aphid afterward.

There has nothing yet been discovered that we could depend on for the purple scale. The ladybird that was imported from Australia and liberated in Los Angeles County was not a success, for the reason that in Hawaii, where it was successful, there were always young and tender and soft scales upon the trees upon which the larvæ of this ladybird could work. It was not the case in Southern California. They were killed out in the winter. So something else will have to be secured for the purple scale. We have now liberated in various parts of the State parasites for all the pests that are seriously dangerous except the codling-moth and the purple scale.

George Compere is now on a voyage around the world to look for the parasite of the fruit-fly. He is a member of the Agricultural Department of Western Australia, and is traveling for the West Australian government. Before his departure he visited me and I planned a voyage that he should make and how he should make it, expecting to get an appropriation from the Legislature. But as that appropriation failed, we will have to resort to some other plan to get the money. However, we suggested to the Governor a plan, and he has assented, and we may be able to get a sufficient amount of money so that I can have the direction of George Compere on this voyage. The West Australian government will pay half of the expense and California the other half, and they will be very glad, indeed, to co-operate with us; and it is my opinion that they will also be willing for Mr. Compere to be directed by the fruit-growers of California in his travels. And the hope is that we will secure, or gain the knowledge where we can secure, the parasite for the fruit-fly, for the Morelos orange maggot, and for the gypsy moth which has denuded the forests around Boston.

MR. ALLEN. Mr. President, you spoke some time back about the competition to be met with in the West Indies in the shippers' business. You were formerly a resident of the West Indies for some years?

PRESIDENT COOPER. I lived in the West Indies for ten years.

MR. ALLEN. I would like to ask you whether, in your opinion, lemon culture will be equally successful with orange culture in the West Indies; that is, are the natural conditions such as to favor lemon culture there?

PRESIDENT COOPER. No, I doubt whether they will ever go into lemon-growing. They have their lemons, of course, and use them more or less. But they depend largely, for all their culinary purposes, on the sour orange; that is to say, they clean all the dishes and all the pots and everything with sour oranges. They don't use soap. So far

as lemon-growing is concerned, it will be a matter of many years in the future.

MR. ALLEN. Can they grow satisfactory lemons there? Will the fruit develop the proper acidity?

PRESIDENT COOPER. Yes, I think they can grow lemons there just as well as we in California. It may, however, be too warm. Because, according to my knowledge, the lemons were grown high up in the mountains. Probably experience taught them that the fruit wouldn't grow on plains.

MR. ALLEN. Isn't it a fact that citrus fruits grown in a truly tropical country do not develop the same amount of acidity as those grown farther north, as in the northern part of Florida and California? And, if that be true, might not it follow that lemons would not grow satisfactorily in the tropics?

PRESIDENT COOPER. I should be inclined to that opinion, without any positive knowledge.

VICE-PRESIDENT GRIFFITH. I appoint as a committee on the President's address: Thomas Stone, of Pasadena; C. R. Paine, of Redlands; and C. C. Teague, of Santa Paula.

MR. GOODWIN. If there is nothing before the Convention, it seems to me there is one matter the Fruit-Growers' Convention, assembled here to-day, should take action on. And, with that in view, I would move you that this Fruit-Growers' Convention do congratulate Governor Pardee upon his selection of Frank Wiggins and J. A. Filcher as the commission from the State of California to the St. Louis Exposition, and that we do most heartily indorse the appointments and pledge ourselves to aid them in every possible way. And further, that the secretary of this Convention be instructed to so notify Governor Pardee.

Motion adopted.

MR. DORE. I move that a committee be appointed to tender to Senator Bard our thanks for his work in behalf of the California fruit-growers.

Adopted.

PRESIDENT COOPER. I will name that committee at the afternoon session. Also, I will name a committee on resolutions at the opening of this afternoon's session.

MR. BERWICK. Mr. Chairman, as the thought occurs to me, we are going to have an unusual opportunity during this Convention or after this Convention to do some good for ourselves. Our President will be here in this city. He is here partly to know what are the wishes of each locality. It strikes me that a committee should be formed to sum up our deliberations and our wishes as expressed in this Convention, and convey it to President Roosevelt during his visit here. It would be very appropriate that a committee of Southern California fruit-growers

should wait upon him and state their wishes, and so on, in such matters as the Convention desires. I move that a committee be appointed for that purpose.

PRESIDENT COOPER. I want you to re-form your language a little. It is not Southern California fruit-growers; it is the State of California.

MR. BERWICK. Well, I would say a convention of California fruit-growers assembled in Southern California for the express purpose of learning Southern California's wants and wishes.

PRESIDENT COOPER. That is better.

MR. KOETHEN. If that is the motion, I will second it.

PRESIDENT COOPER. Mr. Berwick didn't name the number.

MR. BERWICK. I leave it with the Chair. It ought to be an imposing number. I should say ten or eleven.

MR. DORE. I suggest, as an amendment, that the President of this Convention shall be chairman of the committee.

MR. BERWICK. I accept the amendment.

Motion, as amended, adopted.

MR. BERWICK. Mr. Chairman, I move that if possible, the State Commissioner of Horticulture be requested to have continued by the Commercial Museum at San Francisco the cablegrams and other advices by mail from the various consuls abroad; that the Commercial Museum be requested to receive them, to interpret them, and to send them out to the fruit-growers as rapidly as possible.

PRESIDENT COOPER. Well, why wouldn't it be better to attend to that matter independently, entirely free from the Commercial Museum or any other organization; to have the Horticultural Commissioner get that news direct to the Horticultural Commission?

MR. DORE. I think, Mr. President, although I don't claim to be an expert on this line, that it would be much better if we had our own communications, and could get them direct and more speedily and without sifting or changing or in any manner diluting.

MR. BERWICK. I am willing to amend my resolution in accordance with Mr. Dore's wishes, although I believe it has not been seconded so far.

The motion was seconded.

PRESIDENT COOPER. The motion as amended is that this matter be taken up by the Horticultural Commission, independent of any other organization, for the benefit of the fruit-growers of the State of California.

MR. DORE. I suppose it will be more expensive?

PRESIDENT COOPER. It will cost more.

MR. ROWLEY. I know personally that the subscribers of the Commercial Museum at San Francisco don't care to have that information given broadcast through the newspapers. They claim that they sub-

scribe and pay for it, and if there is any value in that information they are entitled to it, and not the public. So that, as you see, there is a certain amount of friction, and always will be.

PRESIDENT COOPER. The understanding, then, is that this motion calls for independent news.

Motion adopted.

MR. BERWICK. Mr. President, is there anything to prevent the California Washington Navels being grown in the West Indies?

PRESIDENT COOPER. No, there is nothing to prevent it. The Navel orange has been grown with very great success in Pernambuco, and Rio Janeiro, in Brazil. Probably the finest oranges ever grown anywhere in the world are now growing in Pernambuco. They are very thin skinned. And the Navel oranges, I suppose that is where they came from originally to California. The climate of the West Indies is very much like that of Pernambuco, and there is no reason why the best oranges can not be grown on any of those islands.

MR. KOETHEN. Then upon what do you base your judgment that they can not plant orange groves in the West Indies and get them into bearing in four or five years, as they do here?

PRESIDENT COOPER. You understand that that country is not prepared for growing oranges. It would take two or three years before the land could be subdued and before the crops could be changed to commence on these trees. And they can not be gotten in that country. The stock would have to come from some other place, and it can not be done under four years; nor I doubt in eight years.

MR. STONE. Is it not the fact that the excessive moisture of some of those islands, the West Indies Islands, militates against the Navel orange, which requires, as I understand it, a dry atmosphere?

PRESIDENT COOPER. As to that I could not answer. I don't know.

MR. ALLEN. Mr. President, this question of the Jamaica orange I think has been gone through with experimentally. In the first place, its status in this country is very well understood. It has been imported here in large quantities for a great many years, and it has not competed with the California Navel orange in the New York market, for instance, or the other Eastern markets. I read recently an interesting article in the "New York Fruitman's Guide," which stated that this would be the last year of imports of Jamaica oranges on a commercial scale. It is stated that since the time of the Florida frost large orchards were planted on a commercial scale in Jamaica, and that those orchards have been failures and they are being abandoned and the land which had been put into orchards is now being put into other crops, such as sugar and bananas. The experience of two gentlemen, brothers, of Riverside, is an illustration of this fact. They thought Jamaica was going to be a

point of importance, and having the California experience they went to Jamaica to exploit the business and introduce California methods; and after two or three seasons they gave it up in disgust and came back. I believe there is nothing to fear from Jamaica.

MR. BERWICK. Do you know the reason of the failure?

MR. ALLEN. They say that the cultivated orchards do not do as well as the old natural orchards—don't produce as good fruit.

MR. DORE. How about budding the old orchards?

MR. ALLEN. I don't know in detail just how the thing has been conducted. But I do know, or at least I judge from the articles I have read, that it has been tried pretty thoroughly in Jamaica, and by people who had had experience in other localities, and that they are giving it up in disgust as a failure. And this is said to be the last year of any imports into this country in any considerable quantity.

PROFESSOR PAINE. I know of an orange-grower in Redlands who was concerned about this, and who made a special visit to Porto Rico this past season in order to learn the orange conditions there; and, without going into details, I learned from him that he was perfectly content to go on with his orange business in Redlands without fear of great competition.

MR. DORE. How much can you produce your oranges for, and what can you get for them? Those are the fundamental questions that attract the attention of the practical man who undertakes to find out whether it is profitable, whether it is a permanent assurance of success in the ownership and cultivation, with his own toil and that of his family, of a limited area in this garden of the world.

MR. GRIFFITH. The question is asked, "What does it cost to raise oranges?" The testimony before the Interstate Commerce Commission was that it cost anywhere from 85 cents to \$1 a box, according to different persons' estimates, plus the freight, to raise, pack, and sell a box of oranges.

MR. HARTRANFT. How much?

MR. GRIFFITH. It costs anywhere from 85 cents to \$1 a box and the freight, to raise, pick, haul, pack, and freight, and sell a box of oranges. In other words, if a box of oranges sold at destination for \$1.80, it brings 90 cents for the railroad company and 90 cents for the grower.

MR. STONE. This gentleman has propounded a very vital question, which Mr. Griffith has only partly answered. I doubt very much if there is a man in this room who can tell us what it costs him to raise a box of oranges. We ought to know that, and it seems to me that we are pretty bad business men if we don't know it. My orchard is young. But when it comes into bearing I shall vote myself as pretty much of a dullard if I don't know what it costs me to raise a box of oranges.

MR. GRIFFITH. There are two ranchers at Azusa who have figures, for I think five years, on the actual cost of production, including all of the cost of picking, hauling, packing, and selling, including interest at six per cent on the value of \$1,000 per acre on full bearing trees, and the cost of water—the output of money and the income of money balanced one as against the other. These are the Slauson ranch and the Spaulding & Powell ranch. They keep books. I saw the figures myself, but didn't examine them. We discussed what it cost before they went on the witness stand. The result is the average cost. You will understand that one year it costs more than another. Taking the average for five years, Mr. Slauson figured $87\frac{1}{2}$ cents, Mr. Powell 90 cents, and others on the witness stand figured \$1. One man was asked to guess, and he guessed \$1.25. That included everything upon a ranch of several hundred acres.

At this time a recess was taken until 2 o'clock this afternoon.

AFTERNOON SESSION—FIRST DAY.

TUESDAY, May 5, 1903.

The Convention was called to order at 2 o'clock.

President Cooper announced the following committees:

On Resolutions of Thanks to the Honorable Senator T. R. Bard for his persistent efforts in opposing the reciprocity treaty with Cuba—A. P. Griffith, Azusa; C. R. Paine, Redlands; B. N. Rowley, San Francisco.

On Resolutions—John S. Dore, Fresno; Edward Berwick, Pacific Grove; Mr. Stone, Los Angeles.

On Memorial to President Roosevelt—Ellwood Cooper, chairman; H. C. Allen, Pasadena; Professor A. J. Cook, Claremont; L. M. Holt, Los Angeles; B. N. Rowley, San Francisco; E. M. Ehrhorn, Mountain View; Mr. Hutchinson, Fresno; A. D. Bishop, Orange; C. R. Paine, Redlands; Edward Berwick, Pacific Grove; J. H. Reed, Riverside.

IRRIGATION AND CULTIVATION.

BY JOHN HOFMAN, OF CUCAMONGA.

The topic assigned me is one which, in its broadest sense, would require a paper so long that but little time would be left for other matters. This, however, being a fruit-growers' convention, I presume the handling of soil here discussed will relate to the orchard, but even then we are confronted by a task of considerable magnitude, if every kind of soil is considered fully. Let us, then, in order to condense as

much as is practicable, divide our soil into three kinds, and simply call them heavy (containing much clay), loamy or light, sandy or gravelly. Let us also discuss this from a practical rather than a theoretical standpoint.

In thinking of irrigation and cultivation our minds naturally consider the running of water and the stirring of the soil which follows; but I think the subject is much broader than that, and in reality relates to the work, or non-work, if I may use the term, which is given the land throughout the entire year. Here in Southern California our season really begins with the fall rains. Let us commence our reasoning at the same time and begin then to prepare for the following summer.

The three kinds of soil previously spoken of will require different treatment, but all in a general way may be handled alike at this season, if we make an exception to extremely heavy soil, which many furrow each way with heavy plow and subsoiler, which enables the land to take in the winter rains more readily.

The practice of green-manuring is surely a good one, for in this way we in a measure imitate nature, and the nearer we come to copying after her the more substantial will be our work. The mere fact of turning under a wealth of green is itself of great value, and when we add to this the fertilizing benefits derived from any of the nitrogenous plants the benefits are multiplied many times. The skeptic says as much is drawn from the soil as is replaced. I do not believe it, and point to the old fields grown up to grass and weeds for years—this land is not deteriorating. Aside from the fertilizing which the soil receives by plowing-under a crop of peas, the humus added is of great value in assisting the soil to remain loose, and this is one of the ends at which the thoughtful worker aims, for such land will take in water more readily and retain it longer than will a hard, compact soil.

A good way to secure a rank growth of peas is to plow early in the fall, break up the crust which has formed during the summer—roots can now be cut with comparative safety—sow peas broadcast or drill, harrow or cultivate the ground, draw furrows to allow of winter irrigation if necessary, and unless the season is unusually wet, irrigate often after the peas are up sufficiently to shade the ground. Plow-under as soon as the pods are well formed. This can be done by using a sharp plow, heavy chain, coulter, and patience—plenty of the latter should be taken, and then the chances are even that the stock will be fairly well exhausted by the end of the first day. A disk harrow is said to be an advantage, if run over the land before plowing.

There are a number of native plants which are very valuable. All of our wild clovers and lupins are good, and it has often seemed strange to me that lupin seed is not on the market. The plant possesses some

advantages over even the pea, being among other things a deep rooter, and more easily plowed under.

We have now carried our orchard to say the month of March; the plowing is completed. Many use a harrow immediately after, but the custom is not to be recommended, as it tends to pack the ground, and should later rains come the water will be taken in better if the ground be rough. By smoothing a little, moisture is saved; but the evaporation is light at this season, so this may not be considered of any moment. Should the land break up very lumpy, however, it may be advisable to use a harrow.

After the peas are well rotted, cultivation will of course be necessary, and it is best to do this very lightly at first, in order not to bring the vines to the surface.

There are two generally accepted methods of irrigation: the basining and the furrow system. Each is well known. The basining is, I believe, the method earliest adopted; and this, let us say, consists of irrigation by flooding, whether in basins or by allowing the water to spread over the entire surface. The basining proper can be done on any land; but where the water is allowed to flow gently over the surface the land must be level, or nearly so. There are several serious objections to either form and no decided advantage. First, the entire surface being soaked, the evaporation is many times what it would be were furrows used. Virtually all the water required to wet the top six or seven inches, depending on depth of cultivation following, is lost, and worse than lost, for in this moist earth capillary tubes will be much easier made than in a covering of dry earth. Second, the labor in preparing for and in cultivation after, is much increased, as well as the actual running of the water. One advantage which the advocates of this system claim, that of a more equal distribution of the water, is worth considering, although in the furrow system a careful irrigator will so arrange his streams as to give a fair, if not actually an equal distribution of the water to all the trees.

The second way spoken of is that by furrows, and here again we find many methods employed, from the shallow affair made scarcely below the surface, to the deep trench through which a subsoiler has been run to a depth of several feet. It is obvious to all that one of the main objects of the irrigator is to get the water down deep. It seems useless to argue this, or state the reasons, as every one is no doubt familiar with the subject. The deeper the furrow, the less will the water show on the surface after an irrigation. Six or eight shallow furrows drawn between two rows of trees amount to little better than a basining, except in the cost of preparation. But three, two, or even one deep furrow, made with a heavy, sharp plow, and so deep that the crust which forms just below the line of cultivation is broken, will allow the water to sink in

rapidly, and virtually none will be lost by evaporation. The heavier the soil the less readily will the water be taken in, but the more it will spread laterally, consequently fewer streams are necessary, but the water should be run a longer time. A subsoil furrow will allow the water to sink very rapidly, and a large stream is accordingly necessary. On light soils a greater number of streams should be run, if only for a few hours, for on land of this nature the moisture will sink quickly and spread but little. On soil of this kind, it is well to wet the space between the trees by checking, "zigzagging," or in some other way. This method has of late become quite popular with many, but to my mind it can be overdone, for the cutting of roots to such a depth, even when the furrow is made some distance from the tree, does not seem a natural proceeding.

Each orchardist must, or should, study his subsoil carefully, and this can best be done with pick and shovel propelled by the "hired man," if such a luxury is possessed. Many of us deliberately waste water by running a longer time than is necessary on the light soil. A rough study of a piece of my ground has caused me to alter my methods materially. I ascertained that on the loamy soil, with some rock underneath, water which had been run thirty-six hours had penetrated more than 7 feet, and at a depth of 5 feet had spread $4\frac{1}{2}$ feet on each side. All the water was in the ground. Two streams, then, in space between rows 20 feet apart, would wet all the land. How much better this way than the soaking of the surface for a few hours.

The plan, adopted by many, of flushing through the streams, and then allowing the bottom of the furrows to become dry and crusted over before regulating, should be condemned, for by so doing one simply counteracts all the effects of the deep furrow. The water will spread on the surface without penetrating. When the work is finished the land appears to be plentifully irrigated, but use a shovel and see how many roots are really treated to a wetting. I have seen trees showing signs of drought while the soil a few inches below the surface was moist; the roots down deep were dry, and those on the surface could not draw enough moisture to satisfy the tree.

On lighter soil, the rows should be short. If too long, the trees at the upper end receive a far greater amount of water than is their due. Streams 150 feet long will answer very well. On slightly heavier soil they may be twice that length. As a rule, the longer the stream the more unevenly will the water be distributed. A simple and effective way to give the trees at the lower end of the place their share, is to cross-furrow say one third the way up, and after the streams have been fairly well regulated take up what would be wasted by cutting in between the trees. This is an easier and better way than to depend on regulating entirely at the head ditch.

There is yet another system of irrigation which has been tried by some, occasionally with success, but oftener with failure. I allude to what is called subirrigation, although I have tried to impress on your minds that all trees should be subirrigated. The system invented by Mr. F. M. Chapman, of Covina, is, so far as I know, as successful as any in operation, and certainly the portion of the orchard in which this is installed compares most favorably with any I have seen. Mr. Chapman has given these trees no irrigation in four years except by this underground system. He is confident that 20 per cent of the water is saved, and virtually all of the labor of preparation and cultivation, so irksome when continued throughout a long dry season. Briefly described, the system consists of a main from which run laterals to the tops of small reservoirs built in the ground, in the center of squares made by four trees. The small pipes are made of cement and in a very ingenious way. A trench having been dug and leveled, two pieces of 2 by 6 are laid edgewise in the bottom about 5 inches apart. These serve as frames. A floor of cement is laid, and on this is placed a 2-inch iron pipe to serve as core. Around this is packed cement, which soon hardens. The core is then drawn out, leaving a rectangular pipe of cement with 2-inch opening. The reservoirs mentioned are also built in the ground, being, when finished, circular basins with cement sides and earth bottom. The pipes and reservoirs are buried in the ground deep enough to be safe from plow point and cultivator teeth. When in operation the reservoir at the upper end of the row is filled, then the second, and so on down to the last; when this is full all are. The water is then regulated at the main so that none wastes from the bottom. Mr. Chapman's trees are 24 feet apart, and he says that with water standing in basins less than twenty-four hours the moisture will be drawn over to the tree and will rise to the level of the water in the reservoir. The cost is about \$125 per acre.

There are other and cheaper, and consequently less permanent, systems. An inverted V flume, laid under a berry patch, is of great convenience, and is said to work well—barring gophers. What may be termed a combination of the furrow and the subirrigation systems is made by running a single furrow near a row of trees, and connecting this by shovel with a hole dug, say 2 feet deep, between the trees, allowing the water to pass down the furrow and keeping the holes filled the necessary time. This has been tried by a number of our orchardists, but the extra cost of digging the holes discouraged the continuance of the practice.

So much for irrigation. The cultivation to follow is of almost equal importance. It should be done reasonably deep, but I do not believe it necessary or advisable to run the cultivator in 8 inches, as many claim. Land in which there are no roots will retain moisture throughout an

entire summer season, if kept free from weeds and cultivated perfectly 4 inches deep. Cultivation should be done as soon after irrigation as possible, and here is another advantage the deep-furrow plan has over any other: it allows the work to be done on some land within a few hours after turning off the water. Many orchardists immediately drag a smoother or light harrow over the furrows. The dry dirt falling in, closes the pores and saves evaporation until the regular cultivation can be done. This cultivation should be followed by a second in a few days, but the latter need not be more than 4 inches deep, if done with a very fine-tooth cultivator. A heavy chain, the ends of which are fastened to the outside shanks of the cultivator, acts nicely as a smoother, and adds little to the draught.

This in a rough way describes the necessary work on the land. It should be repeated at regular intervals until relieved by sufficient rain to warrant a discontinuance of artificial irrigation, when the year's work will again be commenced.

HANDLING THE SOIL.

BY J. H. REED, OF RIVERSIDE.

At the recent examination before the Interstate Commerce Commission in this city, the discussion concerning the cost of producing citrus fruits elicited much interest and no little solicitude. It certainly emphasized most clearly the need of better methods and greater economy in transporting and marketing our product. But however much we may hope from the efforts for fairer costs and improved service in carriage, and from the recent new organization for marketing, we must yet face the fact that if our present output, with the enormous increase already in sight in the near future, is to be taken at all, it must be at low prices. So that our final recourse for fair profits in the future must yet be sought from other sources. After many years of practical experience in the orchard, and some breadth of observation outside, I am thoroughly convinced that there is a sufficient margin yet to be gained by economy in production and better handling to easily place and retain California fruit-growing on a basis of fair profit, even with the constantly increasing output. But this will depend on our using the best known orchard methods. Hence the excuse for discussing these homely every-day subjects, one of which has been assigned to me for this occasion. Lest some may yet think these small matters unworthy the consideration of such a Convention, I want to add, to illustrate: We in Riverside are proud of our achievements in orange-growing; and think we are as nearly "up-to-date" as any of our neighbors. Yet in our valley you will find a considerable percentage

of growers using tools and methods of twenty years ago. It can be easily shown that the lack of wise use of well-known improved methods, entirely practical to all, costs our community not less than a quarter of a million dollars annually—an item worth considering, especially as the same relative condition probably exists in other districts.

No factor perhaps has helped more to gain the American manufacturer his precedence over the rest of the world than his quickness in recognizing and adopting new machinery and new methods which would do his work better and faster. Too much like the European mechanic, we horticulturists, as a rule, are inclined to hold on to our old methods because we are accustomed to them, and to our antiquated implements because we have them.

Handling the soil with reference to irrigation and cultivation, is the subject assigned me, but with your permission I would like to dwell somewhat on a feature of soil handling not immediately affecting irrigation or cultivation as ordinarily considered, but which I think you will agree is quite pertinent to the matter in hand. The handling of the shallow clay and other soils often overlying substrata, not only void of plant food, but detrimental to plant growth, found so generally in the far Eastern States, requiring shallow tillage, is doubtless to a considerable degree responsible for the shallow handling so generally practiced on the deeper soils of the Middle West and Pacific Coast States. Farmers too frequently, on removing from one locality to another, where local characteristics are materially different, persist in using the methods to which they have been accustomed. The mistake of shallow tillage on our deep soils has long been recognized. For many years, perhaps no subject has been more frequently discussed at our horticultural clubs, farmers' institutes, and in the horticultural press than that of deep cultivation. But in spite of the agitation, and the marked advantage where adopted, it has made but slow progress. Plowing orange orchards in our valley commenced eight or nine years ago. Its practice has increased year by year, but not until the present season did it become practically universal. Deep cultivation has made and is yet making similarly slow progress. But it would be difficult to estimate the benefits that have already come to our orchards from these two improved practices.

Another radical improvement in handling soils is beginning to attract attention in cereal and especially in fruit farming; that is, the stirring of the subsoil much deeper than is now generally practiced, even with our most approved methods. The value of this especially deep tillage has long been recognized and acted upon in some of the Old World countries. Traveling abroad several years ago, I found myself greatly interested in the preparation of seed-beds for common cereals in the richer agricultural districts of Italy. I knew, of course, of their raising

several cultivated crops a year on the same fields, but I had not conceived of the immense yields per crop, and could only account for them by the extra deep tillage. I saw gangs of men in line with long, narrow-bladed spades (plows being seldom used), turning the soil to more than twice the depth that even our better farmers plow for similar crops.

Tilling the soil for cereals is outside of my subject, but you will allow me to say, in passing, that I can not believe that the best handling of the soil in grain farming, in Southern California at least, has yet been found, or if found, is generally practiced. I was not then especially interested in fruit-growing, but two years ago my son made special study of citrus fruit culture in the Mediterranean countries. He found not only this same deep manipulation of the surface soil by hand, but where they were preparing to set out new orchards he saw them digging over the entire space to a depth of 2 or 3 feet. He found in their well-cared-for groves not only the thickly-set citrus trees, but frequently the entire space between occupied by other crops—sometimes vegetables, sometimes grapes and other small fruits. Even with heavy fertilizing, this enormous amount of growth of tree, fruit, and vegetable could not be maintained except for the extra depth of the root bed.

This specially deep soil handling is practiced to some extent in other Eastern countries. In some parts of France a long, peculiarly constructed double plow, cutting a furrow from 25 to 30 inches deep, is used in preparing the soil for vineyards. The municipal gardens near Paris, fertilized by the city sewage, are annually plowed by the same implement, and enormous crops are raised. I am told that equally deep plowing is done in parts of England.

In our own country this specially deep tillage has been tested more extensively in the semi-arid regions of the Middle West States. It is now some eight or nine years since, during an exceptionally dry season, a Mr. Campbell, who had been quietly carrying on farm experiments for several years in South Dakota, astonished his neighbors by producing an average of 140 bushels of potatoes to the acre, while their crops were nearly or quite failures. His land had been plowed very much deeper than usual; the bottoms of the furrows being firmed by an implement for the purpose, to conserve moisture, and the surface kept fine. The results of Mr. Campbell's experiments attracted the attention of railroad men, and since then he has had in charge experiment farms, mostly in the interests of railroads, in South Dakota, Nebraska, and Kansas, with results that have attracted wide attention in this country and abroad. Of course other devices are used to help secure these results, but without the exceptionally deep plowing none of them would avail. Not only has this new method of farming made grain-raising profitable on those dry lands, but it has made fruit and timber

growing possible, and this is the point especially pertinent to this discussion. With little if any rain after the middle of June, by the deep plowing and fine surface mulching, trees are kept in vigorous growth until October without irrigation.

But in spite of its marked success this new system has been and probably will be of slow growth, for reasons easily appreciated. One reason, previously mentioned, is that the average agriculturist there as here is slow in adopting new methods, especially if somewhat radical. But the principal explanation is that while the processes are simple, the work must be done intelligently and at the right time, and this requires an extra expenditure of time and care, and special tools, not readily afforded. But in spite of this slow growth the new system of soil handling has helped bring about a wonderful change in that great semi-arid region. During the first half of the 90's, a quarter of a million of people abandoned that section because the ordinary crops and the old methods of handling the soil proved failures. During the last five years the influx to these same lands has been even greater than was the outgo. More claims were entered in that dry region last year than in any previous year of its history, and lands have increased in value an average of 100 per cent within the five years. Eventually this improved system of handling soil is to be at least an equal factor with the discovery of new crops adapted to the dry climate, in peopling and making productive a strip of varied width, stretching a thousand miles from North Dakota to Texas, capable of sustaining many millions of people.

To-day the whole nation celebrates the Louisiana purchase of one hundred years ago. Less than a hundred years from now, populous States then occupying nearly half of that great purchase, which during all the century have been considered practically uninhabitable, may celebrate the achievements of modern agriculture.

I have dwelt upon this because the conditions seem not unlike our own, and I believe this new system of agriculture may do as much for us in Southern California as it is doing in those semi-arid regions.

The experiments now being made with the powerful English steam plow in the beet fields at Oxnard are in this direction, and will be watched with much interest. If a root bed twice the ordinary depth not only increases the product, but also doubles the length of time the soil can profitably be used for that exacting vegetable, it is reasonable to expect that a bed of extra depth will prove of vastly more advantage to the deeper rooting fruit tree.

And this is not a matter of mere opinion. Others as well as myself have put the theory to practical test sufficiently to be convinced beyond a doubt of its value. For five consecutive years, excepting one, I have planted orange trees on ground plowed from 12 to 16 inches deep, actual, in holes 2 feet deep by 2½ feet in diameter. Modern after-treatment was

followed, but compared with orchards planted the old way (that is, in holes barely large enough to take the ball conveniently, dug in the unmoved soil, save a few inches of plowed surface, even with best after-treatment), the results have been markedly different.

To illustrate: From one of these orchards planted five years ago this spring, the second and third seasons after planting we took enough fruit to pay all the expenses of the first three years, including planting. Last year, before the trees had been planted full four years, the receipts from the five acres were sufficient to net a good income on a valuation of \$1,000 per acre. This year the crop will pay over 10 per cent on a valuation of \$2,000 per acre (a price for which the orchard could have been readily sold with the crop), after all expenses are paid. I take this instance because the orchard is the oldest of my own planted with special reference to previous preparation of the ground. But later plantings show similar results, and a large planting, now two years old, by a neighbor who made even more thorough preparations for the root bed, promises to quite outstrip my own experience. I do not claim that these results are wholly due to deep preparation of the soil before planting, but insist that this is what made deep after-culture and other modern treatment able to produce them.

My theory, which has grown out of these and other experiments, sufficient, as I think, in time and extent to generalize from, is that the most important advance to be made in California horticulture during the next decade, after bringing into more general and thorough use modern deep surface cultivation, is the preparation for orchard planting by making a root bed two or three times as deep as is now the usual custom. And I am inclined to think that this applies to deciduous fruits even more than to citrus. I expect yet to see orchards set in ground that has been thoroughly stirred in some way to a depth of from 20 to 30 inches at least.

Time will not permit discussing the philosophy of this deep handling of soils; but the more extensive aëration, securing deeper rooting, utilizing a larger portion of native fertility, and greater storage capacity and conservation of moisture, I think will readily occur to you as most important gains for the new system.

As to handling the soil as more directly connected with irrigation and cultivation, the features now generally adopted by our most successful orchardists are so familiar that I will call your attention to but two or three practices which seem to me most important. The first in importance connected with irrigation, in my estimation, is the placing of the irrigating water at once as far from the surface and as near the root bed as possible, by furrows as deep as can be made without disturbing leading roots. Though the marked benefit from this deep furrowing has been demonstrated for several years, the practice has made but slow

headway among average orchardists. You will yet see more furrows 3 and 4 inches deep than from 6 to 8 inches deep, as they should be. To secure really deep furrowing requires, first, a full appreciation of its importance; next, a suitable tool and persistence in its use. It is difficult to make uniform 6 to 8 inch furrows with a three-shovel furrower, especially if the ground has not been kept thoroughly and deeply cultivated. It is usually better to take the additional time and use a two-shovel furrower, and it should be of the best form and in good condition. Too much stress can not be put on the importance of securing deep furrows at any cost. Where deep-furrowing implements have been used continuously for a considerable time with suitable application of water, followed by proper cultivation, the so-called irrigation hardpan, so much discussed, has disappeared and there is no longer excuse for that sharp-cutting subsoil implement that has done so much mischief.

Another modern process coming into quite general use, in our valley at least, is covering the irrigating furrows soon after the water is taken off and before the ground is fit for cultivation. With deep furrows this is easily done with any implement that will pull in the shoulders of the furrows, without firming the moist ground. An upright plank with a wide strip of strap iron in front, at bottom, projecting a little below the wood, with sharp steel spikes thickly set in the wood, extending a couple of inches below the iron, drawn lengthwise of the furrows, serves to good purpose. It covers the bottoms of the furrows with fine earth (it is not necessary to fill the furrows), and the steel teeth fines the surface between the furrows enough to stop evaporation, which otherwise goes on rapidly before the ground is fit to cultivate. I dwell upon this simple device because, after several years' use, I deem it really the most important process, next to deep furrowing, connected with irrigation. In our own experience we consider that it makes a saving of from 15 to 20 per cent of the water got into the ground, over the old way of allowing the excessive evaporation to go on until the soil is fit to cultivate. A heavy implement that will firm the ground should not be used.

I should have stated before that the methods of handling the soil, here discussed, apply especially to clay, granite, and other of the heavier soils. In light sandy or gravelly soils, handling and irrigating are quite different problems, which I can not now discuss.

After all that has been said and written, and especially after the marked results that more than bear out all that its advocates claim, I am quite ashamed to speak of deep, general cultivation between irrigations. Besides, to argue it before such an audience as this is like the preacher, on a rainy Sunday morning, scolding the absentees over the heads of the faithful few present.

But the immense loss constantly occasioned by the lack of it, urges its being preached in season and out of season. I can not enforce the importance of this modern practice better than by an object lesson we now have at Riverside. Our citrus orchards for the most part are small and generally managed by the owners. There is one large exception. A dozen years ago a trust company developed several thousand acres. A considerable portion of the now bearing orchards on this tract is yet owned and managed by the company. The ordinary methods of cultivation were followed until something over a year ago, when Mr. James Mills, an enterprising orchardist of long experience, was induced to take charge of this department, with large discretionary power. His first and most radical change was to deep tillage. Instead of cultivating 3 or 4 inches deep as had been done, he insisted on a depth of from 6 to 8 inches. The result on that great stretch of orchard is simply wonderful.

Of course this marked improvement can not all go to the credit of deep cultivation. It was made possible by deep winter plowing and other important improvements introduced. But without the specially deep, regular, thorough cultivation, all else could not have brought about the radical change now seen in the orchards. It is true that Mr. Mills and other managers of large holdings have the advantage over us, who work only our own small orchards. They can command the tools best adapted to the work, and power to handle them. Mr. Mills is now using a simple implement, consisting of a heavy 6 by 6 wooden beam 8 feet long, to which is attached fifteen heavy shanks with narrow shovels, properly hung behind a simple running gear. This is put down from 6 to 8 inches, making a heavy draught for four large horses. It is not so easy to accomplish the same kind of work with our lighter teams and lighter implements, but it can be done. It costs more, very much more, than the old way, but if the additional cost of from \$5 to \$10 per acre secures an additional income of from \$25 to \$50, then the additional expense is true economy.

There is one other modern practice which I think is not fully appreciated: the fining of the surface, especially of our heavier soils, and keeping it constantly loose by frequent stirring. This is our best means, not only of holding the moisture in the root bed, but also of preventing the hardening of the layer immediately above the roots. A simple practice which has come into quite general use in our valley, is to attach a bar of iron, a heavy chain, or a piece of hardwood behind the cultivator, properly hung and of sufficient weight to crush the moist clods turned up by the shovels. A slight impact pulverizes the fresh lumps, which a few hours of sun would turn into hard clods. The simple device also levels the surface, reducing evaporation. The frequent use of the fine-tooth harrow is coming more and more into use to help make and keep the important fine surface blanket of soil.

All this sounds very simple and scarcely worthy of our attention. But the fact is we have come to the point in fruit-growing in California where success depends not only on knowing the best methods, but on having all details carried out thoroughly and intelligently. The great need to-day is more intelligent labor in our orchards. The great manufacturer with his perfected automatic machines can use automatic men. There is no automatic labor in the successful orchard. Every orchardist needs to be an expert and have intelligent help. Our schools, from the primary to the university, have been educating away from the farm until the professions and business offices are crowded with poorly-paid young men, while the farm and the orchard must take such material, both for management and detail, as can be found, and this is often most crude and inefficient. There are scores of places in our valley to-day waiting for young men properly trained in agriculture, where the compensation would be far above the average earnings in our professional and business offices. And if there is a business or profession promising more pleasure or pecuniary success than that of the capable and intelligent California fruit-grower, I am not aware of it.

DAIRYING IN CONNECTION WITH FRUIT-GROWING.

By C. W. LEFFINGWELL, JR., OF WHITTIER.

It is the destiny of California to become, in point of population and prosperity, one of the greatest States in the Union. We have here a climate in which most men desire to live when once familiar with it. We have in our great expanse of territory, a variety and richness of soil, a world of undeveloped water, such as can not elsewhere be surpassed. With such natural advantages, it is hard to realize how recently our great State has begun to make substantial progress toward the fulfillment of her destiny, and how backward is the condition of her agricultural industries as compared with the farming regions of the East. Among the factors which have retarded this development are the ownership of immense grants by individuals, and wasteful and speculative methods in farming and fruit-growing.

As a State we have had too few main products, and the failure of one or two crops has had too much effect upon our general prosperity. Again, whole districts have gone mad over the planting of one kind of fruit, and the failure of one crop has produced hard times. The individual fruit-grower has bought more land than he could pay for, has set out more trees than he could care for, and has recklessly strained to get rich quickly, by devoting every energy to the growing of one fruit crop. He has neglected to raise on the farm part of his food and sustenance. He has failed in every particular to practice the thrift and economy

that go to build up a stable wealth. His farming has been extensive rather than intensive. With all his eggs in one basket, the failure of one crop has gone hard with him, and too often he has found that his soil was unfit for the variety of fruit in whose development he has spent his last dollar.

If we would realize the great possibilities that lie before us as a commonwealth, we must correct these evils. In the place of great land grants owned by individuals, and farmed in careless fashion, we must have a vast number of small farms, each supporting a family of American citizens. In the place of a small variety of products, we must have diversity, and diversity not only in each district, but also in the products of each farm and orchard. In place of wasteful methods of culture, we must make each acre produce to its limit. Instead of depleting our soils, we must build up and maintain their fertility.

It may be safely said that California is now making rapid strides in the breaking up of large holdings into small farms, in the acquiring of an intelligent and thrifty class of small farmers, and in the diversification of products. In this diversification the development of the dairy interests is playing an important part, and is destined, in the future, to become one of the most important factors in maintaining the fertility of our soils. It is in this respect that dairying is of the utmost importance to the fruit-grower. The two industries should go hand in hand, as one is supplemental to the other. Every great fruit-growing district should have part of its acreage, where possible, devoted to alfalfa. Every fruit-grower who can produce this kind of milk-producing feeds, should devote part of his ranch to its culture, and keep a few cows. Many ranches have spots of soil that will pay better in alfalfa than in fruit, and in many districts alfalfa can be grown between young trees until they come to full bearing, without detracting from their productiveness. When the trees are in full bearing, alfalfa hay can be bought, and there are few orchardists who can not find a place to grow a few pumpkins, sugar-beets and other succulents, which, with alfalfa and bran, will make up a complete cow diet. These feeds, put through the digestive apparatus of the cow, would bring in for milk and butter a regular and sure cash income, the benefit of which, in a community whose main crop is ready for market but once a year, would be felt in every line of trade. Dairying would thus help tide over the long period of waiting between crops for the money that sometimes never comes.

As I have said, the most important way, however, in which dairying is supplemental to fruit-growing, is in maintaining the fertility of the soil. Nature has given us a wonderfully rich soil, which we have drawn upon lavishly; but nature's bank account is not inexhaustible, and a day of reckoning will come if we do not make regular deposits of fertilizer to protect our soil account from overdraft. We can secure chemical fertil-

izers by paying out our hard-earned dollars, but by our methods of clean culture we are burning out our soils. We must have humus, and to supply humus together with plant food, there is nothing so beneficial to the soil as animal manure, and there is no machine so good for making manure as the cow. There is this peculiarity about the alfalfa plant, that it draws most of its nourishment in the form of nitrogen from the atmosphere. What it does not get from the atmosphere it goes down deep into the earth for, and will grow year after year on the same soil without need of fertilizer and without apparently leaving the soil any worse off. In fact, the top soil at least is greatly enriched by cropping to alfalfa. This crop forms the most perfect single cow feed known to man, and the beauty of it is that after making enough milk to pay a handsome profit on its cost, a cow returns to us 80 per cent of its nutriment in the form of manure. I estimate, from generally accepted feeding tables, that the value of the fertilizing elements in the manure from a ton of alfalfa hay is about \$8 or \$9. It is probable that it would pay to buy alfalfa hay at \$6 per ton and plow it under in our orchards; but how much better a proposition it is to have our cows work it into manure while making a good profit from it in the form of milk and butter. The same principle holds good regarding other feedstuffs that can be used to supplement alfalfa. The manurial value of a ton of bran after passing through the cow is about \$12 per ton, and if the milk produced from the bran will pay a profit on its cost, the manure, when properly cared for, is a very cheap fertilizer to the man who has an orchard to put it on. If a machine should be invented which would draw down nitrogen from the sky, like cucumbers from sunbeams, and would draw up potash and phosphoric acid from the depths of the earth and combine them with humus in readily available form, every fruit-grower would want to buy such a machine; especially if it turned out gold dollars as well as manure.

This is just what the alfalfa plant, in connection with a good dairy herd, will do, and such being the case, there can be no doubt that alfalfa and dairying in connection with fruit-growing should receive more attention. It is not to be hoped that every orchardist will be able to keep a herd of cows, but even if every fruit-grower who now buys milk and butter would keep a family cow, and those who now keep one cow would keep two, this increase, small as it seems, would add thousands of dollars to our wealth, and fertilize thousands of acres that are now going backward.

No doubt the objection is made by many that the care of cows entails too much work. It does take work, steady and faithful work; but it is a work that pays, a work that saves, the kind of work that gets the most out of the soil and builds up stable wealth and prosperity. To these objectors I say, as you raise more cows, raise more boys to milk

them, and as your boys grow up under this healthful discipline, they will have developed in them those rugged traits of industry and strength that have made the American farmer what he is, the life blood of the Republic.

To recapitulate: The stepping-stones to California's future greatness are, the breaking up of large holdings into small farms and orchards; greater diversity in general, and in the products of each ranch; intensive culture; greater care in maintaining the fertility of the soil. To accomplish this latter purpose, it is to be hoped that dairying will receive more attention on the part of fruit-growers.

THE RECLAMATION OF ARID LANDS.

BY L. M. HOLT, OF LOS ANGELES,

Founder of the now popular system of mutual water companies in Southern California.

For many years past, the people of the United States—and especially the people of the arid West—have been studying carefully the question of reclaiming our own worthless public domain, in order to enlarge our nation and furnish homes to the increasing millions of our population.

While this great question of national expansion within our own territorial limits was under consideration, a new question of national expansion beyond our territorial limits was forced upon our people by international complications which could not be ignored, and which resulted in the annexation of extensive insular interests in and beyond the sea.

The original question of home expansion finally resulted in congressional action in favor of the construction of national irrigation works for the reclamation and colonization of a portion of our worthless arid public domain, which action will result in the practical annexation of some of our own territory to the inhabitable area of our country. This appears to be a species of national expansion to which there can be *no* reasonable objection from any source, no matter how much it may be mixed up with partisan politics.

It is always considered good business policy for an individual to improve his own property and make it more valuable—especially when, by so doing, he can create wealth—when, by so doing, he can make ten, five, three, or even two dollars by spending one—or make two blades of grass to grow where none grew before. If this is good, sound business sense for an individual, why is it not good, sound logic for a nation?

It is the application of this sound, common sense that has created Southern California out of nothing; that has created a Riverside out of a poor sheep ranch, a Redlands out of a barren waste, and the Imperial settlements out of a worthless desert.

Thus far the work of making a garden out of a desert here on the Pacific Coast has been confined to individual capital and individual enterprise.

The Government owned a large area of worthless land and many streams of worthless water. It sold the land for a song—more than it was worth—and gave away the water. Private enterprise and private capital took both of them, brought them together and made homes for millions of people and created billions of wealth.

The people who thus brought the land and the water together rarely made any money out of the enterprise, and frequently they lost their investments; but the settlers generally made what the promoters lost, and the State became much more wealthy for the work done.

This loss of money by the capitalists back of irrigation enterprises was the result of a combination of causes. Lack of accurate information relative to how the work should be done was a leading cause; experimental work added to the disastrous results; and slow settlement, occasioned by the greed of promoters, who frequently charged more for water rights than the traffic would stand, thus piling up a large interest account on the wrong side of the ledger, being the cap sheaf that would call for the appointment of a receiver, frequently forced the settlement of the business in bankruptcy proceedings.

Incidental to this method of procedure, a high rate of interest paid for borrowed capital and exorbitant prices paid for work done, lands purchased, and material bought, because of lack of funds, were other items that tended to cancel supposed large profits.

In looking over the field, we find several different stages of development work.

Under the old Mexican régime, prior to the annexation of California to the United States, irrigation systems were very crude and the legal machinery for their ownership and management was very simple. Neighbors got together, dug their cheap ditches, and then took turns in cleaning them out and distributing the water. Very little or no cash changed hands in this simple process.

Under American occupation, Yankee ingenuity sought out many inventions, and one of them was to incorporate a water company for profit, construct a system of canals and ditches, and then charge the land-owners under the system for the water used by them. The more they charged for the water, the larger the dividends they could declare; and sometimes they went beyond the limit of the land-owner's ability to pay.

At this stage of the proceedings, the Legislature stepped in and passed a law requiring Boards of Supervisors of counties and the governing bodies of incorporated cities and towns to fix water rates that might be charged by water corporations, whether the water was used for domestic or irri-

gation purposes. This law was a necessity, but it had the effect of stopping the investment of money in water companies on that basis.

It was at this stage of the proceedings that the writer suggested a plan for the formation of mutual water companies on a co-operative basis. Such a water company was to be incorporated for the purpose of supplying water to its stockholders only at cost. No one could get water from such a company except he was a stockholder, and such corporation could declare no dividends, because there would be no profits. Each person owning land to be irrigated by such company must take one share of stock for each acre of land to be irrigated, and such land should be described in his certificate of stock. Good attorneys said that such a company could not be legally formed, but they were mistaken.

The first water company formed under this mutual plan was incorporated in 1875, for the then new settlement of Pomona; but on account of the financial panic of that year, which bankrupted the people having that enterprise in charge, the company went out of existence and other people reorganized the system.

This mutual water company plan was the third stage in the legal machinery plans for the ownership and management of irrigation works. Under this mutual water company plan, the State need not supervise the rates to be charged the people for water, as the people would supply themselves with water at the lowest possible price, for they were simply helping themselves to the waters from the stream, and the mutual water company was the legal machinery through which this was done.

In 1881 the Redlands Water Company was incorporated on the mutual plan basis, and that company is to-day the oldest mutual water company in the State.

Then followed the Etiwanda Water Company, which was incorporated in 1882, and the San Antonio Water Company at Ontario, which was incorporated in 1883.

In 1884 the Riverside Water Company was formed on the mutual plan to succeed the Riverside Land and Irrigating Company, a corporation whose stock was practically all held by two individuals—a corporation that was rapidly becoming bankrupt, that was ruining the fair prospects of that model settlement, and bringing financial distress upon its principal stockholders.

Mutual water companies have usually been formed by moneyed men and real estate operators who would secure a tract of land and a water supply; then they would construct the irrigation system and convey it to the mutual water company, taking the stock of the company in payment therefor. They would then subdivide the land and sell it at a price sufficient to cover cost of land, improvements, the water system, and what they might consider a fair margin of profit. They would

then transfer one share of the water company stock with each acre of land sold, and when the land was all sold the water stock would all be in the hands of the land-owners, who would manage it to suit themselves.

The fourth and last step in the construction of the legal machinery for the ownership and management of irrigation systems in this State was the enactment of the Wright irrigation district law in the spring of 1887, during the great financial and real estate boom that swept over the State in general, and vigorously swept over Southern California in particular, as many of our people have occasion to remember, because of the fortunes made or lost, or because of the fortunes both made and lost.

This district law was built on a solid foundation, after years of study by some of the most competent irrigationists of the State, who had given irrigation laws careful consideration. But a building may be erected on a solid foundation and still be so poorly constructed as to be absolutely worthless.

Mr. Wright presented to the Legislature the best district bill that could be passed by that dual body—a bill that was made weak in spots by the requirements of the State Constitution, and made weak at other points by the unwillingness of the Legislature, backed by the people, to have the State itself take any financial responsibility in assisting the people of the arid sections to create wealth where theretofore there had been nothing but desolation.

One of the weak points of the law permitted unscrupulous speculators to take advantage of the system to enrich themselves at the expense of the public, and this kind of work was extensively done.

If the law had provided that the State should supervise the formation of irrigation districts great good might have been accomplished and the law might have been a blessing to the State instead of a curse. The law might have created a State Board of Irrigation, composed of, say, the Governor, the Attorney-General, the Secretary of State, the State Treasurer, and a State Engineer. The duty of this board should have been to examine carefully all applications for the formation of irrigation districts. Such a board could have passed upon the character of the land to be reclaimed, the water-supply, the cost of constructing the works, the engineering questions connected with such construction, and the advisability of such works from a business point of view. If the application were approved, the voters of the district could vote on the question of forming the district. A qualified voter for such an election should be a land-owner in the proposed district, and he should be allowed to cast one vote for each acre of land owned by him within the proposed district. When it comes to the issuance of bonds, the State Board should fix the amount and then submit the question to the voters of the district, the same as the question of organization was submitted.

Before such a law could be enacted, the State Constitution would have to be changed.

If the bonds were voted, the State could then sell its own bonds and then buy the district bond issue. Three per cent State bonds could be sold at par, and $3\frac{1}{2}$ per cent district bonds could then be purchased by the State, and the State would thus receive one half of one per cent on all district bond issues for its work of managing or supervising the affairs of the irrigation districts and financing their bond issues. In this way the district would save 10 per cent on the sale of the bond issue and $2\frac{1}{2}$ per cent interest each year.

One of the weakest points of the law as enacted was, that the construction of irrigation works reaching up into hundreds of thousands of dollars was placed in the hands of men entirely unfitted for such work; for, as a rule, only men of very limited means and more limited business experience were usually to be found residing on dry claims which must be irrigated before they could produce a living for a family.

Another weak point was found in the law in the fact that the heavy burden of taxation had to be met by these poor men who only owned poor, non-productive, dry ranches, that were worthless without water, before these worthless ranches could be made productive or before portions of such ranches could be sold.

For these reasons most of the districts formed have been failures, and have passed out of existence; a few have compromised their indebtedness, some have been declared illegally organized, a few are yet working their way through the courts, and an occasional one, under favorable conditions, has met with moderate success.

The mutual water company system, formed under the general incorporation laws of the State, is the only form of irrigation system ownership left to the people of California to-day that is worthy of public confidence and adoption. This law is flexible and can be suited to all conditions that may be encountered, while the Wright district law is non-flexible, and must be followed to the letter or its securities are of little or no value, and its very existence is jeopardized. Nearly all the irrigation systems of Southern California are to-day in the hands of mutual water companies.

As an indorsement of this mutual co-operative system, it is a noted fact that the United States officials connected with the geological survey having in charge the preparatory work of constructing irrigation systems for the Government, when they were looking over the entire irrigation interests of the United States, in order to find a perfect system from which to make a model to place on exhibition at the St. Louis World's Fair in 1904, selected a system here in Southern California owned and operated by a mutual water company, thus giving governmental indorsement to this plan of co-operation as against all other systems adopted by the various States of the arid West.

Notwithstanding this fact, strenuous efforts have been made recently to make radical changes in our irrigation laws, so as to make them conform to systems of other States not so desirable as our own.

Radical changes in irrigation or any other laws are to be avoided at all times, but especially should they be avoided when no improvement is made by the change.

The laws of California touching on irrigation matters are not perfect by any means, but we have the basis for the best system in the world at the present time, and all that we need is to perfect that system.

If California had a clear field in which to commence work—if all the land belonged to the Government and there were no people here to secure vested rights—so that we could start from the foundation and build up, it would be different; but it must be remembered that every step taken to-day in the way of a radical change in our irrigation laws runs up against vested right snags at every turn.

To illustrate: In the early history of the State, the old law of riparian rights—which was a beneficial law in a country like England, but which is not applicable to an arid country—was made a part of the law of the State of California. Under a rigid construction of this law, there can be no such thing as irrigation, because under that law all water taken from a stream must be returned thereto again undiminished in quantity and uncontaminated in quality. Under that law, extensive rights accrued, so that it was impossible to repeal the law, only so far as streams were concerned on which rights had not accrued.

If the irrigation public would devote their time and attention to the perfection of the system which we now have, and which has proven so beneficial and so nearly perfect in its application to our needs, instead of trying to wipe out this system and establish in its place another system that has not proven to be superior, much more progress could be made toward a perfect system.

A great cry has been made in favor of public ownership of irrigation systems. This demand rests on a solid foundation. But what is public ownership? Certainly there can be public ownership without placing that ownership in the hands of the United States Government, or in the hands of the State Government, or even in the hands of the County Government. The people who are interested in a particular irrigation system should own that system. The people of the City of Los Angeles would not want either the County, State, or National Governments to own their domestic water system. The mutual water company system is public ownership, pure and simple. The closer together we can get the ownership and the users of water, the better. If the people of Riverside own the Riverside irrigation plant, through the machinery of a mutual water company, what more public ownership is necessary? No public ownership can be more effectually accomplished under any other proposed plan.

If California would go to work and perfect the mutual water company system we now have, this State would possess the most perfect system of irrigation laws to be found in the world.

A title to the use of water is built on a less solid foundation than is the title to land. Hence, land-owners who have a water right watch with jealous eyes any attempt to interfere with present conditions of the law governing the use of water.

The people recognize, in the mutual water company, a solid system upon which they can rest their rights. They believe it to be possible to make changes in that system for the better, but any attempt to make such changes must be carefully considered, and those making the attempt must know that they are on the right track, or the storm which will hover over their heads will be very like a cyclone, as was the case when the late session of the Legislature attempted to upset existing conditions by the passage of a bill that so thoroughly aroused the business men as well as the irrigationists of the State.

Gradual changes, if wisely conceived, can be made without detriment to public interests, but radical changes should be avoided.

The best advice that can be given to the lawmakers of the State on the change of irrigation laws, seems to be "make haste slowly."

There are to-day about 250,000 acres under irrigation in the five southern counties of the State—Los Angeles, San Bernardino, Riverside, Orange, and San Diego outside of the Imperial settlements. This area includes the cream of this country. It represents the foundation on which our wealth is based; and while there are large interests representing large capital not directly connected with the water systems that have converted these 250,000 acres of desert into 250,000 acres of wealth-producing gardens, still if these irrigation systems were wiped out of existence, Southern California would lapse back into the condition of innocuous desuetude—the condition that existed here before the American occupation of the country.

In thirty years Southern California has grown from 30,000 population to 450,000, and the wealth has increased in like ratio. This wealth and this population have been built on a foundation of 250,000 acres of irrigated land.

It was believed by the general public thirty years ago that the irrigated area at that time had reached the limits of possibility, and that all the waters of Southern California worth using were then utilized.

After increasing in population from 30,000 to 450,000, it is now known that the limit is not yet reached, for to-day irrigation developments are making greater strides than ever before in the history of the country.

During the past three years, one plant—the Imperial Canal System—has been bringing under cultivation and wresting from desert conditions double the acreage now under irrigation in the five southern counties outside of that system.

If the irrigation of 250,000 acres has made Southern California what it is to-day, what will the irrigation of 500,000 acres more do for this country?

Most of the irrigated lands of Southern California between the mountains and the sea—to the extent of 250,000 acres—are devoted to the production of citrus and deciduous fruits—a \$10,000,000 item of oranges annually leading the list—while the 500,000 acres under the Imperial Canal System will be devoted mostly to the production of the great staples of beef and pork. The Imperial Canal country will feed the nation on the substantial, while the coast valleys will furnish it with the delicacies.

Not only is the Imperial Canal System adding this vast area to the productive soil of the country, but the United States Government, stimulated by the success of the Imperial Canal System, has undertaken to utilize a portion of the waters of the Colorado River in reclaiming other large tracts of the arid public domain—more than equal to the present irrigated area of this portion of the State—all of which will be tributary to the upbuilding of the five southern counties of the State.

And why should not the Government take a hand in making valuable its own worthless public domain? It has the land and it has the water. It has the financial strength and it has the business ability. It can take an acre of land that is to-day absolutely worthless and a stream of water that is absolutely worthless, and by putting them together, it can produce wealth—can make the acre of land and the acre-foot of water very valuable, ready to assist in supporting our ever-increasing population. After the land and water are brought together, the combination can be sold for more than it cost to bring them together, and the homeless citizen, in search of a place to make a home, will be glad to reimburse the Government in its effort to make valuable its own worthless land.

To-day the Government is selling worthless land for \$1.25 an acre, and the purchaser must go to work and make that land valuable; whereas, the Government should make the land valuable before selling it, and then it would not only give value received for the money it takes from the settler, but it could, if it so desired, get double the cost of the reclaimed land, and still the settler would be better satisfied than he would be to take a chunk of the desert in its native worthlessness for nothing.

THE DUTY OF WATER.

BY T. S. VAN DYKE, OF SAN DIEGO.

In thirty-five years' residence west of the Mississippi I have seen nothing more ridiculous than the financial struggle to get water into the upper end of a ditch for ignorance to throw away at the lower end. While I have done my share toward getting more water, I believe it far more important to learn to use what we have; for the amount used is actually less than the amount wasted, except in Southern California, where we are so poor in water that we have to be stingy with it.

Yet no question is more difficult than the amount of water necessary to perfect a certain crop without waste. It depends so much upon the nature of the crop, the soil, the climate, the tillage, the handling of the water, the temperature of the water, the size of the irrigating head, and the length of time one can have it without interfering with the rights of others on the same ditch, as well as on the rainfall and many other things, that the question is much like asking how much food it takes to feed an animal. Dividing the total area irrigated by the number of inches or feet of water at the head of the ditch bears a painful resemblance to ascertaining the duty of meat by dividing the amount delivered at the back door of our big hotels by the number of guests on the register. Yet worthless as it is, this is about the only way of finding the duty of water in the greater part of the West.

We have far better data in Southern California, though most people could make nothing out of them. The answer can only be approximated, and then only by those who know how to handle the hoe in the field in the intelligent manner that years of painful economy have taught us. For there are too many points to be considered that no one else knows, and engineers generally consider the hoe beneath their dignity.

The question resolves itself into the question of waste. Waste from carelessness or laziness is of too many varieties for consideration; but there is another kind, which is economic waste, or really not waste at all. To insure full wetting in time to allow others to use the water some must run off the lower end of the land, and the shortness of the time allowed the irrigator may make this waste considerable. So the nature of the crop may make it cheaper to waste water than labor, while its value may not justify tight aqueducts as oranges might. Common prudence demands a reserve held for emergencies, which in good years might have to run away unused. For such a place as Riverside to base its supply on what may be required by young trees with an ordinary crop in years of fair rainfall would be very unwise. It should be based on the requirements of old trees in full bearing in a short year. For the crop is so valuable that a shrinkage in such a year would

offset all that could be made out of the water in other ways during the good years. On the other hand, for many low-grade crops the reverse of this policy might be better in many places.

All such waste is intelligent waste and rarely amounts to over 20 per cent, while in Southern California it is generally far less. Ignorant waste is quite another item, and outside of Southern California runs from 50 per cent to several hundred. This also has many forms; such as using more water as a substitute for the cultivator when the ground begins to bake, an old Indian trick to which the average white man fondly clings as long as he possibly can; ignoring the difference between products, and giving grapes as much water as oranges or watering onions like strawberries; and a score of others, like neglecting to grade the ground, trying to force water in wrong directions, etc.

A good sample of ignorant waste may be seen near Albuquerque, where a resident engineer a few years ago estimated the duty of water at a cubic foot a second, or fifty California miner's inches to eighteen acres. This would be about an inch and a half a day of rain measure or acre-inches, or nearly forty-five inches a month. Those who have seen forty-five inches of rain fall in six months on a soil much looser than the fine sediment of the Rio Grande bottoms can understand the impossibility of putting more than one tenth of this amount into the ground, for six successive months. Seven inches a month in most parts of the East and prairie States make a wet summer, and probably not over four inches enter the ground in most places having a clay subsoil, like much of the prairie. If we could have six inches a month in Southern California we would have trouble to get it all in the ground, even in summer and even if we could have it to order. And the proportion of it that would go in would on most all soils suffice for good crops of anything we raise here. One half of it would suffice for more than half of our products, and two thirds would be enough for almost anything but old orange trees in full bearing and alfalfa on some gravelly soils.

This is assuming that the season is started with the ground full of water, as it would be in the East from the melting snows and winter rains. But this is a very violent assumption, even for Southern California. For of all forms of waste to which man seems hopelessly wedded, letting all the water of winter run to the sea and starting the irrigating season on a dry subsoil is the most universal. It is a relic of barbarism that, strange to say, yet survives in Southern California, where water brings the highest price in the world; for while many have learned a lesson in the last few years of short rainfall, there are still many who have not.

This equivalent of six inches of rain or less accords with the practice of our best irrigators. Remembering that so many inches or feet of

water at the head do not mean the same number put into the ground, we find about six acre-inches a month the maximum used for heavy crops of old oranges and alfalfa, while prunes, apricots, almonds, and even peaches rarely get much over two acre-inches. Six acre-inches would be about a miner's inch to two and a half acres. In most years this is more than is necessary, while fine crops of deciduous fruits are raised on one fourth of that and often less. And many a good crop has been raised on three irrigations of only one and a half acre-inches each, the third irrigation being after the crop is picked. This would be a miner's inch to twenty acres. Good crops of oranges have also been had with an inch to ten acres. But on most soils and in most climates it is hardly a safe basis to depend on. We now have more places where too little water is used than places where it is wasted.

The acre-inch or acre-foot, based on rain measure, is by far the most satisfactory way of expressing the amount of water used, and great confusion exists not only from the varying nature of the inch in different States, but because it is estimated not by the actual amount of water delivered on the ground during the year, but by the rate per acre at which it is used during a certain period, called the "Irrigating season," which also varies very much. Thus if a man is entitled to an inch to ten acres, this means thirty twenty-four-hour inches each month, or its equivalent in some form, equaling a foot and a half of rain measure a year, or an inch and a half a month. The chances are that during the six months of winter he let his allowance run to the sea, because he expected the clouds to do their duty. Consequently he had only nine acre-inches left to use for the next six months. This was all he put into the ground from the ditch. But as it was used during that six months at the rate of an inch to ten acres it is called an inch to ten, although if the winter part had been used it would have covered the land a foot and a half deep instead of nine inches. This makes rain measure or acre feet or inches the only clear way of treating the subject. The other is as ridiculous as difficult, if we consider what it would mean if he had used the inch of water only one month during the summer. It would still have been an inch to ten acres, because used at that rate. Yet the amount put on the ground for the year would have been only one and a half acre-inches, or an inch and a half rain measure. Had he used his full right for the twelve months it would have been no more by that measure, though by rain measure it would have been a foot and a half.

In twenty years' study of this subject in many places I have found the estimate of the irrigator very unreliable. The only certain way to find what a man has used is to ignore his water right, or his opinion of what he has used, and find from the water office the amount he has ordered and paid for during the year. See if this tallies with the book

of the ditch-tender who turns him out his water. Get the area under irrigation, not only from the owner, but by your own measurement of his fences or corners. Make an estimate of his run off or end waste by repeated watching of his irrigation. Then, and then only, can you know what amount of acre-feet or acre-inches he has put on the land. Then by considering his cultivation, the skill of his handling irrigating heads, the rainfall of that section, the nature of the subsoil, the temperature of the water, which is a great item little thought of by those not familiar with the hoe handle, you can get an approximate idea of the duty of water. And you must study your own work in the same way. It will be found that the amount of water needed for any crop is greatly overestimated by all but the most intelligent irrigators.

Neglect of the subsoil causes the beginner in irrigation great loss of faith. It is the most common of all errors, especially on the desert, where it is of the most importance. Nearly every one leaves the ground dry until about ready to plant, then wets a thin skin of soil on top of an ash heap dozens of feet deep that has not been wet for centuries, plants seed in this, and then says you have to keep pouring water on all the time to keep things alive. That is not the worst of it, for if that pouring is neglected even a day the plant may fail in very hot weather. If anything fails on a dry subsoil it is very hard and often impossible to revive it after it wilts a little. But with a wet subsoil it will not only go long without wilting if the top soil becomes too dry, but it will stand days of wilting and then revive and go ahead with little injury.

With this subsoil in proper condition there is no such increased quantity of water needed as one would imagine on the deserts. In the hot, dry air of the Sacramento Valley the great crops of deciduous fruits are grown almost entirely on the water stored in the ground by the winter rains. And most of this is in the subsoil. If that were dry it would sap the moisture from the top soil downward as fast as the sun and wind sap it above. But if the top soil is well cultivated the subsoil actually supplies moisture to it. For the past two years I have been trying to work out a problem on the lower Mojave River, on which nine different hard-working settlers failed. I have had my share of tribulation, but none of it from miscalculation about the duty of water. I was told I would have to sit up nights to pour water on the things fast enough. Yet last year I raised as fine melons as can be seen anywhere with a ten-hour run of water once in two weeks, although the thermometer was at 110° almost every day, and for days at a time at 115° inside the largest buildings, with a hot wind blowing at about double the velocity of the seabreeze on the coast and not a particle of dew at night. Yet not a leaf wilted, although melons in the gardens at Daggett, on the same soil, less than a mile away, and watered every day, wilted, failed to bear, and even died. The difference was that those were merely

sprinkled on a dry subsoil. Mine were planted in ground that had been gridironed with small streams for weeks. They were then left three weeks without water to force them to deep rooting. They were then watered once in two weeks with a deep furrow two feet or more away. At the last irrigation the water was allowed to run twenty-four hours, the weather being the most intense and continuous hot spell of the summer. In less than a week hundreds of melons were cracking open, and in another week hundreds more were decaying from the inside.

I found it much the same with other things; but too strong conclusions must not be drawn from such instances. There are some subsoils that will not reservoir moisture well enough, and there are trees and plants that are tremendous evaporators of water through the leaves in hot weather. But the principle holds wherever it can be applied, and thorough soaking for many feet before anything is planted will greatly reduce the amount of water needed afterward. If it brings up alkali, the sooner it comes the better, for it would come in time if you wet the ground enough for good success. This may be very important where your summer water is very cold. By filling the ground when the ground itself is cold and nothing growing you do no harm. But by waiting until things are ready to grow and then applying cold water too often the ground does not recover enough from the chill. In the mountains it is a common sight to see corn thus ruined. I have seen it so kept back with mountain spring water that it never tasseled, although having plenty of warm weather and planted early enough.

The use of deep furrows made with a subsoil plow is a great help in increasing the duty of water, but this is not subirrigation proper. In subirrigation the water is all delivered below from openings in pipes. Without a very expensive plant these openings will be so far apart that you never can be certain of wetting all the ground, or of wetting any of it evenly. The movement of water underground, even in gravel, is very irregular and can not be ascertained by tests in boxes or anything of the sort. Unless the wetting is uniform you have limited irrigation, too much like irrigation with small basins around the tree or with one furrow to a tree. If you can do no better, this may do better than nothing. But it is generally better to go where you can get plenty of water, for you will rarely get water to do full duty when limited to only a part of the soil.

PRESIDENT COOPER. The essays that you have just heard read are now before the Convention for discussion.

DISCUSSION ON THE GROWING OF ORANGES.

MR. GRIFFITH. I want to ask Mr. Hofman whether the growing of peas or growing of green fertilizer has any effect upon the puffing of oranges?

MR. HOFMAN. I am sorry to say I have no information to give on that subject. I have not heard the puffing of oranges mentioned with green-manuring, and I would be as interested in that as anybody.

DR. WOODBRIDGE. I think there has been some confusion on that subject. I believe there is no connection at all between the growing of a green crop and the dropping of the orange, but there is in plowing at the time when the trees are in blossom. I think it is a fixed fact that if the orange orchard is plowed while the trees are in blossom, the fruit will drop, especially if the plow is run deep and the spongy roots are cut off.

MR. GRIFFITH. I didn't refer to the dropping, but to the puffing of oranges. I noticed in an experience of my own that in an orchard where I had no weeds of any consequence the oranges didn't puff much, while in another, where the weeds grew ranker, I had puffy oranges.

PROFESSOR COOK. Mr. President, I wish to say that some of our very best cultivators think they do see a relation between puffing and very heavy applications of stable fertilizer. I do not think anybody knows it yet, but some of our very best men believe it. If true, it is owing, undoubtedly, to an excessive amount of nitrogen in the soil. If that is the case, why wouldn't a very heavy application of green fertilizer bring about the same result? In this connection I wish to state that I think that what Dr. Woodbridge has spoken of is a very important matter. I saw the same thing that he spoke of, and that is the danger of putting in your green crop too late and plowing it under too late. Last October was too late to put in a green crop, because the winter was very cold, and where crops were put in so late as that, if they were left to full maturity, March or April, it was altogether too late to put in a green crop.

A MEMBER. Why was it too late?

PROFESSOR COOK. As your tree has blossomed fully, and just as the fruit is setting, the roots ought not to be disturbed; and if you plow it under at that time you are almost sure to break in upon the tree nutrition which is necessary to set a full crop of fruit. I think there is a point there.

I wish to speak specially of one paper which I was glad to hear, and that was the paper on the dairy in connection with the orchard. I am somewhat of a crank on that subject; but when our agriculturists, our best men, tell us that alfalfa has \$8.50 of value as a fertilizer in every ton—and that is backed by our Government—and when they tell

you that bran has a value of \$11, and when you know that by the purchase of those and feeding cattle and doing it wisely we can make money on it—for people are doing it—then certainly this is not simply visionary. It is something that all ought to heed.

DR. WOODBRIDGE. Now, in regard to the puffy oranges. I want to say that I never have analyzed a puffy orange that has not had the maximum amount of sugar in it, which shows that it was ripe at the time it was puffy. And I remember hearing Mr. Charles Chapman say, in a paper he read before one of the institutes some two or three years ago, that the time to market oranges was when they were ripe. If you will take an orange from a tree that has puffy oranges on it, you will find, as I have done in over a hundred instances, that the puffy orange has more sugar in its juice every time than has the solid orange that is not puffed. Therefore, I think, although I am certain that nitrogen will hasten the ripening of an orange, it will cause it to puff sooner.

PROFESSOR C. R. PAINE. Outside of your test, when you come to taste a puffy orange, do you not always find it more insipid than any other orange on the tree at the same state of maturity?

DR. WOODBRIDGE. I am judging entirely by the polariscope.

MR. PARKER. I tried the experiment some years ago, upon a little piece of orchard, of watering my trees regularly from September right through the last part of the growing season, so that the ground was not dry at any time until after the main rains came in the fall. I kept irrigating up to that time. And I found that I had scarcely any puffy oranges on that little piece. I think that where the sap stops and checks for a period of time, from any time in September on, and then starts to flowing again, that is, when the spring growth starts in February, the sap goes into the orange quite freely, and that is what is the cause of the puffing.

MR. KRAMER. There is a certain law of nature which I think bears upon this question. Weakness causes overgrown fruit, the same as it is the cause of small fruit. No matter what causes the weakness, it makes the fruit overgrown or too small. I have found out that a good many orange trees when they were only slightly eaten by gophers produced an enormous sized fruit, but when they were very badly barked it was a matter of oranges small in size and full of seeds. So, as we all learn in botany, there is this law that it is weakness that causes overgrown fruit and it is weakness that causes small fruit. Every fruit tree has got to be properly cultivated and have every proper condition of the climate and soil and everything right, in order to have the fruit in perfect condition.

MR. BERWICK. That only puts the question one step farther back. Suppose that is true; then what is the cause of the weakness? I have lived quite a long time in California, and I recall the time when we

were told regarding bone fertilizer—that bone was the best thing for us as a source of phosphoric acid. Only about three years back they reversed that, and told us that bone was of no use for phosphoric acid, but was only useful for the nitrogen in it. Now, regarding this barnyard manure. We have been told for quite awhile that it was not any good except for humus. Now we are told it causes too much nitrogen and puffs the oranges. I want to know regarding these things. I want no dubious words brought in, such as “weakness,” because weakness means nothing. What causes weakness?

MR. KOETHEN. I have been studying this question for quite a time, and I have come to the conclusion that it is not only one thing that may produce puffiness, but that anything which will produce a weakness in the tree at any time during the development of the crop may produce puffiness in the orange. For instance, if an orchard goes along through the summer and a portion of it is allowed to become dry, you will find invariably that that portion of the orchard will show puffiness that winter.

MR. BERWICK. We are getting more definite now, and I am glad to see it. Because I asked a question and wanted to know what about barnyard manure. Scientists one day say, “No, there is no nitrogen there to amount to anything”; the next day they say there is lots of it there.

MR. REED. I think this matter with reference to puffy oranges was up at our first farmers' institute in Southern California, and has been up since. I think we are farther away now than we were then. At the time of the first farmers' institute I had two trees where there was plenty of nitrogen from the stable, and I was sure the oranges therefrom would be no good; and sure enough they were puffy next year. I was satisfied that stable manure made oranges puff. For the last few years those trees have been in the same condition and have raised good crops ever since. The last year I have had two trees that had no fertilizer whatever. They were so situated that we could keep the soil about them well mulched, and they had plenty of water; but we did not fertilize them. Those are the two trees that had more puffy oranges than any other trees in the orchard. I have no idea of the cause of it. I believe the discussion of these matters will go on in this way indefinitely until we make some provision for a definite, accurate, and careful investigation by experts. I believe that if we had been trying to secure this sort of work we would have made some headway by this time. I doubt whether this way or that way of treating the orchard for puffy oranges, split oranges, black spot, and gum disease will accomplish very much except an expert will come into Southern California and take charge of an orange orchard and have perfect control of it through years of experience, watching these troubles carefully and thoroughly and persistently.

MR. DORE. Mr. Chairman, it appears to me that the gentleman who has addressed the Convention might spend a little time in drafting a resolution asking from our General Government and Secretary of Agriculture just that kind of work here; and when this body shall ask for it as a body, we are quite likely to receive consideration and attention. There occurred to me during the afternoon a few questions that I would like to ask. I want to know this: Is this trouble increasing in the orange-growing district of Southern California?

MR. REED. Not to speak of.

MR. DORE. It has always been with you to a greater or less extent?

MR. REED. Yes.

MR. DORE. One question that has aroused my curiosity. I have been studying the orange business a week or so. What proportion of your oranges are afflicted with this unaccountable disease so as to destroy their value?

MR. GRIFFITH. In answer to the question of the gentleman, and also in answer to the causes of puffing, I want to say the matter of the percentage of puffing is a varying quantity. This year there are more puffed oranges, I believe, than there were last year.

MR. DORE. More frost, wasn't there?

MR. GRIFFITH. No, I think not. There was more frost last year in my orchard than this year. Now, the cause of puffing is something for which I have never found a reasonable explanation. In my orchard men have marked trees that got dry and hot, expecting to find puffy oranges, yet didn't find any. I had puffy oranges this year on land where not a pound of fertilizer of any kind had been put for two years. There are two points, to my mind, eliminated from the puffing of oranges. The orange trees bore very heavily this year, and this year the oranges puffed more than last year.

MR. DORE. Can you suggest anything in which this season differs from last season?

MR. GRIFFITH. It has been a chilly and damp season. More water has fallen this year than usual, and there has been more chilliness and coldness in the atmosphere.

MR. DORE. Then, might not cold and wet be the inducing causes?

MR. GRIFFITH. Possibly. Yet I have known this same puffiness to occur in the dry seasons that have preceded the last two or three years. This season, however, it seems to be somewhat more pronounced. I don't know that the cause can be controlled. I sometimes think it is because of the irregularity of rainfall, because the rainfall comes at a season when it ought not to come; and sometimes I think it is because we let the ground get dry and then water again. Some of my neighbors say, "You must keep your orchards absolutely wet all through the fall, and then the fruit won't puff." One of my neighbors who told me that

has puffed oranges, too. There are two things connected with it which I don't understand and which I have tried to find out. This year we had very few cracked oranges; some years we have a good many—10 per cent, I think, last year. This year I doubt whether there was 1 per cent. But the puffed oranges this year will be more than there were last year. There are two things I don't understand. Why does the inside of the orange grow too fast for the outside, causing the skin to crack? Another year, later in the season, the skin commences to grow and the inside stops, and then there are puffy oranges. While our puffed oranges are good and sweet, they will not ship to market; they will decay.

PRESIDENT COOPER. You gave the percentage, as you supposed, of the cracked oranges?

MR. GRIFFITH. Last year we had 10 per cent.

PRESIDENT COOPER. What would be your estimate of the puffy oranges?

MR. GRIFFITH. It depends what season the orange was picked in. In February, no puffy oranges; in March, perhaps 15 per cent. In the next thirty days they puffed rapidly. Puffing commenced after the first of March, and it proceeded with a rush.

MR. CRAMER. I would like to say that excess of moisture will cause puffy oranges. If you try to grow oranges along the coast, in a damp climate, you will raise nothing but puffy oranges; so that it looks like excessive moisture is too much for the trees and causes them to have puffy oranges. Probably the lack of moisture will cause them to crack, too.

MR. DORE. I want to ask another question. I want to know how much soil is required for the best development of an orange tree?

PROFESSOR PAINE. This question is a good one. There occurred in my experience, in the last weeks of December, a year ago, and in January, an instance in my own orchard, or a chance, in the laying of a pipe, for very careful measurement and observation. The orchard is laid out on the equilateral triangle system, and in the laying of this pipe the trench was cut to a depth of 30 inches, and about $4\frac{1}{2}$ feet from the trunks of the trees. The line was a quarter of a mile long, and there was a chance to observe very closely the effect of the cutting of the roots of those trees. The pipe perhaps passed within 2 feet of some of the trunks of the trees. I think some of the roots of the seedling trees that were cut off were as big as my leg, many as big as my arm. I know of only one tree that seemed to wilt. The growth of the trees didn't seem to be at all affected. I drew my conclusions by walking along the row of trees cut and comparing them with the row on either side. The crop of this winter was the one to judge by, and I must confess that I was surprised to see that there was no apparent difference in the result from those three rows. And I concluded that as cultivators

we need not be careful of cutting roots in a damp winter season; and I have satisfied myself that I don't need to be extremely careful, in subsoiling with a plow, not to disturb the roots.

MR. HOLT. I would like to give an experience of an orchardist in Orange County on the subject of the cutting of the roots. He had an Australian Navel orchard that bore but lightly, and he had become so disgusted with it that he had concluded to cut it out. He didn't have it cut out that spring, so he thought he would plow the orchard and try it one more year. Just then a man came along, a stranger, who wanted to work on his farm, and he hired him. Having to leave home for a few days, he told the man to plow that orchard, but not very deep. When he got back he found that the man, who had a very large, heavy team to work with, had run the plow in clear up to the beam, over the whole piece, and the whole orchard was full of roots which the man had plowed up; he had torn the roots all to pieces. He was very much provoked and paid off the man and shipped him. That year he had a large crop of oranges from that orchard, where he had never had a good crop before, and he was so well pleased with the result of the plowing that he sent off and hunted up the man and brought him back and hired him and apologized for discharging him.

PROFESSOR PAINE. What time of the year?

MR. HOLT. In the winter time.

MR. PAINE. Before blossoming time?

MR. HOLT. Yes, sir.

MR. BLANCHARD. When I came in, this question of puffy oranges was being discussed. I supposed all knew that an excess of nitrogen would puff oranges. There may be many other things that will puff them. A later question was asked as to the depth of soil. The soil on which I planted my trees is very, very deep. Practically, there is no bottom to it. But it took the trees fourteen years to bear a paying crop. Some of the same trees, planted up the cañon where there was very little soil, and they were seedling trees, bore in a very few years, but their life was very short. Our cañon is a rocky one. I have noticed that the orchards in some instances failed, and one seedling orchard, quite an old orchard, has been dug up. I think the reason has been in part because the roots had got down into the rock, onto the barren soil.

MR. REED. If we cut a root as much as has been indicated here, we damage the tree. If the root of your tree runs out 20 or 30 feet it is covered with fibrous roots through which the tree gets nutriment, and if we cut it, it seems to me we take some of the nutriment from that tree. The matter of subsoil plowing came up in Riverside Valley three or four years ago. It followed the matter of the hardpan. The orchardists claimed that they could not get water down. Hence the

subsoil plow came into use and for two or three years it was used considerably. Two years ago there were two different gentlemen came to me and wanted me to see what was the trouble with their orchards. Two of the finest orchards in the valley. They were in very bad condition. I knew nothing about the treatment until afterward. Each of those orchards had been plowed from 16 to 18 inches both ways with a cutting subsoil plow. The owners, both of them, acknowledged that they believed that that process damaged those ten acres of orchard at least \$1,000 for that year. The one that was damaged the most has had very little fruit on it this year. I will simply state further that while the process of deep-root cutting was quite popular three years ago, the next year it was less popular, and last year I know of but one instance in our valley where deep-root plowing was used to any extent, and that was by Mr. Mills. I don't know of another instance where the plow has been used in the last twelve months. But it is not a matter of opinion. Out from the tree are running in every direction these roots, some of them 20 or 30 feet away, and the fibers are at the other end.

MR. STONE. I should like to give a reply, as far as I can, to this gentleman on my right, as to the depth of the soil. I have several kinds of soil on my place, from heavy to moderately light and very light. The moderately heavy soil I suppose would be about 10 feet deep, and the light soil would be, some of it, not more than 2 or 3 feet deep. I see very little difference in the growth of the trees, and I think it is generally accepted that the fruit from the trees on the light soil is better than the fruit from the trees on the heavy soil. I know of an orchard not far from my own where it is so rocky that there are, between the trees, rocks jutting out of the ground as big as a man's body. And it has good trees and fine fruit.

MR. KOETHEN. I have a resolution I would like to present, partly prepared by Mr. Reed, as follows:

Resolved, That it is the opinion of the Fruit-Growers' Association at the twenty-eighth annual State Convention, that the time has come when the citrus fruit interests of this State demand the assistance of either the State or Federal Department of Agriculture in the investigation of diseases and cultural methods of citrus trees.

PRESIDENT COOPER. That will be referred to the Committee on Resolutions, under the rule. The orange question has been pretty fully discussed. Suppose you take up that of irrigation.

DISCUSSION ON IRRIGATION.

MR. STONE. With regard to irrigation, there have been so many theories laid down, and some practices explained, that we are still left very much in the dark as to what is the best method of irrigation—basining, or shallow furrowing, or deep furrowing. Now, I remember hearing, not long since, of a gentleman who just had one furrow in the middle of his rows of trees. I presume they were from 20 to 24 feet apart. And he had a deep furrow—I think it must have been something like 16 inches, from 12 to 16 inches—one furrow only between his trees, and he ran the water in that furrow, and declared himself perfectly satisfied with the results. Now, there are some other methods. There is the subsoiler in use, which is very much the same thing, except that the water is not so much exposed as it is in the running stream. Now, I tried a subsoiler in my orchard of lemon trees. They were really wanting water, and showed that they were, and I determined to try them with the subsoiler. I never saw trees respond to the treatment of water as they did on that occasion. They responded very rapidly to it, and I have never seen any injury arising with reference to the destruction of some of the small roots of those trees, which roots undoubtedly were destroyed. Then some others use shallower furrows, perhaps not over 6 or 8 inches deep, which I have practiced myself, each side of the trees, and sometimes two on either side of the trees. That would be four in a row. If there is any gentleman here practicing that system of one deep furrow I should very much like to hear his experience with regard to it, because it means a very much less expense to those of us who have to irrigate our orchards.

MR. HOFMAN. In that little talk of mine I tried to tell you of an experiment or investigation I made along those very lines. Water which had run thirty-six hours had penetrated more than 7 feet. Seven feet is quite a depth when you dig the hole yourself. And it had also spread laterally $4\frac{1}{2}$ feet to each side of the furrow at a depth of 5 feet. Of course at the top it was the width of the furrow. At 5 feet it had spread $4\frac{1}{2}$ feet each side of the furrow, which would be 9 feet for one stream at a depth of 5 feet.

MR. BOARDMAN. I live in western New York. In central New York we cultivate fruit to quite an extent—grapes, apples; no oranges, of course. But I want to say one word in regard to the digging of a ditch near trees. I have twenty acres of orchard about twenty-five or twenty-six years old. I commenced at the upper end of the orchard. I wanted to draw spring water to my barn, and I dug a ditch about $2\frac{1}{2}$ feet deep, from the upper end of the orchard, when the trees were about twenty years of age. We ran diagonally through the orchard, and the ditch was dug close to a good many apple trees. And I found this

result. The first year I think there was fully as much fruit on the trees where we had cut off the roots as there was on trees anywhere else in the orchard; as much as usual; but after that there was a loss. That was ten years ago. And I don't think the trees have caught up in their bearing where those large roots were cut off. Now, we have about 22 inches as the average rainfall, winter and summer, in our climate. Most of my orchard is drained. We drain with tile 28 feet apart, 3 feet deep, and we keep those tile drains open at both ends, and there is a current of water usually through that tile, especially in the summer, when we notice it more particularly. And we cultivate and keep a dirt mulch 2 or 3 inches deep upon the surface; and with that and the irrigation from that tile drain, which is open at both ends, we think we get an abundance of moisture, except perhaps in the very driest of times. And it strikes me that that is something very like your irrigation. But we notice that where we have built tile drains 28 feet apart and open at both ends we do not suffer very much with drought in the driest of summers.

PROFESSOR PAINE. I want to speak on the matter of irrigation, the subject President Cooper assigned us, and state some practices of mine that relate both to surface irrigation with ordinary surface furrows and subsoil furrows at the same time. I do not like to cut the roots deeply in growing times, so I make my subsoil furrows quite near the center. I frequently make, near the center, about 3 feet apart, two subsoil furrows, from 12 to 14 inches deep. In that way I think I injure the growing roots as little as possible. And in preparing the ground for irrigation, at the same time I am going to run water through the subsoil furrows in the middle, I make two other furrows nearer the trees. So that all in all there are six furrows in the tree space—two of them near the row of trees and two in the middle. The object of so doing is that the subsoil furrows may provide water to tide over from one irrigation to the other, provided I don't come to them at the right time and provided I have not given them sufficient water and evenly distributed it. And I find it is effective in that respect. But I know that in the line of a row, from tree to tree, there are a good many roots near the surface which I think do not get water from the percolation from the bottom and from the low depth of these subsoil furrows, and I therefore provide those four furrows near the line of the trees to wet the roots along the line of the rows, both about the trees themselves and in the space from tree to tree. And I think that in that way I provide for the greater part of the root surface as well as can be done by surface irrigation at all. And it works very satisfactorily.

MR. WEEKS. I don't know whether Mr. Stone referred to me or not when he spoke of irrigating in a single furrow. But I have irrigated that way for some time. I don't irrigate in deep subsoil furrows, but in

shallow surface furrows—a single furrow in between the rows of trees. In setting the old seedling trees about twenty years or more ago they were placed about 28 feet apart. Then later, when I budded over to Navels, there was a small Navel tree set in the center of the four. That brought them 14 feet apart—7 feet from the furrow. And the water is run in that furrow. Before I had my own water I used to run it two days—twenty hours. Last summer I ran it forty-eight hours without stopping. I like this method very much. I was forced to it in the first place. After plowing-under my green crop my ground was very rough. I could not make shallow furrows and carry the water. I had been in the habit of making three. I said: If I run the water in three furrows one day or in one furrow three days I would put on the same amount of water. So I thought I would reach it in that way. I like it for several reasons. One is it saves the trouble of covering up the wet ground. I don't get much wet ground—a little on each side. If I turn the water off to-night, to-morrow morning I run alongside of it on the side where the furrow has been thrown up with a plow and throw that loose dirt back on the wet ground. Three days after that I run the cultivator through any depth I choose. I have had very good success running the water in that way. As a proof of it, the first year I started to do so I had some young trees that had been set the fall before; that is, they were nine months old. That was three or four years ago. That summer those young trees got no other irrigation except that single furrow, and they did splendidly and grew well. They made a strong growth and continued to look in fine condition throughout the season. So I take it for granted they are getting water enough. I have all kinds of soil, from the very lightest ash-heap to an adobe that will bake pretty hard—not the worst kind, but brown adobe. I have used the same system in all, and have had good success in all. I prefer, though, for oranges, a deep soil. While it is a little slower to start with, in my estimation you get a much finer and stronger growth and a much healthier tree.

MR. STONE. That seems to me to be a thing worth threshing out. If it is enough for us orchardists to plow one furrow between our trees instead of three or four, it is saving us a lot of labor and a lot of money, and that is what we are all after. If there is any other experience that will confirm this, I should be glad, Mr. President, if you can extract it.

MR. WEEKS. One word I didn't mention. I have found after irrigating in a single furrow and forcing the water down that way and having it disappear entirely, that if you take a shovel and dig down anywhere—and where there is no hardpan at all—you will find moisture when you get down a short distance. The soil was not dry around the trees. It was moist under the surface. It saves a large amount of weed hoeing in summer.

MR. BERWICK. How often do you apply water?

MR. WEEKS. I irrigated last season three times. The first irrigation was a very long and heavy one. I irrigated on twenty-one or twenty-two acres, equal to one hundred and fifty ten-hour days. But we had had three very dry years and I hadn't enough water. But I had my own system that time and I put it on for keeps.

MR. BERWICK. Have you stated how long the water stands in the ditches after you irrigate?

MR. WEEKS. Last year I used it forty-eight hours, two twenty-four-hour days.

DR. WOODBRIDGE. I was going to say that on my small orange orchard on Buena Vista street, an acre and a quarter of trees, twenty-six or twenty-seven years old, they are 21 feet apart, which makes them on the quincunx 15 feet apart; and they have been irrigated only with one furrow for the last three or four years. I subsoil nearly at right angles to the way the water runs.

MR. HUTCHINSON. In our county, Fresno, to irrigate with as little water as you people do, I think we would get very little fruit. We have plenty of water there and we put it on. At the lower end of the ditches it has got a little too much for us, and the water is rising there and it has got very near the surface. But I have tried irrigation in the rows the way you indicate, between the grape roots, which are only 10 or 12 feet apart. But we find that it is better to run closer, next to the vines. We let the water in, and sometimes it runs in one place; where it comes out it may be on for three or four days, and the other places about twenty-four hours; and we find that we don't have any too much water; we are ready to irrigate again in about six weeks.

MR. BERWICK. On that land where your water table stands so high, do you still irrigate?

MR. HUTCHINSON. No, sir; we are draining instead.

At this time a recess was taken until Wednesday, at 9:30 A. M.

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, May 6, 1903.

Convention called to order. President Cooper in the chair.

CURING AND MARKETING OF LEMONS.

BY C. C. TEAGUE, OF SANTA PAULA.

The past year has marked one of the greatest, if not the greatest, strides that has been taken in the lemon business since the shipping of lemons from California has assumed anything like commercial proportions—a stride that has been a complete revolution of old methods and one that is destined to have a far-reaching effect upon the future of the business. I refer to the open-air method, as it has been termed, of holding and curing lemons.

Unfortunately about 75 per cent of our lemons are gathered in the winter and spring months, and up to last year the experience of our growers and shippers who had attempted to hold their fruit until the summer months had been so disastrous, on account of the heavy decay, that they had concluded that the most profitable way was to ship the fruit within from four to six weeks after gathering. The result was that the fruit was not equally distributed throughout the year, and at times the market would be so glutted that the shipper would get "red ink" for his shipment. Not being able to hold his lemons when the market was low, and having only a small percentage of his crop in the summer when the price is usually high, one can, perhaps, imagine how the lemon-growers' books have been balancing at the end of the year, and will probably be able to answer the question often asked, Why are so many lemon groves being budded over to oranges?

The old style lemon house, and the one still used by many of our growers, is a double-walled, double-roofed affair, some of them having patent systems of ventilation, and others depending simply upon doors and windows. When attempting to hold lemons by this method, they are massed in the house and the fruit just picked given exactly the same ventilation as that which has been in the house several months, when, as a matter of fact, lemons in different stages of curing require radically different treatment as regards ventilation. As a result of this treatment some of the fruit is usually wilted from receiving too much air, while the greater portion of it is badly decayed from receiving too little.

Proper ventilation is the keynote of success in keeping lemons, and after extensive and expensive experience along the old lines I assert that it is entirely impractical to hold lemons in large quantities, for any great length of time, by the old method. We have all been on the wrong track in believing a low temperature first in importance. If the ventilation is right, the temperature will take care of itself. I have often said that the proper keeping point for lemons is just that point between where they will wilt and where they will sweat.

The Limoneira Company of Santa Paula was the first to equip a house on the open-air plan, and as that company has the most extensive plant and the widest experience in this method, perhaps a description of its lemon house and its methods may be of interest.

To begin with, the lemons are very carefully picked, great care being taken in handling so as not to bruise the fruit. Rings $2\frac{5}{8}$ inches in diameter are used for winter picking and $2\frac{1}{4}$ inches for spring and summer, never more than six weeks being allowed to elapse between pickings, and the fruit is usually picked about once a month. By careful attention to this, desirable sizes and good keeping stock are obtained. I want to say right here that this is the weak point of over 90 per cent of the lemon-growers of California. I have just returned from a tour of the principal lemon-growing sections of the State, and I found, as I have always found, that the carelessness with which picking is done is almost criminal. In grove after grove which I visited at least 50 per cent of the value had been lost by allowing the fruit to hang on the tree too long. Not only on account of large sizes would it have to be discounted 50 cents per box, but the keeping quality of the lemon which is allowed to mature on the tree is never good. Good results can not be obtained, even by the best methods of keeping lemons, unless the fruit is picked at the proper time and carefully handled. A little illustration will, perhaps, be in point.

Some time ago I visited one of our Southern California packing-houses, and they happened to be getting out a car of lemons at the time. I noted the rough, careless manner with which the fruit was being handled, and spoke to the manager about it, remarking that our fruit would not stand that kind of treatment, and asked him if he did not have trouble with decay. His reply was that they had practically no decay, and that their fruit was giving fine satisfaction. Before leaving, I took note of the car number and watched it in my bulletin. When the car arrived East, 25 per cent decay was reported.

The Limoneira Company's house is 300 by 100 feet. The flooring is 2-inch planking, and the roof is covered with gravel paper roofing. The building has no sides whatever, allowing free circulation of air. The fruit for storage is put into regular shipping boxes, piled in blocks of 560 boxes. There is a double row of these blocks on either side of a

20-foot space which extends the entire length of the building, and which answers the double purpose of a work room and an air space. The boxes are so piled as to permit of the circulation of air around each box. Each block of fruit is covered with a canvas 10 by 10 by 20 feet, made box shape and open at the four corners. The ventilation is controlled by the raising or lowering of this canvas, and each block of fruit can be given exactly the ventilation that it requires, irrespective of the other fruit in the house. By this method, fifty or even one hundred cars of fruit can be handled and kept in as good condition as if there was only one. Each block being numbered, a complete record of the lemons from each of the six sections of the ranch is kept from the time they are picked until shipped. The fruit is washed in a lemon-washing machine, and is piled up in the house wet just as it comes from the machine. The canvas covers are not dropped over it, however, until it is thoroughly dry.

The Limoneira Company handled over one hundred cars by this method last year with perfect success, some of the fruit being kept for nearly six months in good condition. Not a lemon was shipped under ice, and no allowance was allowed nor claim made for decay, excepting on one car which contained weak stock and which by reason of a mistake in transportation was nearly a month in transit. In this case 5 per cent deduction was allowed. There are, at the present time, about sixty-five cars of lemons in the company's packing-house, and we do not feel the least uneasiness regarding it, knowing that by this method we are masters of the situation. Any one trying to handle that quantity of fruit by the old method would be gray-headed in a single season.

We hear a great deal of late about sending our lemons East as soon as cut, there to be held in cold storage for a favorable market. I must say that I have no faith in that plan, and the following are a few reasons why I think it impracticable:

First—The lemon when picked and handled properly should stand shipment to the Eastern markets without ice, and the ventilated lemon that arrives in good condition invariably gives better satisfaction than fruit that has been iced. True, sometimes fruit that is a little weak can be iced and be made to arrive in fairly good condition, and will, perhaps, sell well; but what does it do when taken out of the low temperature of the car and subjected to the hot humid atmosphere of the East? It decays and goes in as evidence that California lemons are not good keepers. I believe that the keeping qualities of hundreds of cars of California lemons are injured every year by icing. In the early summer months a few cars of lemons will, perhaps, arrive in bad condition and the order will be sent out, "In the future, ice your cars," and the shipper immediately goes to icing, regardless of whether the fruit to be shipped is hard, good keeping stock or not. If it is bad practice to refrigerate

fruit in transit, it is certainly not good practice to put it in cold storage after it arrives in the East.

Second—To be successful in the lemon business means eternal vigilance as to care in handling so as not to bruise the fruit. When we who grow the lemon and are so deeply interested in having it handled properly have such difficulty in securing help that will handle it carefully, what could we expect when it went from under our watchful eye to the cold-storage plant in the East, there to be stored, sorted over, and repacked before going to our customers?

Third—The expense of storage and repacking, freight on decay.

Fourth—Why ship them East when they can be held here and shipped whenever it is necessary?

But we do not want to hold all of our lemons. What we should do is to have them more evenly distributed throughout the year, and to sell them when we can get a fair price, and be able to hold them when we can not. If we can do this, and I think we can, and if we will strive to pick our lemons carefully and at the proper time, handle them carefully all of the time, put up an honest, well-graded pack—if we will do these things, good market conditions are sure to follow, and we will all find our lemon groves profitable.

THE ORANGE FROM BLOSSOM TO CAR.

BY A. D. BISHOP, OF ORANGE.

First, there is the care of the orchard, and this should be in progress for several months in advance of the blooming season, so as to put the trees in condition for healthy bloom and to hold the fruit after it has formed. We should endeavor to accomplish this by continuous cultivation; by irrigating frequently enough to insure continuous growth to the end of the growing season; and by fertilization if necessary, and this will be shown in the color of the foliage and also in the size of the leaves, for if the leaves cease growing before they have attained more than one fourth to one half their natural size under normal conditions, be sure something is lacking.

The tendency of an orange tree is to over-bloom. This is very marked in some varieties, and so burdens the vitality of the tree as to render dropping of the fruit a necessity; and as the fruit is all alike the dropping frequently does not stop until all is gone, unless the trees are well fortified against it by the presence of sufficient available nitrogen in the soil and by other conditions of cultivation and moisture that there may be no check in the growth until the young fruit has attained considerable size.

The character of the soil has a very marked effect upon the quality of the fruit produced—much more than on the growth of the trees—ranging from the coarse, thick-skinned, over-acid fruits, usually puffy, grown on the heavy, compact soils slowly impervious to water, to the high-colored, smooth, tender-pulp fruits of the lighter alluvial soils.

I feel certain that the quality of fruit produced can be materially changed by the addition of proper fertilizers. What they really are, and the best time for applying, can only be determined by careful tests of the orchard plots themselves; and while we have been in the business long enough to have demonstrated this, the fact remains that we have only recently begun these experiments on scientific lines and only in limited numbers, the average grower waiting for the experiment station or others to determine just what is proper to do. I fear we have given too little attention to the use of potash, being misled somewhat by the fact that chemical analysis has shown a fair percentage in the soil; but it is by no means certain that all that can be shown by chemical reaction is present in such form as to be readily available for the needs of the tree.

The fertilizer question may be considered about like the following: Nitrogen, to promote the setting of the fruit; potash and phosphoric acid, for its proper development; and possibly iron, in small quantity, in some of its readily soluble compounds, to add depth to the color. And I am inclined to the desirability of applying them separately in their more concentrated forms rather than in the mixtures. It is hardly safe to depend entirely on stable manure as a means of fertilization. Be very careful not to allow trees to show the need of water in November, by waiting for the first rains, with plenty of water at your command, for it will be much more detrimental to the fruit to allow the trees to suffer for water at this time than it would be to allow them to suffer in August.

A matter of no less importance than the proper growing of fruit, is putting it into the hands of the consumer in a manner to give satisfaction; and it is of the greatest consideration that it should carry well. To insure this it must be handled carefully. The usual essayist writes: "Fruit should be handled like eggs," and then recommends that pickers use sacks in which to place the fruit after picking it from the trees; but we never hear of a sack being recommended in which to carry eggs. The pickers generally use the sack with its contents of fruit as a cushion to keep themselves from coming in contact with the ladder; and we frequently see them with the patent open-bottom sack standing erect, allowing the fruit to drop two or more feet to the bottom of a picking-box. Generally the fruit is piled high in the boxes, and when they are moved they are dragged across the tops of each other rather than being lifted so as not to touch the fruit in another box. We are constantly

talking about care in handling, but the people we employ to do the work do not use such care as experience has taught is necessary, and, as I have been informed on remonstrating with a packer, "we are not concerned about the grower." In a lifetime of experience in handling practically every variety of fruit grown in this country, the orange is the only fruit product in which the custom is to face the top of the box and press the cover on rather than the bottom.

The fact is, fruit does not carry nearly so well as it did ten or twenty years ago, before the advent of the machinery packing-house, wherein are concentrated large quantities of fruit, necessitating large gangs of pickers and packers, with the natural hurrah attending such matters; and before the use of the modern ventilator-refrigerator car, which as a protection from frost in winter or refrigeration in summer is all right, but as a ventilator car is a complete failure, since it must be in motion to be a ventilator at all, and as most cars are twice as long in transit as they were ten years ago it is evident they must stand still one half the time. Consequently we are driven to refrigeration six weeks earlier than we should be.

In contrast to this we had a packing-house without machinery; thirty-five to fifty boxes was a day's work for a packer, who wrapped the bottom row as carefully as he did the top; it was not considered necessary that the fruit should be packed two or more inches above the top edge of the box, to be pressed down with the cover; two or three days were required in getting the fruit from the tree to fill one car, instead of loading two cars in one day, and when loaded even into an old combination stock car the fruit carried without complaint of it having been received in bad condition.

Is this difference in carrying quality due to difference in handling, or is it possible that some constitutional difficulty has come to tree and fruit, due to the growth of large quantities for a long time in one section, as has attacked many other soil products when planted continuously on the same plots?

We are frequently reading that there need be no fear of over-production of *good* fruit, the writers of the articles imagining, I suppose, that in their districts only could such fruit be produced. If so, there will always be plenty of inferior fruit, which will largely make the price for all, unless it should be the policy of the railroads to maintain such a high freight rate that it would be impossible to send it to market except at a loss; and this is not impossible, since a prominent railroad official stated at the Interstate Commerce Commission investigation, that about a 10,000-car crop was more profitable to the railroad companies than a larger one.

The cost of getting our fruit to the consumer is unreasonably high; even according to the terms of the new merger the price charged is very

nearly \$1.60 per box cash outlay, to which must be added the profits of jobber and retailer. The wages of employés, and other items entering into the cost of picking and marketing have steadily increased for a series of years, while the average selling price has declined.

A FRUIT-GROWER'S WANTS AND DESIRES.

BY EDWARD BERWICK, OF PACIFIC GROVE.

This paper professes to be simply an expression of individual opinion.

One of the first things this fruit-grower wants is, he wants to *know*—to know where, after paying boom prices for land and water, after satisfying the exactions of materialmen and laborers, of the beef trust, the oil trust, the lumber trust, after mollifying every other trust or distrust, and after guaranteeing the railroad and refrigeration companies all the traffic will bear—*he wants to know where the horticulturist comes in.*

Almost everything this much-enduring person needs has risen very considerable in value during the last few months (even the commission merchants in San Francisco have raised their charges 25 per cent), while, at the same time many orchard products have actually depreciated: *the fruit-grower has had to furnish more money from a smaller purse.*

Obviously one of three things must happen: prices of necessaries must come down; prices of produce must go up; or the grower will go broke, the producer will fail to produce; for no man can continue in a business that will not support itself and him.

What I want to know next is *why*, in the face of these conditions, does the fruit-grower aid and abet the circulation of boom literature in the Eastern and Middle States? Special instances of unusually favorable results, rarely achieved even under unusually favorable conditions, in unusually favored localities, are published broadcast, as though they were of every-day attainment all over the Coast. The result of this is, that people flock in under false impressions and thousands are bitterly disappointed and disgusted. The transportation companies, the chief circulators of this aforesaid boom literature, are the chief beneficiaries. Any one who declines to assist in this boom business *is writ down* "unpatriotic." Why? Why, even if a grower were doing as well as the printed matter would lead a reader to infer, should he invite all the world to come and compete with him in business? Who has ever heard of a lawyer, a grocer, a saloon-keeper, or even the editor of a newspaper, who had a good thing, rushing out into the highways and hedges to ask all the world to come and start as rivals in the same occupation? Then why is the non-booming fruit-grower alone singled out as "unpatriotic," because he declines to grind the S. P. ax?

When you tell a gullible public of the big things you *raise*, tell them also of the big things so many of us *can not raise*—THE BIG MORTGAGE. If that has been true in the past, as many of you know *but too well it has been*, is it likely to be less true in the future, with increased expenses and diminished receipts?

One of my desires then is, *to stop this fruit-boom foolishness*. No doubt it will result in the survival of the fittest orchards and orchardists. Many of the misfits and unfit are already grubbed out or sold out. Meanwhile, the skilled horticulturist, on a well-selected orchard, finds life none too easy, because his failing competitor, though losing money, helps to glut a limited market; for, as our canners and shippers have realized, there is a well-defined limit, even to a "world market."

It does not take an overpowering number of carloads of any kind of fruit to glut even Covent Garden market, in London, England. And the citrus fruit-grower knows, to his cost, that even if his market were unlimited, the railroad company's equipment of suitable cars and engines is entirely too limited. Let the fruit-growers, then, send forth their fiat, *that this misleading booming of their industry be stopped*.

Another want is a time-schedule on East-bound fruit-cars. The grower guarantees the freight charge before the car leaves the railroad depot. He pays for the service of transporting his perishable goods, expecting that that service will be some real service to him, and that his goods will be delivered at their destination in reasonable time. Through some inefficiency, mishap, or negligence, the goods are unduly delayed. Instead of a carload of salable fruit, a carload of mushy rottenness arrives at the terminus. The railroad company, in place of a service, has performed a non-service, a disservice. Surely, the very least it should be called upon to forfeit would be the charge made the grower for a real service. There is no valid reason why fruit trains should not make as good time as cattle trains.

But this point was so fully discussed in a former paper at our last San Francisco Convention, and one of the cures for this inefficient service, *government ownership of our railroads*, occupied so large a space at a former Convention in this city, that I will not occupy your time with them now.

I want to remind you of what may seem, to some of you, more nearly present possibilities: possibilities not merely of cheap transportation, but of such a widening of markets as would almost justify the biggest boom you ever imagined.

Looking over the British postal guide a year or two ago, I was struck with the fact that in a list of countries covering some ten pages of that guide, and embracing names of places which you and I rarely hear pronounced, the United States was almost the only country with which there was no recognized "parcels post."

Now, let me tell you what a comparatively insignificant republic can and does do in the way of postal facilities. Inside its own domains it carries letters up to one half pound, and delivers them at the house to which they are addressed for one cent, provided that house be within $6\frac{1}{2}$ miles of the nearest postoffice; beyond that distance, for two cents; and miles are long in the Swiss Alps, that region of lofty peaks and snowfields.

But little Switzerland does more than this. Parcels up to 11 pounds weight are received in its postoffices and carried to any address indicated inside Swiss territory at rates as follows:

Up to 1.1 lb.....	3 cents.
Over 1.1 lb. and up to 5.5 lbs.....	5 cents.
Over 5.5. lbs. and up to 11 lbs.....	8 cents.

On larger parcels, up to 44 pounds, the rates from postoffice to post-office are:

11 lbs. to 22 lbs.....	14 cents.
22 lbs. to 33 lbs.....	20 cents.
33 lbs. to 44 lbs.....	30 cents.

And for 3 cents additional these packages are delivered at the domicile.

On September 1, 1900, Switzerland, Austro-Hungary and Germany extended their interstate parcels post to packages up to 110 pounds in weight, at rates composed of the combined rates of both countries.

What is done in Great Britain you can read fully in this month's "Cosmopolitan Magazine." What *not* to do you can also find there. When their parcels post was instituted, 55 per cent of the receipts was conceded to railway companies for the mere carriage. So mistaken was this bargain, which ends in 1904, that the postoffice department has returned in part to mail-coaches (horse or motor), and by these vehicles 11,500,000 parcels are annually rescued from the rapacity of the railways.

Just one word as to Germany. The German farmer can send 110 pounds of produce post haste to any part of Germany or Austria for 60 cents. For 3 cents, or less, additional, the postoffice will collect its value and forward the cash to the sender of the goods.

Now let me tell you in addition what rates other countries pay. The German pays 83 cents for an 11-pound package to Aden. The Mexican pays 90 cents, and the American pays \$4. To Argentina, in South America, the German pays 73 cents, the Mexican 58 cents, and the American \$4.50. To Bosnia, in Central Europe, the German pays 13 cents, the Mexican 30 cents, and the American \$4. To the Transvaal, which you have heard of in South Africa, it costs the German \$1.90, the Mexican 28 cents, and the American \$4.25. To Venezuela, the German pays \$1.72, I believe it is, the Mexican 63 cents, and the American \$5.

Now, gentlemen, what Mexico can do, I think we ought to be able to do, if we try hard.

I read in the "Review of Reviews" that two wealthy men in Ireland are preparing to furnish that distressed country with auto-trucks, these big trucks to convey agricultural products. What they are able to do in a distressed country like Ireland you ought to be able to do here also.

Now, gentlemen, you are the sovereign people; it rests with you to direct your servants to go and do likewise. When you can post two boxes of oranges to any part of the Union for 60 cents, and have them delivered as quickly as are newspapers and magazines, your transportation question will be solved. What hinders? Railroad and express company lobbies, do you say? Yes! But, far beyond these, your own apathy and your blind devotion and docility to your party machine—a machine operated, as you know, by corporation money! You are full well aware that what is possible for Switzerland and Germany is possible for America. You must admit this, or accept the alternative, that our Government is inferior in this respect, at least, to the Government of Germany.

Now, I want every voter here, and every voter in the United States, to join the Postal Progress League, and to pledge himself to vote only for such nominees for Congress as will promise to make it their business, first, last, and all the time, to insist on the immediate institution of an efficient parcels post. If our Postmaster-General does not know how, and will not learn how, let us import a Swiss, or a German, or a New Zealander, who does.

Already 420,444,573 pounds of second-class matter are annually transported by the American postoffice. That is more than three times the weight of California's average transcontinental shipment of fresh deciduous fruits. It is no doubt important to feed the mind. There is one thing prior in importance even to that, viz.: to feed the body. Bringing producer and consumer in touch through the postoffice solves not only the question of transportation, but also the whole question of marketing and middlemen.

And these three questions of *marketing, middlemen, and transportation* I am sure every fruit-grower in this room wants, and wants badly, to see settled.

It would pay the grower *then*, and I almost think it would pay him *now*, not to pack and ship frosted oranges and grass-green lemons; and one of this grower's desires the past winter has been to find in Pacific Grove some brand of oranges he could be sure that Jack Frost had not already sucked dry, and some brand of well-cured, juicy lemons with which to brew, for his friends, the refreshing lemonade (in view of the fact that hard drinks are there held accursed).

Steel roads and auto-trucks are another of the possibilities of the

future that this grower wants. Perhaps you think his wants are too great for the United States Treasury to satisfy. By no means! There is one simple method of furnishing the postoffice with ample funds and equipping national steel roads. This grower wants to see the millions, now worse than wasted on an army for destructive purposes, utilized to universal advantage on an army for constructive purposes. He wants to see America a world-power in the old sense of an enlightenment and example to other nations, and not a world-power in the European sense of a bullying exploiter and destroyer of weaker peoples, under the intolerant plea that their civilization is not our civilization. The worst possible infringement of the Monroe doctrine is the introduction into this hemisphere of European militarism, with its overbearing aristocratic tendencies, and its endless exactions on the scantily furnished purse of the toiler.

This grower deplotes the day when peurile jingoism discovered George Washington and the signers of the Declaration of Independence to be "back numbers." He wants Washington's warning words of parting to ring in the ears of every American, young and old; the words, viz.: that a "standing army is dangerous to the liberties of any nation and it is especially inimical to republican liberties."

"Were half the power that holds the world in terror,
Were half the wealth bestowed on camps and courts,
Given to redeem the human mind from error,
There were no need of arsenals or forts."

This brings me to the last desire I have time now to express—a desire for a better education for all of us, old and young. I am a little disposed to think that what Mr. Collis P. Huntington once said of our educational system is true: "It teaches boys to talk instead of teaching them to work." We have to learn to realize with the leader of the Roycrofters, that "He is best educated who is most useful"; and with President Jordan that "Wisdom is the knowledge of what is best to do next; skill is showing how to do, and virtue is doing it."

In the past, we have let pedants and pedagogues tell us what was a true education. They, with their little stock-in-trade of Latin or Greek and the like, told us that the stuff they had to peddle was the genuine goods. So in my young days a man was not called "educated" unless he could lard his eloquence with extracts of ancient Greece or offer his hearers a fragment of Latin tongue. Now we laugh at such foolishness, and deem it conceited pedantry. But we still suffer our boys and girls to be dosed with the same mixture, under the pretext that it is necessary to a knowledge of our own language; when at the same time we know, on the word of his friend Ben Jonson, that the greatest master of English literature the world has ever known, William Shakespeare, had "small Latin and less Greek."

It is safe to say, at least from the standpoint of this fruit-grower, that a knowledge of obsolete words is one of the least useful and least necessary things that a child can study. Let us drop from our school courses this remnant of monkish, mediæval mummary, which has masked as enlightenment, while acting as a veil for the grossest ignorance.

"Too long the night has lasted of darkness and depression,
Of sorrow and of anguish, of wrong and black despair;
Too long has error held us in bondage and oppression,
And fear-begotten death-germs to vitiate the air."

Don't let your children be educated as slaves to the superstitions of the past. The science of fruit-growing demands an acquaintance with almost all sciences from A to Z. This being so, do not permit their minds to be made what Kipling calls "perfect rag-bags of useless knowledge."

Now, then, you good people are the salt of the earth: Californians grow the best fruits in the world; and "by their fruits ye shall know them." So we must be the best people in the world. If you good people concur in any or all of these my wants and desires, there's just one thing to do: Put your shoulders to the wheel and push hard for their attainment.

"Good times are made and fashioned of men's souls." They come as they are worked for. Neither school boards nor legislatures, neither President nor Congress, will make any move forward except under the pressure of public opinion. It is for you—you salt of the earth!—not only yourselves to loudly express, but to concentrate the expression of public opinion by forming associations. And you must needs be both loud and persistent, for the corporations, in whose grip you are now clutched, know not only the value of clamor, but the uses of cash that talks and talks loud.

I have come nearly 500 miles to say these things to you. I am sure you will not let it be labor in vain.

PRESIDENT COOPER. We will now listen to the address on the subject of marketing citrus fruits, by A. H. Naftzger.

MARKETING CITRUS FRUITS.

BY A. H. NAFTZGER, OF LOS ANGELES.

Mr. Chairman, and Ladies and Gentlemen: I think this is the first time that I have ever asked a Fruit-Growers' Convention in California to listen to an extemporaneous talk from me. I have generally endeavored to concentrate what I had to say into a few suggestions on paper. Unfortunately for you, perhaps, as well as to my own dissatisfaction, I have been obliged, by circumstances that I could not control, to come to you this morning and try to make a few suggestions extemporaneously.

If the programme of the morning has been carried out—and it is another misfortune of mine that I was not able to be here earlier—the fruit is now cured and on board the cars. I have no doubt it was well done up to that point, because, as Mr. Berwick has told you, nobody knows better, if indeed anybody else so well as Californians, how to grow the fruit and how to prepare it for market. It has long ago been demonstrated that the climate and the soil and the men of California are particularly and peculiarly adapted to grow the most luscious fruit on the globe and to get it ready for market. We always compliment ourselves, you know, in this way. It makes us feel good, and it does nobody else any harm.

Now, after the fruit is on board the cars, the real difficulties begin. Years ago it was discovered by the growers of these fruits in California that while it was a very great advantage to grow good fruit and to prepare it well for market, there were still serious difficulties to contend with. Having discovered this, various methods were attempted to successfully market the crop.

Early in the history of the citrus fruit industry of California, when there were only a few thousand carloads in the whole State, the difficulty began to present itself, as it always does with the attempt to market any perishable product, especially when that product is located a long way from the consumers, as is our California citrus fruit. Efforts were made by the commercial and speculative packers to inaugurate a system of handling, to get together in some form of agreement among themselves by which they would avoid the disasters of competition and independent operating. This was not very successful. A little later a portion of the growers organized themselves into what was called the Fruit Exchange, and sought, by methods under their own control, and by a machinery absolutely at their own domination and dictation, to market their products. Into this organization was gathered probably half of all the growers in Southern California and controlling approximately half the product. This was measurably successful. You will pardon me if say that I believe that for years that organization was the only safeguard of the citrus fruit-growers of California. It was the only circumstance, it made the only condition, of possible successful growing of citrus fruits and converting them into money. But it was only measurably successful, because it did not draw to itself all or nearly all of the growers. A large proportion of the growers never identified themselves with the organization. In consequence, there were various methods of trying to do the business. The individual grower shipped on his own account, or consigned to the market. Some of them sold fruit to the commercial or speculative shipper. These various shippers were operating, as I have said, on an individual basis. Last year I think there were more than seventy-five of them in the field in addition

to the Exchange, more than seventy-five shippers of citrus fruits out of California. No one of the seventy-five knew what the others were doing. Each of the seventy-five was striving for the best market. Generally each of them knew about as much as the others, and if any market was fairly good, everybody made a plunge for that market, and the market that was best immediately became the poorest in many cases. It is not necessary for me to go at length into a discussion of these points; you are familiar with them; you know to a certain extent what it means. But let me give you a significant illustration of it. By-and-by I will speak to you of a later organization, which took effect on the first of April of this year, and when that organization took charge of the marketing business of the various factors that merged into it, everybody had more or less fruit unsold in the markets, and this was all put together for the purpose of clearing the atmosphere, and it was found that in a single city one of these shippers, and not the largest of the lot, either, had forty-five cars of fruit on the sidetracks, a good deal of it badly decayed. Now, this was only one of quite a considerable number of shippers who combined in this organization, and, as I have said, it was not the largest by any means. But it illustrates the condition of things. Everybody had a lot of fruit on the sidetracks in that city. Hundreds of cars were there at that time unsold, and all of them weighting down the market; all of them, or a large proportion of them, more or less decayed and becoming weaker every minute and depressing the market every minute more and more. As I have said, everybody operating on his own account, everybody struggling to get his fruit disposed of, everybody hunting the man who would buy a car of fruit, and the man who had any disposition to buy a car of fruit knew that there were a vast number of cars on the sidetrack and he was in no hurry. The holder of it would be quite as anxious to-morrow as he was to-day, and the prices would surely not go up over night. So that the shipper was at the mercy of the buyer and at the mercy of his competitor, and the growers were at the mercy of them all.

Now, I have not overdrawn the picture. This is a circumstance that is familiar to everybody who has ever attempted to market a perishable product, whether it was fruit or something else. I have perhaps sufficiently traced the history of these undertakings. They were to a certain extent successful. When the product was limited and the demand was strong, the fruit could be sold at a fair price. When the product increased and became large and was a little weak in itself, in its carrying qualities, or for any other reason, the markets were sluggish and the prices were low. And of course, since our product was steadily increasing, since we had more and more from year to year, with every prospect of very much more in the near future, the problem became serious as to what was to become of our citrus fruit industry. Out of those condi-

tions came the negotiations, in the month of March of this year, for a consolidation of interests. I have said that a good many people were operating independently, and the Exchange was handling approximately half the shipments. I shall not go into the details of these negotiations. They lasted for days and nights, for weeks. They involved a great deal of thought, consideration, deliberation, concession, and sinking of differences and trying to get together for the protection of the industry itself. Some of these factors were speculative factors, some of them were people not growers, but interested simply by reason of their investments, who had been buyers and shippers and had been receiving on consignment, and so forth. All of these things had to be taken into account and some basis reached by which the business could be transacted and nobody forced out and nobody hurt. The result was the organization of the California Fruit Agency, which is essentially and simply a marketing medium, and that only. It has no power under its charter to buy fruit or to speculate in any product whatsoever. Into this organization was absorbed the Southern California Fruit Exchange, the principal shippers and packers of fruit, and the growers if they chose to come into it. In order to put this at the service of the growers, the parties formerly operating independently of the Exchange immediately proceeded to organize what they called the California Citrus Union, for the purpose of single management of their packing operations. The shippers became packers only. They put at the service of the growers their packing facilities, charging them a flat figure for packing and selling. And this figure—I think you will agree with me, as you probably know exactly what it is—is materially less than the same packers and shippers were previously charging the growers for transacting their business. This is perhaps an important factor, but it is not the most important. It is not so important to the grower that the expense should be reduced one or two or three or four or five, or even ten cents a box on his product, as that the market should be protected and that he should be able reasonably to get the value of his product. That is of much more importance. It was a matter of small consequence whether he paid forty or fifty cents for the packing and selling, if there was no margin over that. The important thing was that the markets be so steadied, if possible, that he may have a margin of profit for his industry.

Now, the object to be sought in this combination was not the profit of the packer. It was to so control the distribution of the product as to put no more fruit into any one market than it required and to leave no market unsupplied. You can quite understand that the Exchange, having been operating for years without any profit to anybody—I mean by that in the shape of earnings—it was doing business at absolute cost, for the growers, and in the nature of things could not change this basis, so far as its growers were concerned, and therefore the interests of the

Exchange would naturally be to continue a basis of equity to the grower. The other parties to the agreement, if they secure and hold for themselves the support of the growers and continue to pack their fruit, must also insist that the basis be equitable to the producer. And I am here prepared to say that I think that result was accomplished. The California Fruit Agency is now, after thirty days' operation, handling perhaps a little more than 80 per cent of the shipments out of California. We are not handling all, because it takes a little time to accomplish these results; but day by day we are increasing the percentage, and I think that before the season has closed we shall have a very large proportion of all the growers connected with this marketing system.

I think I have said about enough covering these main points. You asked me to talk about marketing citrus fruits. I have sketched the field; I have touched the high places, and I have told you of the final effort now operating to make a marketing system for every grower of citrus fruits. And I will say this further: that this system is at the service of every citrus fruit-grower in California. We have agencies of our own in every important city in the United States and Canada. Scattered everywhere are our own agents introducing this fruit. We believe that through this system we shall be able to get a larger demand; that is, we shall introduce the fruit everywhere. Our agents will hunt every possible corner of the United States and in foreign countries as rapidly as it is necessary, to find people who will eat California oranges and consume California lemons. I have no hesitancy in saying that we shall be able, by reason of the volume of the business, at a moderate expense, to introduce the fruit into wider consumption than it has ever had before. And this is one of its primary purposes, because, with the increasing product, the first year that we have a full crop in California we shall exceed thirty thousand cars, beyond any question. Florida is coming back to us pretty rapidly with an increase in her product, and we are menaced more or less with the importations from the islands on the south and a little from abroad; not very much from the Mediterranean except as to lemons, and we would not have that if we cured enough of our own. What we want is more lemons in California, and not less.

Now, I think I shall give you an opportunity, if you desire, to ask me any questions in relation to marketing citrus fruits. I do not know anything about marketing citrus fruits to-day except the effort of the California Fruit Agency to market all the fruit for all the growers in California. If there is any other method I do not know anything about it.

PRESIDENT COOPER. Any questions you wish to ask will now be in order.

MR. STONE. I would like to ask Mr. Naftzger if there is any change whatever with regard to the California Fruit Exchange—as to its original members?

MR. NAFTZGER. None whatever. The Exchange remains exactly as it has been heretofore.

MR. STONE. And do I understand, Mr. Naftzger, that the other shippers who have amalgamated with you will cease to buy fruit, or are they open to go into the orchards and buy fruit as they originally did?

MR. NAFTZGER. They tell me they have no expectation of buying fruit. They are putting their packing facilities at the service of the growers, to be marketed for their account.

MR. STONE. Why I mention that is, that there is a very serious weakness if independent buyers can go into the field before the crops are ripened and attack men who are badly in need of money and induce those men to accept money on their crops. Now, I do hope to impress upon Mr. Naftzger and everybody concerned that, if possible, that system shall cease and I hope it may cease. It will be for the interest even of the poor rancher who is hard up for money sometimes, that this advance shall not be made, and that the buyer shall not go into the orchards and attack weak men in this way and fasten themselves onto them in such a manner that they can not get rid of them. I hope that if it has not been done already, some means will be adopted to prevent that. It may for the moment tide that man over his seeming difficulties, but it will seriously injure him; and not only that, but seriously injure every other grower whether he takes money from the buyer or not. That is a point I should like thoroughly cleared up. I don't suppose Mr. Naftzger can compel them not to buy fruit—I don't see how he can; but if they buy it, there is an alternative for that, which I have urged time and again, and that is that the local associations shall be so active in all the deals as to see that if such men are attacked, they, themselves, shall also attack them, and in order to prevent these men getting in the hands of independent shippers, they shall themselves advance the money to the growers and tide them over the event, so as to prevent in the future what has been such a manifest, such a transparent disaster in the past and which led to the Fruit Exchange and to Mr. Naftzger's exchange. And while saying this, I will say I can not help feeling and saying that in Mr. Naftzger's personality I seem to almost see the redeemer of the citrus industry. (Applause.)

MR. NAFTZGER. I will say, Mr. Chairman, that there is no factor connected with the California Fruit Agency—and I think I am perfectly safe in saying no factor connected with the California Citrus Union—that is buying a pound of fruit, or offering to buy it, from anybody, and has no intention of offering to do it. There might come a condition later on where, in order to protect ourselves, it might be necessary for some-

body to buy the fruit; that is, in order to keep it from being marketed in the reckless way that business has been done heretofore. What we want is the control of the fruit when it is on board the cars. That is the thing we want, and when we have got that, the disaster back of that is the disaster to the individual grower who sold it for less than it was worth. And I don't think anybody will pay him any more. I don't think there is anybody in this business, from now on, for charitable purposes. And so, if the grower is forced to sell, as Mr. Stone has suggested, it will be at a low value; and there is no factor connected with this marketing agency that has any inclination to take this advantage of the grower. We want the grower to bring his fruit into the marketing system and get its value less the cost for marketing. That is what we want. As you are very well aware, the Exchange was here for years trying to induce every grower to come into the Exchange, where the charge to him for marketing was the absolute cost and not one cent more, and he got the difference. But if there should come a circumstance or condition of things under which it might be absolutely necessary to buy in order to protect ourselves, the fruit might be bought. But even then, it must be marketed through the agency, and that is the one important factor—the control of the product after it is on board the car.

MR. STONE. I am much obliged for that explanation. One more point, as Mr. Naftzger is at the head of this organization, as I understand it: Suppose that such circumstances as I have shadowed forth should take place; will that be within your cognizance, Mr. Naftzger, or could it be done without your cognizance?

MR. NAFTZGER. Not necessarily with mine. It might be done without. As I have already endeavored to state, the Exchange membership remains intact; no disturbance of that whatever. The Citrus Union, which is the combination of all the other factors that came into this agency, and which is essentially another exchange, slightly differing from the old one of course, that organization puts its packing facilities, packing-houses, all over California, at the service of the growers, and seeks to bring them into that organization to have their fruit marketed through it. Now, if they found anywhere that they were menaced by outside influences, by speculative influences that sought to come into their territory, they might be obliged, under these conditions, to buy some fruit. I don't think that situation is likely to arise; but it is a possible condition, and I should most likely know of it, but it would not necessarily fall under my notice.

MR. THOMPSON. I understand that the buyers' association, or the buyers' part of the general organization, has a right to receive only 50 per cent of the fruit, and that we as a co-operative association, at present control somewhere in the neighborhood of 43 per cent. Now, I would

like to know if the association has the right to receive the balance of this fruit uncontrolled to the extent of their 50 per cent in conjunction with the 50 per cent that the buyers' association has a right to receive?

MR. NAFTZGER. Of course this is getting into deep water. But nevertheless we have endeavored to make this organization so that there is nothing under cover at all, so that there is nothing mysterious about it. You can readily see that when we undertook to bring into one combination factors which had hitherto been discordant or antagonistic, one of them operating on a purely co-operative basis at cost and the other speculative in character or operating for a profit, we had a difficulty to overcome. The co-operative members could not be put upon a profit-bearing basis, naturally. The others could not be put upon an absolutely co-operative basis, else they would go out of business. You can readily see that the man who has got his money invested in packing-houses over the country, if he continues to operate at all, must operate at a profit. There is no use pretending that he doesn't, because he expects to have his profit. Hitherto he has been charging the grower from 45 to 50 cents per box for packing and marketing his fruit. To-day he is charging him 31 cents for packing and 8½ cents a box for marketing, or, in gross, 39½ cents as compared to 45 and 50 formerly charged. That is a material lessening. But, as I have said to you, the important thing is not the reduction in the cost of operating so much as in the steadying of the markets. Well, now, if the Exchange was thrown open under this consolidation, you can see what would happen in the nature of things: nine out of every ten of all the people outside, probably, would come to the Exchange operating on a co-operative basis, and the other man is put out of business. That we could not do. Now, he says to us: "You are only interested in your members, aren't you? What interest have you in the people who have never been with you? You have been trying here for years to induce the fruit-growers to come into the association, and how can you claim any interest in those who have refused to come in?" There is no answer to his question. We may have an incidental interest in our neighbors' children, but we have much more in our own. And when we have provided for our own families, we have pretty nearly done our primary duty. I don't mean by that that we ignore other people; and we did not. But he says: "Then maintain your status. All you have a right to ask is to provide for your own members." And we did. We provided perpetually, or so long as this organization lasts, for the marketing of every pound of fruit of every member of every organization or association connected with the Exchange in the State of California. Now, he says: "As we have hitherto been operating with the rest of the growers outside of the Exchange, we propose to put at their service these packing facilities, and offer them the marketing agency, the Cali-

fornia Fruit Agency, at much less cost than we have ever charged them for operating before; and we submit that it is a fair proposition." It looked so to us—in any case, gentlemen, it was the best thing that could be accomplished under the circumstances.

Now, I will go a step further. Mr. Thompson says that he understands that the outside combination is entitled to take 50 per cent of the growers and we maintain our status, which is something between 40 and 50 per cent. Now, that leaves a difference, a remnant in there. What about that? Well, now, this is the situation: When they have obtained their 50 per cent, then we may take into consideration how the others might be equitably provided for, to strengthen a weak association that is operating to some disadvantage here and there. I don't know just how it can be worked out. But our theory was this: The growers up to 50 per cent have their opportunity to come into the Citrus Union. There is no ironclad rule that they may not have any more, but that is the basis. Now, after they have obtained their 50 per cent and we have taken care of our membership on the present basis, we have got still 10 per cent to figure on. If they want to come into this Agency, then we say: "Here, in this community, it would be better for the Union to maintain a packing-house. The product is small in this community; it would be better for the Union. There can not two operate. In another community there is a small association in the Exchange operating at some disadvantage because it is small. Strengthen that up a little in order to permit the Exchange to operate advantageously for the growers." That is the basis—trying to harmonize and to work together in this interest. I don't tell you exactly how it will work out, because I don't know. Some of these growers will probably never identify themselves with either. There is always somebody in a community who knows more than all of his neighbors (laughter and applause), and just what may become of him I am not able to say. When he becomes a menace to us, we will have to do like the President said. You remember, when the doctors were scraping the bone in the President's shin after he was hurt in Massachusetts—was it?—and it was hurting a good deal, he said: "I feel as though I would like to have another talk with that motorman up there in Massachusetts." (Laughter.) Now, it may come to pass that after we have got along to that point we may want to have another talk with that grower who knows more than everybody else. But we will cross the bridge when we get to it.

I have tried frankly to answer your questions. And I want to say to you now, don't let anybody make you think that there is anything under cover in this movement. And I am prepared to say to you, in behalf of everybody connected with the Exchange, that there is not an element in it that is not straightforward and square in every particular. There is

nobody to be hurt, and there is no contemplation of making war on anybody, anywhere, for any reason. If the growers of citrus fruits in California wish to make this undertaking a successful marketing agency, they can do it. If the growers get up and howl and "won't play," then of course it is up to them. (Applause.)

MR. STONE. Mr. President, just one more question, with regard to this membership. Of course Mr. Naftzger will be operating for the present members, it seems. But they will die, and go out, and how will the present proportion be maintained? Will it be by selection, or how?

MR. NAFTZGER. Perhaps I ought to have said that in addition to its present membership, the Exchange is permitted perpetually to make good its withdrawals by taking new members. It takes its full proportion of all new orchards as they come into bearing; so that it maintains its status in that manner. For instance, if it loses a member by withdrawal, or by the death of a man, unless his family comes into the inheritance and continues with the Exchange, it can solicit another member and take him in, in order to maintain its strength and holding, in order to continue its packing at fair expense. In other words, in every particular it is contemplated that the existing status of the Exchange and its associations be perpetually maintained.

MR. STONE. I wonder if Mr. Naftzger would mind saying whether he is likely to do anything with regard to foreign markets and would like to shadow out anything to this Convention? That is very important.

MR. NAFTZGER. I will say that we have the question of foreign markets constantly under consideration. The Exchange established an office last fall in London, and has been corresponding with other foreign countries, such as Germany and Scotland, and so on. We did not attempt much of anything in France, because the duty is pretty high in France. The duty is high in portions of Germany, but some of the cities of Germany are free cities. But we have that constantly in mind. We did only a little exporting, because we didn't have the class of fruit that was wanted abroad; and we don't have this year. We had big sizes enough this year, but they were not very desirable. What the foreign market requires, so far, is large sizes of fancy stock. But I assure you that we shall leave nothing undone to open the markets as rapidly as it is possible to do so.

PRESIDENT COOPER. I desire to announce that the committee to prepare a memorial to be presented to President Roosevelt on his arrival in Los Angeles will meet here to organize immediately after the close of this morning's session. The essays you have heard read are now before the Convention for discussion.

MR. BERWICK. I have a resolution here I would like to read before being offered to the committee, if I may do so.

PRESIDENT COOPER. Read it.

MR. BERWICK. I would like to say that this is the Fruit-Growers' Declaration of Independence, in my opinion. (Applause.) I will read the resolution:

WHEREAS, The public need of an efficient domestic and foreign parcels post is so obvious as to require no argument; and

WHEREAS, This favored nation lags far behind Old World nations, and even behind the republic of Mexico, in regard to postal facilities; and

WHEREAS, The Postmaster-General, by and with the consent of the President, has power to conclude parcels post conventions with any foreign government; be it

Resolved, That we, the Fruit-Growers of California, in convention assembled at Los Angeles, this 6th day of May, 1903, respectfully urge on our President and Postmaster-General to take the necessary steps for the conclusion of such parcels post conventions with all nations willing to reciprocate in the matter.

We also urge upon Congress the imperative need for such immediate action at its next session, as shall enable our Postmaster-General to establish a system of parcels post, at least equal to those systems it has been found possible to operate successfully in Mexico, Switzerland, Germany, and elsewhere.

Resolved, That a copy of these resolutions be handed to President Roosevelt during his visit to this city, and a copy be sent by our Secretary to the Postmaster-General, and to every member of Congress.

The resolutions were reported favorably by the Committee on Resolutions and adopted by the Convention.

PROFESSOR PAINE. Mr. Chairman, I have another resolution to offer, and move its adoption:

WHEREAS, The official position held for a period of twenty years by the President of the State Board of Horticulture has been efficient and satisfactory; therefore,

Resolved, That the twenty-eighth State Fruit-Growers' Convention of California hereby extends its thanks to Governor Pardee for his appointment, under the new law, of the Honorable Ellwood Cooper as State Commissioner of Horticulture.

Resolved, That the Secretary of this Convention is requested to communicate this resolution to the Governor.

PROFESSOR COOK. I would like to second that motion.

The motion was unanimously adopted by a rising vote.

MR. KOETHEN. I believe discussions are in order on the papers that have been read. I wish to say something in the nature of a challenge to one remark made by Mr. Bishop in his paper; and if I am wrong I think we ought all to know it. He makes the statement that fruit raised on heavy soils is not equal to fruit raised on light soils, speaking of oranges. I have been taught, ever since I have been in California, that the most marketable fruit has come from the heavy soils such as you find in the red soils in Redlands and Riverside and other places. If I am wrong in this, I wish to be corrected; but I believe that the statement made in the essay is not in accordance with the facts.

PROFESSOR PAINE. The writer used the term "alluvial" as not being the best soil on which to raise fruit. It seems to me to be recog-

nized the wide world over that the alluvial soil is not the best soil for the raising of fruits. It is a good soil, but not the best for high qualities of fruit. Fruit grown thereon is apt to be too coarse, too heavy, and with large cells.

MR. GRIFFITH. Mr. President, I suppose that largely the translation of this remark would depend upon "what kind of land I have got"; that each of us thinks we have the best conditions to raise the best oranges. In our own district, I believe that most of us have agreed and concluded that the lighter soil will produce a finer-skinned orange and a better keeping orange than the heavier soil, and that is probably because it is easier worked. I don't think there is any difference, really, between the two kinds of soils; but it is easier to handle a light soil, and consequently people can make an easier success of growing finer-skinned and better keeping oranges on lighter soils than on the heavier soils. For my part I much prefer lighter soils for growing oranges.

PRESIDENT COOPER. I would like to say that there is some sandy soil that furnishes more plant food than any other kind of soil. Certain sandy soils are very rich in plant food.

MR. GRIFFITH. Mr. President, I have a resolution that I would like to read, for the sake of discussion, and then have it referred to the Committee on Resolutions. If I read it now, with the permission of the President, it is simply to get light, perhaps, on the subject, now that we can have more time to discuss it than when the Committee on Resolutions reports. I don't wish to have the resolution adopted, but would like to read it for the sake of discussion.

PRESIDENT COOPER. Read it.

MR. GRIFFITH. The resolution is as follows:

WHEREAS, By competent testimony before the Interstate Commerce Commission, sitting in Los Angeles one month ago, it was established that the transportation companies' freight rates were so excessive and the time consumed in the transit of fruit-laden cars so unreasonably long as to leave the fruit-grower no margin of profit; be it

Resolved, That this Convention of Fruit-Growers, assembled at Los Angeles this 6th day of May, 1903, demands a time schedule on East-bound fruit-cars, not to exceed six days to Chicago and nine to New York, with a maximum rate of \$1.25 per hundred-weight, with a rebate of 10 per cent per day for each day of delay, and compensation for any decay of the transmitted fruit; be it

Resolved, That we recognize the intention of the railroad companies to foster the lemon interests by granting an emergency rate the past winter, and believe it to be their true policy to encourage the continuance of the whole citrus industry by a gradual reduction of the freight tariff.

Resolved, That a copy of these resolutions be forwarded by the Secretary to Hon. C. A. Prouty, Interstate Commissioner.

The resolutions were referred to the Committee on Resolutions.

MR. HOFMAN. I have frequently heard and read of Mr. Teague's articles on lemons, and I would like to ask one thing. He deals largely with the climatic conditions of his own immediate neighborhood, I think. Now, were he to try this tent proposition in our country, I think

it would prove a failure. I would just like to hear what he thinks himself. Ours is a high altitude.

MR. TEAGUE. How far do you live from the coast?

MR. HOFMAN. About forty miles from here.

MR. TEAGUE. Your climate is not very different from the climate of Riverside, is it?

MR. HOFMAN. No.

MR. TEAGUE. The Arlington Heights Fruit Company have been in successful operation in their district. You can visit them any time. I judge they have just about the same climatic conditions that you have.

MR. HOFMAN. I presume so; yes.

MR. TEAGUE. Look up Mr. Little, of the Arlington Heights Fruit Company. He will show you what he is doing there. He has one of their packing-houses built on this plan, and it is in successful operation. He informed me the other day, when I was there, that he was very well pleased with it.

MR. HOFMAN. He has not tried it through one summer season though, has he?

MR. TEAGUE. I was there last year, and he had lemons out in tents without even a shelter that I saw; the fruit had been there three months, three of the late spring months, and the lemons were in fairly good condition—surprisingly so to me, the way they had been treated; but the fruit so far is in excellent condition. Understand, when your hottest weather comes on, that then is the time when you want to be putting your lemons on the market. That is not the time you have got to keep them through. It is through the spring months, up to, say, June, and then you have got to begin to take them out if you get them into market.

MR. GRIFFITH. I would like to ask Mr. Teague—you say the tents are 10 by 10 by 20 feet. Are they 10 feet high?

MR. TEAGUE. Ten feet high, 10 feet wide, and 20 feet long.

MR. GRIFFITH. And then you have your building up high, raised 10 feet high off of those poles?

MR. TEAGUE. No, sir; the canvas is open at the corners. They lace on the same principle as a shoe. Just unfasten the corners and throw the curtains up.

MR. GRIFFITH. How far apart do you pile your boxes?

MR. TEAGUE. It depends upon the climatic conditions that they are under. If you have a dry climate, a windy climate, you would want to pile them closer. If you have a moist, damp climate, you would want to be able to give them plenty of ventilation. I would not prescribe any special number of inches apart.

MR. BLANCHARD. Answering this gentleman here, I saw in Cucamonga, I think in his own section, years ago, some lemons that were

stored away in the end of a shed—not a great quantity—covered up with paper and sacks. The owner told me they were put in there in December. I saw them in July. He went into the shed to exhibit the lemons to me, and I never saw better lemons in my life, or better cured. They had been there from December until July, and were kept practically under the same conditions that we are now trying. They were kept there six months.

At this time a recess was taken until 2 o'clock this afternoon.

AFTERNOON SESSION—SECOND DAY.

WEDNESDAY, May 6, 1903.

The Convention was called to order at 2 o'clock. Vice-President Griffith in the chair.

VICE-PRESIDENT GRIFFITH. Gentlemen, we will first take up the matter of the question box. We have a couple of questions here we wish to have answered. "What about dust spray for orchards?"

MR. PEASE. We took up the question of dust spraying for the purpose of trying it on our apple trees. On some of our apple orchards we have red spider, in the mountain districts, and the commencement of the codling-moth. The dust spray was highly recommended, and a Mr. Ford of Redlands has used two or three different machines which were sent to him on trial. The dust is a preparation of lime, paris green, bluestone and something else, I think—sulphur, perhaps—and it is claimed that the lime would carry it and it would stick to both sides of the leaves, no matter what the climate. But we have tried it in the mountain districts where there are no fogs, and it is a failure. In places where it has been tried on lower ground I have heard it said that the dust would be so thick that it would absolutely stick to both sides of the leaves. But so far, with us, we have had to give it up on the apple orchards.

VICE-PRESIDENT GRIFFITH. The next question is: "How does compressed air compare with common pumps for raising water?"

PROFESSOR COOK. We have a good many of both around us, and with a single plant it is probably better to have the common pump. But where you have a number of wells quite different from each other, the compressed air is a great deal better, and gives satisfaction. But it is very expensive, except where you have a good many wells. We have a large number of wells which are managed by the pump at Claremont,

and they are wide apart—a mile apart, I believe. They have given excellent satisfaction. It is pretty expensive at the start, but it makes up for that by the reduction of expense in management and in running afterward.

VICE-PRESIDENT GRIFFITH. Tell us under what conditions compressed air is useful. It is not satisfactory under all conditions, is it?

PROFESSOR COOK. It is desirable where the wells are wide apart.

VICE-PRESIDENT GRIFFITH. Another condition that is necessary to make compressed air successful at all is a given depth of water. I think that double the depth of water to the lift is required to make compressed air successful, and that is not always to be had. Where it is to be had, I think compressed air is economical under certain conditions.

We have another question here that is a perennial inquiry, or an inquiry every time we have the fruit-growers together, I think. It is contained in a long letter, which I won't take the time to read. It is addressed to Professor Cook, and asks him to bring before this audience the question of variegated leaf. The gentleman does not want theories, but practical experience. He has such leaves and he wants to get rid of them before he goes on planting more fruit. Will Professor Cook tell us how to get rid of the variegated leaf?

PROFESSOR COOK. Some say cold water makes variegated leaf, and I think near Claremont cold water has caused variegated leaf. I know of fruit trees put in a sheep corral, and those trees had a very bad case of variegated leaf. I think if anything affects the health of the tree, or if the tree gets too much or too little water perhaps, it will make variegated leaf. Anything that brings ill health to the tree—lack of proper nourishment, for instance—will cause it. I believe around Claremont the variegated leaf is caused by cold water. Variegated leaf is like a man who is pale—there is something the matter with him.

MR. SCOTT. One cause of variegated leaf is lack of nourishment in the soil. I have an orchard at Duarte that fifteen years ago had this variegated leaf, and it gave me a great deal of trouble. Not only the leaf variegated, but the fruit was very often small and split. I consulted with one or two chemists, and they told me that if I would apply iron to the soil it might have a good effect. I used this stuff called "ferris," from the Woodbridge Fertilizing Company, and used it two years, and to-day I have only one tree that has variegated leaf. As to irrigation, or want of irrigation, I don't think that has anything at all to do with it, for the reason that in the same row of trees and with the same amount of cultivation and amount of water given one with another, you will find one tree with variegated leaves and the others absolutely free from it. So I don't think that has anything to do with it. But I must say that in my own experience this sulphate of iron applied to the

soil cured my trees. I have only one tree on the place now, out of twenty acres, that has a sign of variegated leaf.

MR. KOETHEN. I have an idea that Professor Cook struck the keynote exactly. It may be from one of a dozen causes.

VICE-PRESIDENT GRIFFITH. Professor Cook's theory meets a circumstance of my own that I was going to mention. I recollect incidentally a couple of trees, or a tree here and there on my ranch, that had been cut down to be budded. In some cases I noticed that the branch which had been pruned had budded out, and perhaps the bud had failed, and that that branch was throwing out a very sickly, miserable-looking spotted leaf, evidently coming from a wound there, from a condition of weakness, a lack of something. It came from the wound in that part of the tree, very evidently, the rest of the tree being of a very good color.

We now come to the programme for the afternoon. I am requested to invite Mr. Rowley to speak this afternoon on the report of the Committee on Labor, on the subject of farm labor, put into his hands by the twenty-seventh Fruit-Growers' Convention.

REPORT OF COMMITTEE ON FARM LABOR.

MR. ROWLEY. As secretary of the California Employment Committee, I submit the following report for consideration:

Mr. Chairman and Gentlemen of the Twenty-eighth Annual California Fruit-Growers' Convention: GENTLEMEN—At the twenty-seventh California Fruit-Growers' Convention, held in San Francisco in December, 1902, the Hon. H. P. Stabler contributed a paper dealing with the question of farm labor in California, and in that paper recommended that a committee of fifteen be appointed for the purpose of perfecting plans whereby an organized effort might be made to induce young men and men with families in the agricultural districts of the Eastern States to come to California to reside and engage in orchard and farm work. That committee, so far as possible, was to represent the various fruit districts of the State. In conformity with this idea the following committee of fifteen was appointed: T. H. Ramsay, Red Bluff; A. B. Humphreys, Mayhews; Thomas Jacob, Visalia; A. D. Bishop, Orange; B. N. Rowley, San Francisco; G. H. Hecke Woodland; E. W. Woolsey, Fulton; F. H. Swett, Martinez; Frank Wiggins, Los Angeles; J. F. McIntyre, Ventura; B. E. Hutchinson, Fowler; G. H. Cutter, Sacramento; Robert Hector, Newcastle; F. B. McKeivitt, Vacaville; H. P. Stabler, Yuba City and L. F. Graham, San José.

This committee without delay took up the matter assigned to it, and selected the Hon. H. P. Stabler as temporary chairman. Mr. Stabler issued a call for the entire committee to meet on December 11th at Paso Robles Hotel, Paso Robles, a quiet spot where the committee could deliberate without fear of interruption. Twelve members of the committee responded to the call, as follows: T. H. Ramsay, Thomas Jacob, A. D. Bishop, B. N. Rowley, G. H. Hecke, E. W. Woolsey, Frank Wiggins, J. F. McIntyre, B. E. Hutchinson, G. H. Cutter, F. B. McKeivitt, and H. P. Stabler, and the work of organization was at once proceeded with.

The committee held several sessions during the three days that it remained at Paso Robles, and fully outlined its plans for the future. The farm labor question was considered and discussed from every standpoint that suggested itself.

A permanent organization was effected, known as the California Employment Committee, appointed by the State Fruit-Growers' Convention to Procure Farm Labor. H. P. Stabler of Yuba City was elected chairman; T. H. Ramsay of Red Bluff, vice-chairman; and B. N. Rowley of San Francisco, secretary. The following-named gentlemen were chosen as an Executive Committee: H. P. Stabler, T. H. Ramsay, B. N. Rowley, L. F. Graham, G. H. Hecke, A. D. Bishop, and B. E. Hutchinson.

The vast amount of detail work considered is not necessary to this report. After the appointment of a finance committee, the general committee adjourned to meet at the call of the Chair.

Immediately upon arrival in San Francisco the Executive Committee was called together and plans for the campaign outlined. A proposition from the California Promotion Committee, 25 New Montgomery street, San Francisco, was received and, as that committee was in possession of funds and a well-equipped office force, its proposition was accepted by your committee and a satisfactory understanding speedily arrived at whereby the California Employment Committee made its headquarters at 25 New Montgomery street, San Francisco, in the rooms of the California Promotion Committee, and commenced its labors under very favorable auspices. Funds for the commencement of the work were provided by the California Promotion Committee, and we desire at this time to thank the California Promotion Committee and its executive officers for their hearty support.

The most difficult problem which confronted your committee was as to the best method of making known throughout the Eastern and Western States the wants of California orchardists, farmers, and fruit-packers, and the best possible way to reach the greatest number of workers within the shortest period of time and induce them to come to California to labor in the orchards, vineyards, and packing-houses during the fruit harvest. It was finally decided to select from among the experienced fruitmen of the State such as were accustomed to public speaking or lecturing and who were willing to serve without pay, and send them to the thickly populated agricultural districts in the East on lecturing tours. In accordance with this plan your committee selected George W. Pierce and George B. Lorenz of Davisville, and F. W. and E. J. Crandall of San José. They were provided with two high-power lanterns, for the purpose of exhibiting stereopticon views, together with several hundred view plates, selected for the purpose, illustrating California's industrial resources as well as some of the more attractive places of interest; also scenic views, such as in the judgment of your committee would prove most attractive to an Eastern audience.

These four gentlemen left San Francisco the first week in February, 1903, and traveled in company as far as Manhattan, Kansas. Here the parties separated, Messrs. Pierce and Lorenz visiting numerous small towns in Nebraska, Iowa, and Michigan, delivering stereopticon lectures and distributing a vast amount of literature of a character intended to induce young farmers and others to come to California to reside. The Messrs. Crandall visited numerous towns in Nebraska, Missouri, Illinois, and Michigan, delivering lectures illustrated with stereopticon views of California orchard and farm scenery as well as other scenic and industrial views.

The reports from these lecturers indicate a vast amount of interest manifest in all the towns they visited, and the attendance at their lectures was beyond expectations. The weather was extremely cold; the thermometer often registered from ten to twenty degrees below zero. Notwithstanding this intense cold and otherwise disagreeable weather, the attendance was from 250 to 1,500 people, according to the size of the town and hall in which the lectures were delivered, standing room being at a premium at each and every lecture.

There was no charge made for admission and no collections were taken up. Everything in connection with these lectures was absolutely free. The local daily and weekly papers in the towns throughout the districts visited gave lengthy favorable notices, all of which went to the credit of California.

Your committee had a variety of literature printed for distribution in the Eastern States, chief among which were 60,000 booklets entitled "Grasp This, Your Opportunity," copies of which have already been distributed among those attending this Convention.

The lecturers remained in the field about thirty-five days, and the expenses amounted to a little over \$300 each. This included local railroad fares, hotel bills, advertising, rent of halls, telephoning, telegraphing, and many other small necessary items of expense.

The next gentlemen selected to take the field were H. P. Stice and H. C. Swain of Red Bluff, Tehama County. These gentlemen left San Francisco March 4th, traveling together direct to Cincinnati, Ohio, and from that city commenced a tour of the small towns in Ohio. Right from the start they met with encouragement and success, and hundreds of Eastern people, particularly young men and students, were found who were desirous of learning more about California and anxious to come to California to reside. Great quantities of literature were distributed and the beauties and benefits of California made known to thousands of people. Messrs. Stice and Swain were in the field about forty-five days, and on their return reported good results from their labors.

The next gentlemen selected to visit the East in behalf of the committee were Messrs. Murray and Kells. W. H. Murray of San Francisco left for the East on his mission April 13th and will make an extended tour of the Middle Northwest and Atlantic seaboard States. On April 15th, R. C. Kells of Yuba City started for a tour of the East, going by way of New Orleans. He is visiting several of the Southern States and portions of Pennsylvania. These gentlemen give their time free of charge, the committee simply defraying their actual traveling expenses. By this method we have obtained a vast amount of advertising at a small cost by the Eastern press, as they have reported all the lectures, and many of the large dailies have published interviews with our traveling representatives.

The Executive Committee has held several meetings in San Francisco, and as the members of this committee are widely scattered, living as they do in all parts of the State from Orange in the south to Red Bluff in the north, it is a task, I assure you, for this committee to get together. They are obliged to give four or five days' time whenever the committee meets, as two days are occupied in traveling and the committee generally remains in session several days. Thus far the committeemen have defrayed their own expenses, which is no small matter, and everybody connected with this movement has freely given his time. Your committee has, therefore, under the circumstances, the right to consider that it has accomplished a great deal for the length of time it has been in existence. We had a very short time in which to prepare for this campaign, and started our mission without a dollar in the treasury, but in joining with the California Promotion Committee, that committee placed to our credit a generous subscription of \$1,000 and gave us free use of its headquarters, thus placing us in a position to take up and vigorously push the work right from the start. Subscriptions have been received from Woodland, San José, Red Bluff, and Fresno. The following financial statement will show from what sources we received financial aid and how the moneys have been disbursed:

FINANCIAL STATEMENT.

Receipts.

Cash subscription by California Promotion Committee	\$1,000 00
Cash subscriptions from Woodland (raised through the efforts of committeeman G. H. Hecke)	350 00
Cash subscriptions from Red Bluff (raised through the efforts of committeeman T. H. Ramsay).....	560 00
Cash subscriptions from San José (raised through the efforts of committeeman L. F. Graham).....	650 00
Cash subscription from Fresno County Chamber of Commerce of \$25 per month (secured through the assistance of committeeman B. E. Hutchinson).....	75 00
Further cash subscription from California Promotion Committee....	365 00
Total cash receipts	\$3,000 00

Disbursements.

Expenses of lecturers and traveling representatives in the East, 8 in number, to date	\$2,200 00
Printing, stationery, telegraphing, telephoning, expressage, and cartage	78 99
Stereopticon material, including gas, view plates, etc.....	41 85
One standard lantern	85 40
Engraving and printing show cards for store windows.....	50 25
Printing 30,000 booklets, first edition.....	175 00
Printing 30,000 booklets, second edition.....	bill not in
Telegrams to and from the East and local telephoning	19 00
Stationery and rubber stamps.....	8 47
Sundry small expenses connected with the return of lecturers' outfits.....	10 00
Total disbursements.....	<u>\$2,668 96</u>
Total cash receipts.....	\$3,000 00
Total disbursements	<u>2,668 96</u>
Cash balance on hand	\$331 04

In closing this report I can not refrain from calling attention to the able manner in which chairman Stabler has performed the arduous duties imposed upon him. He has given freely of his time and money, having paid his own expenses in traveling about the State. The fruit-growers and farmers of this State have had the benefit of the best efforts that your committee could put forth, and there can be no doubt as to the beneficial results that will obtain from the work already done.

Farmers and fruit-growers of California, it remains now with you to provide work for the hundreds of young men and families that will apply to you during the fruit harvest. Great numbers have arrived, are arriving, and will continue to arrive until the close of the low railroad rates, which will be June 15th next. These people must be provided with work and comfortable living accommodations, and it is to be hoped that you will lend a helping hand and assist your committee in its labors. Statistical blanks have been prepared and mailed to a very large number of farmers and fruit-growers, and the committee earnestly urges that you fill out these blanks and return them to the committee at 25 New Montgomery street, San Francisco.

Respectfully submitted.

CALIFORNIA EMPLOYMENT COMMITTEE,

B. N. ROWLEY, Secretary.

LOS ANGELES, May 6, 1903.

The report was received, and a vote of thanks tendered to the committee for the great amount of gratuitous work its members had done.

VICE-PRESIDENT GRIFFITH. I think the subject of the report calls for discussion at this time. The report is now before you. One very important feature touched upon in the report is the matter of accommodations to farm labor, which I think requires consideration at the hands of a convention of this kind. If we are going to invite farm labor to come from the East to our shores, we require more than employment to make those who come want to stay here.

MR. ROWLEY. The written reports from the lecturers who have been through the East would lead one to believe that there is a scarcity of farm help all over the United States, and particularly so in California during the rush of our busy fruit season. In order to get people who

are competent to take care of your fruit and handle it properly to work in the orchards, some inducement must be held out to them. That inducement at present is a little higher rate of wages than they are receiving throughout the East generally for similar service. But the conditions there are altogether different from what they are here, and those who are engaged on farms there and work in the fruit orchards, except they are residents of small towns and cities and go in the immediate vicinity to work, are provided with comfortable sleeping accommodations, and a place to eat, other than under a shed or tree somewhere; or, as has been written up in the Eastern States, the fruit-growers of California expect a man to sleep in the open air, and sit on a fence during the day, if he has nothing to do, and no place to eat other than as provided for a basket lunch or picnic. In other words, the farm laborers are not provided with accommodations furnished in the Eastern States. In a great many instances these criticisms apply. The only inducement held out here is a change of conditions, a climate, and new scenery. They will come West for that purpose. If treated properly and given proper pay for their services, they will remain. In the outer room, a few moments ago, I heard a couple of men discussing the question of wages in California. One fellow says, "Have you got a job over there?" The other says, "Yes. All I can get is \$1.50 a day and board myself. I went to get board and they charged me \$6 a week. When I get through a week I have \$3 left." They are expecting more than that. The condition of things is such that the fruitman believes and states positively that he can not afford to pay more than \$1.50 a day, where they go and board themselves, or \$1 a day with board. But certainly the people who do the work from early morning until late at night expect reasonable pay, and a great many of them would give more for reasonably good accommodations than the pay. They feel better satisfied when they get better accommodations.

VICE-PRESIDENT GRIFFITH. I hoped that question would be discussed to a large extent this afternoon, for it is a very important one. I know I have been approached by laboring men with reference to the accommodations they get in California, and I know something of the accommodations they get in the East. Where they work for farmers in the East they are practically one of the family. In California they are liable to be outcasts, in many places. However, if there is nothing to be said on the question, I will put the question on the adoption of this report.

The report was adopted.

MR. DORE. I suppose the committee is continued.

VICE-PRESIDENT GRIFFITH. I presume so; yes, sir. It will not be discharged. That is a very important committee to keep.

FRUIT-FLIES AND THEIR EXCLUSION.

BY ALEXANDER CRAW, OF SAN FRANCISCO,

Deputy State Commissioner of Horticulture, and Horticultural Quarantine Officer.

The term "fruit-fly" has been given to a group of dipterous (two-winged) insects that deposit their eggs upon fresh fruits while the latter are nearly or quite ripe and still hanging upon the tree or attached to the plant, and on this account are considered the most troublesome pests the horticulturists have to contend with in countries where they are indigenous, or to which they have been unfortunately introduced.

Repeatedly we have had to burn up importations of infested citrus and deciduous fruits entering the State. To be on the safe side we admit no fruit liable to contain their maggots.

One of the first fruit-flies to demand our attention was the "Morelos orange worm." This pest is supposed to be a native of the State of Morelos, about one hundred miles south of the City of Mexico. From its location we had little to fear from its introduction into California, until railroads began to penetrate and traverse that country, giving rapid transit to perishable fruits and thus carrying the pest to other sections, until now it is to be found in nearly every State of Mexico; and in referring to it we have discarded the name "Morelos orange worm," and use a broader term and call it the "Mexican orange maggot" (*Trypeta ludens*).

When oranges began to reach the Eastern States from Morelos we took immediate steps to prevent their introduction into California, and wrote to the heads of the Mexican railway companies not to receive any oranges for shipment into this State, and were assured that none would be. We also communicated with the United States officials of the Agricultural Department, at Washington, D. C., regarding the advisability of placing quarantine officers to guard against the introduction of such fruit by rail; but in the absence of a Federal law, nothing could be done, and those points are still open. When Acapulco and several other Mexican Pacific Coast districts became infested, infested oranges and sweet limes began to reach us by sea in the possession of passengers and crews on vessels from there, also as freight, and were promptly destroyed by burning, as no dipping or fumigation could be relied upon to destroy the maggot. In preserving the maggots for the cabinet and to send as specimens to the various County Boards of Horticulture in the orange-growing districts of the State, we used 95 per cent alcohol and found they lived from eleven to forty-two minutes therein. Such vitality is probably owing to the fact that in that stage of their existence they live in a solution of citric acid.

When the State Board of Horticulture adopted such radical measures to prevent the entry of such a pest into the orange groves of the State,

the Mexican Government became alarmed and sent out circular letters to the Governors of the various States, urging them to use all possible means to extirpate the pest, in order that the markets of the United States be not closed against their oranges. In part the circular reads: "This Department being desirous of contributing to the extent of its powers, toward warding off an evil of such magnitude from the planters of the country, has deemed fit to address this circular to you, urging upon you the necessity of apprising all growers of the fruit in question of the steps taken by the Horticultural Board of California, and of encouraging them by all possible means to extirpate this pest, which has justly alarmed said board."

No oranges have been received as freight from Mexico since the shipment was destroyed that arrived from Acapulco on Sunday, November 24, 1901, and referred to on page 198 of the Eighth Biennial Report of the State Board of Horticulture. The shipper of that fruit arrived in San Francisco on a subsequent steamer, and from him I learned that the fruit was carefully inspected after it was picked, and again two weeks later before it was packed for shipment. He had gone to all that expense and trouble, as he intended supplying our markets with early oranges for the holiday trade, if the fruit could be selected so that it would pass inspection. We had no trouble in finding infestation in the shipment, and it was burned. The introduction of such a pest into the orange groves of California would soon seriously interfere with the consumption of our oranges.

It is difficult to detect a maggoty orange from external appearance, and only internally when the maggots are full grown and have consumed a good portion of the pulp. The maggot is the same color as the pulp, with the exception of the sharp-pointed mouth, which is black. Very few people would care to risk the possibility of eating from one to sixteen maggots in each orange, so would not use oranges. The Pacific Mail stewards and crews of the various steamers plying between San Francisco and Central American ports have been instructed not to bring any oranges or sweet limes, so we have no further trouble from that source.

During the time the opposition steamers were running between Chili and San Francisco, via Mexican ports, we had to frequently take oranges from the ships' storerooms and even from the tables just set for meals and burn them in the ships' furnaces, in order to remove all possible danger from infestation.

In my report to the State Board of Horticulture, dated June 30, 1902, I referred to a seizure of oranges on the steamship "Tucapel" that called at Acapulco, Mexico. In the presence of the captain, several apparently sound oranges were cut and found to contain maggots. He was so disgusted that he declared he would "never purchase or again eat another

Mexican orange," and in order to settle his stomach he had to partake of something stronger than soda water.

It is not alone from Mexico that we have to fear fruit-flies that attack oranges, for they are found in Fiji and portions of Australia. The maggot of a nearly related fruit-fly (*Trypeta fraterculus*) attacks peaches in the State of Vera Cruz, Mexico. It works in the same manner as the "orange maggot." There is little danger to us from that source, as very few peaches are grown there and none for export. Still, forewarned is to be forearmed, and it gives us a stronger argument in favor of national horticultural quarantine at our gateways. Peaches are extensively cultivated in the United States, and such a pest would in time be a wider spread nuisance than the orange maggot.

Unless our national government takes action to prevent the introduction of infested fruits we can not hope to be long exempt; with the ports of the Eastern and Southern States open, the flies will finally get a foothold.

Since the annexation of the Hawaiian Islands, personal baggage on ships plying only between there and our local ports is free from customs inspection, and there is some danger of the introduction of a serious fruit-fly (*Dacus cucurbitæ*) that destroys 75 per cent of the melon, cucumber, and summer squash crop about Honolulu, where it was introduced a few years ago, I believe, from Japan, as I have found and destroyed cucumbers infested with that pest from the latter country. For several years we have refused admission of the above products from the Islands. Formerly they were imported from there during the winter and spring. After a few shipments had been burned, Byron O. Clark, then Commissioner of Agriculture for Hawaii, took the matter up and questioned my right to destroy any but those found infested. I replied that I had no time to personally inspect every melon, cucumber, and squash to ascertain if it was free from eggs or newly-hatched larvæ of the fly. I suggested that he advise the planters of the Islands not to grow such crops for California, for they would not be admitted. I notified the quarantine officials of the other Pacific States and British Columbia of the danger. Last January, Mr. Wray Taylor, Commissioner of Agriculture, visited us to consult regarding the drafting of a horticultural quarantine law for the Islands. He stated that he had been requested to ascertain if such products as were mentioned above were grown under glass and an affidavit to that effect accompanied each shipment, would they be admitted? I replied in the negative, because we could have no assurance that the ventilators and doors were fly-proof, or that the flies would not be admitted when a person entered or left the glass house. He said he anticipated what my answer would be.

Bermuda has a peach maggot (*Ceratitis capitata*). In referring to this species, Dr. L. O. Howard says: "In Bermuda, some years ago, the

peach crop was almost annually completely destroyed by this insect and this has been practically the case since 1866."

This or a nearly related species was introduced into Western Australia and has now become such a serious pest there that it is almost impossible to raise any marketable fruit, even for home use, and the Government has sent its entomologist, Mr. George Compere, a former Californian, to the Mediterranean seaboard to look up the natural enemies of a similar fly found there. Mr. Compere's instructions are to find the enemy of the pest, even if he has to travel the world over. He has had extensive correspondence with various countries and will visit those that present evidence of the existence of some check to the destructiveness of the fly.

Queensland has a fruit-fly (*Tephritis tryoni*) that attacks all kinds of deciduous fruits and is doing serious damage there. That pest is also reported to have obtained a lodgment in New South Wales. The principal seaport of that State is Sydney, with which we have direct steamship connection and more or less danger of introducing the maggots in fruit brought by passengers. This spring a shipment of 209 boxes of fresh peaches, plums, and pears arrived on the steamship "Sierra," which we immediately quarantined because of the danger of introducing the maggot, as it is practically impossible to inspect and fumigate such consignments and render them innocuous. The fruit was freshly picked from the trees and soon thereafter placed in the refrigerator on board the steamer, thus retarding the development of either eggs or small maggots that escaped the notice of the packers, and made it equally difficult to detect infestation on arrival here. A legal representative of the shipper was present when the fruit was unloaded, and demanded that an inspection of the fruit should be made in his presence, which I positively refused to do, as in my judgment no inspection short of cutting open each peach, plum, or pear could be made that would insure the safety of California's fruit industry. Under Section 3, of our horticultural quarantine law, it was necessary to find infestation in order to commence action against the fruit as a nuisance. The matter was urgent and my refusal to inspect the fruit would act against us should it be taken into the courts. I determined to lay the matter before Mr. Russ D. Stephens, the chairman of the Executive Committee of the State Board of Horticulture, at Sacramento. We submitted the case to Governor Pardee and Attorney-General U. S. Webb, and through their advice an amendment to our horticultural quarantine law was drawn up that would cover such a case. The Legislature was in session at the time and the amended bill was immediately presented and passed both houses without opposition, was signed by the Governor, and now we can stop such imports from countries where such pests exist. Before the bill became a law, however, that shipment, together with the boxes, had gone up in smoke.

THRIPS.

BY PROF. A. J. COOK, OF CLAREMONT.

When a new insect pest comes upon us, or when an old well-known insect appears in a new rôle of mischief, either of which threatens the pocketbook of our people, it becomes a matter of great concern with us all. In all such cases every detail of history is very important.

History.—Late last January I received from an orchardist in Fernando lemons which were seriously marred by brown spotting, that looked greatly like rust, and not a little like the work of the silver mite, yet quite distinct from the latter. Within a few days after that I received from our own county—Los Angeles—from three different persons at San Dimas, both oranges and lemons similarly marked. In every case it was reported that the fruit was fair and perfect when gathered, but became disfigured in about three weeks after the picking. I made careful examination with a microscope, using both high and low powers; and though I discovered no signs of fungus, I did note injury of the superficial cells—the very surface or epidermal cells of the fruit. I reported this through the press. On Monday, February 2d, Mr. H. H. Garstin, of Redlands, came to me with many samples of oranges—some just picked, others picked some days before. The first showed a very indistinct injury, to discover which required very close observation; the other was really the same trouble that had interested me in the cases just reported. I said to Mr. Garstin, “This is plainly the work of some insect, and I know of no insect common enough in our orchard to do it except the thrips; and besides, the thrips is capable of just such mischief.” He replied that Professor Eaton, of Redlands, claimed actually to have seen the thrips doing the mischief. I learned later from Mr. Williams, one of our students, who had visited his home in Redlands a few days before, that the orange-growers of Redlands were seriously anxious about the work of the thrips. They also suggested to Mr. Williams that he study up the history of the thrips, which he did, giving an illustrated article in our college paper, “The Student Life.” Thus the suggestion of thrips was first made by growers at Redlands. The first mention of thrips in print, so far as I know, was in the Los Angeles “Times” of February 4th, in a report of our Claremont Pomological Club, at which meeting I first called public attention to the injury and the probable agency of the thrips as the cause. Mr. Garstin also stated to me at the same time, February 2d, that fruit left on the tree must recover, as early picked fruit was spotted, while that picked later was free from blemish. This important truth seems now fully established. We are not surprised that this is so. The insect is very minute and the injury is very slight and very superficial. If the fruit is picked it fails to receive more sap and the

cells do not heal and become discolored and badly spotted. Left on the tree, they recover and no spots appear. This is a very important truth, as it will urge the delay of picking, which will result in giving the consumer much sweeter fruit and our California oranges a much better reputation. Mr. Garstin also stated that the spotting had been observed for two or three years; that it was first alarming last year, and that the present year often as much as 10 per cent of the fruit was ruined. As this spotted fruit was mixed with the other, it often led to rejection of the entire carload.

On February 13th, Messrs. S. A. Pease and G. R. Holbrook, Horticultural Commissioners of San Bernardino County, came to my laboratory with more of the spotted oranges. Mr. Pease, whom I have always found most cautious and accurate in all such work, also brought the thrips, which I placed under a microscope and exhibited to the students and the commissioners. Mr. Pease had closely observed the thrips at work, had taken as many as fourteen from a single spot, and only found the thrips on oranges, where the spotting was much in evidence. He found this true: no spots, no thrips; much spotting, many thrips. I have taken as many as thirty thrips from a single orange or lemon blossom; Mr. Pease has taken even more. Mr. Pease is worthy of all praise for the intelligent, energetic, untiring work that he has put into this study. He has surely changed hypothesis to fact, and all this with very little or no aid from other investigators.

Why the Change.—Many wonder why spotting occurs now and did not in the earlier years. This is no surprise to the entomologist. Insects change their habits. Every year witnesses the black scale anchored on new and different food plants. Again, insects often change from one part of a plant to another, because of change in the plant. Many species of *Lecanium* work when young on the leaves, but as the leaves become dry from age or lack of sap, the young scale hie themselves to the branches. Thrips usually work on leaves and blossoms and the tender stems. It would not be strange if they, upon occasion, should betake themselves to the fruit, and who could wonder that if one of our magnificent Navels were once tasted it should hold the banqueter to further feasts? It may be true that some condition of the tree, either from weather or soil change, makes the leaves less juicy and palatable, and thus the thrips in search of new and better pasture-ground betake themselves to the fruit. The fact that spotting—thrips injury—is most marked early in the season and disappears later would argue in favor of this second view.

Description of Thrips.—The thrips are very minute, so minute that even good observers may fail to note their presence. The one in question is only about one twenty-fifth of an inch in length. They are also ubiquitous. Hardly a leaf or flower, twig or grass blade that does not

exhibit more or less of some species of these lilliputs. Again, they are very long and slim, and many—most, when mature—have very long, slender, fringed wings. When not in use these wings lie flat on the back of the insect, so that the slender form is still maintained. The first stage, or larva, is quite like the last, or imago, except there are no wings. The pupa looks like both the larva and the imago, but curiously enough is inactive. The head is nearly square; sometimes longer than broad, and in other species the reverse is true. The compound eyes are as usual, and the three usually placed ocelli are often present. The antennæ are prominent, and from six to nine jointed in the adults, though fewer jointed in the larva. Our species, which the authorities at Washington pronounce *Euthrips tritici*, but which to me seems nearer *E. occidentalis*, if the two are not varieties of the same species, shows eight joints in the adult and only four in the larva. The relative lengths of the joints and the hairs on them are of specific importance.

The mouth organs, while structurally mandibulate, that is, fitted for biting, are functionally succatorial, or haustellate, that is, fitted to pierce and suck. We see, then, why the wound to the orange peel is so slight. The insect is very tiny, the mouth organs exceedingly diminutive, and so in their puncture and sucking the merest trace of injury is wrought. No wonder the wound is so obscure. No wonder that it heals entirely when the fruit remains on the tree.

The thorax is not especially peculiar, though its appendages, the legs and wings, are greatly different from the same in all other insects. The six feet all end in a sort of bladder, or sack, which functions, in lieu of the usual claws, to hold the insect to leaf or twig. These sacks can be drawn in or pushed out by blood pressure, which is always done as the foot is set down for use. This fact gives rise to the name *Physopoda*, which is sometimes applied to these insects. The word means bladder-foot. The wings are equally peculiar. They are long, slender, with very few veins, and beautifully fringed. The fringe gives added spread with little added weight. The form, veins, and extent of fringe of the wings aid to determine the separate families, of which there are three. The abdomen shows ten joints. Its form, the hairs which it bears, and the presence or absence of ovipositor are of value in classification.

Order Thysanoptera.—The great Linnæus placed all these insects in the genus *Thrips*, hence this word is singular as well as plural, and always refers to this peculiar type of insect. We still have the genus *Thrips*, family *Thripidæ*, and the word *thrips* with various prefixes, to designate several genera. Linnæus placed these with the bugs, lice, aphids, scale insects, etc., in the order *Hemiptera*. True they are sucking insects, but the wings, the mouth organs, and transformation are all utterly different from the same in all the great bug group. For this reason, all entomologists now wisely separate them from the

Hemiptera and we may know them as Thysanoptera. The order is well named Thysanoptera, as it means tassel-winged, which name, from the insects' fringed wings, is peculiarly appropriate. As we have seen, their wings are different from those of any other insect. We have also noted their peculiar mouth, which is structurally mandibulate, though functionally it is suctatorial. Thus they are on the fence, as it were, between two great groups of insects: those with typical mouth parts, fitted for biting; and those modified to adapt them for sucking. These two groups contain practically all insects except these Thysanopterons. Once more, all other insects either pass through complete metamorphosis from egg to adult where the larva, pupa, and imago are all totally unlike and the pupa inactive, or else incomplete, where the three stages are much alike, except for absence or partial development of wings, differences of development in reproductive organs, and in size. In this group the pupæ are always active. These eat ravenously, and are like the larvæ, except that they have stubs of wings, and are larger, and also like the adults or imago, except that they do not have fully-developed wings. Here again the thrips is a sort of go-between; it is in appearance like the bug and locust, incomplete in its transformations, yet it is inactive like the pupa of the other groups. For every reason, then, we do well to separate these lilliputs, and, few as they are—scarce fifty are known in our whole country—place them in an order by themselves—the Thysanoptera.

Habits of Thrips.—Without doubt most thrips are plant-eaters. Some of our best authorities have pronounced some as predaceous on other insects. Except that some of these scientists are very careful and usually accurate, we would be tempted to think them mistaken and wonder if all thrips were now plant-destroyers. These insects are so small that a mistake would not be strange or unvenial.

It has long been known that one of the most common thrips, *Euthrips tritici*, works on grasses, causing the well-known silver top. They have also been discovered as serious enemies of the onion. Except for their minute size, equal mischief might very likely have been discovered in other lines. I have no doubt that their mischief is far more than is known, and so is very inadequately appreciated.

Natural Enemies.—As each female thrips lays from fifty to seventy-five eggs, we are certain that, numerous as they are, they must have innumerable enemies. These are both animal and vegetable. Insects are the chief of the first and fungi of the second. Some of the Coccinellidæ—ladybird beetles—especially species of *Megilla* and *Scymnus*, prey upon them and doubtless kill great numbers. The little *Scymni* also destroy the red mite which has become so formidable a pest in our citrus groves. The green lace-winged fly, or *Chrysopa*, also destroys many of the thrips. The *Syrphus* fly larva, which is so hungry for plant

lice, and which lays us under a vast debt of gratitude for its destruction of aphids, is also a foe to the pestiferous thrips. A predaceous bug, not very distant in relationship from the bedbug (*Triphleps insidiosis*), is often seen with a thrips on its beak or rostrum. It also banquets on aphids and young scale insects. Without doubt sporozoa and fungi prey upon thrips. Thaxter has taken a species of *Empusa* from larval, pupal, and adult thrips which it had destroyed. Pettit thinks he has taken a sporozoon from thrips in Michigan. But without doubt rain is the most formidable enemy of the thrips. I feel certain that a heavy, dashing rain will kill them by the millions. Possibly our misfortune of the past two months is to be coördinated with our gentle rains and absence of severe downpours.

Remedies.—Without doubt the distillate spray, which I believe is to be the greatest boon in the way of insecticides yet discovered, will be quick death to the thrips. Thus it will give a triple benefit: kill the scale, with many of their eggs, and destroy them in more mature growth than will fumigation; kill the red mite (red spider), and many, if not most of their eggs; and last will kill these baneful thrips. I have yet to hear of any spotting of oranges in orchards that were sprayed within a few weeks of the time—February—when the spotting occurred.

PARASITES OF INJURIOUS INSECTS.

BY DR. W. B. WALL, OF SANTA ANA.

Possibly many of us have not given sufficient thought to the wonderful work and incalculable value of the parasites of injurious insects, many of them so small that they can scarcely be seen by the unaided eye, and yet they have done a work impossible to man. Without them, in a very few years, injurious insects would consume or destroy nearly all vegetation; so our very existence is largely dependent upon them. After their beneficial mission has been accomplished, they in turn would become an intolerable nuisance but for their self-limitation by the consuming of their own food supply. In this way nature keeps up an equilibrium, except where man interferes with her plan, by transplanting to a new field, injurious insects to pursue their work of ruin, unrestrained by their natural parasites.

It is needless to say that California is preëminently kind to all life, animal and vegetable, and that man has been drawn here from every quarter of the world. Either carelessly or ignorantly, he has brought with him, or afterward imported, many, if not all, the injurious insect pests with which we are afflicted. It matters not how they get here; when here, they live, multiply and destroy.

Horticulture in this State has been damaged many millions of dollars by the bringing in of pernicious insects without their parasites.

The cottony cushion scale (*Icerya purchasi*) alone, would ere this time have made California a barren waste, if no parasite had been found to arrest it in its fearful ravages. It devoured all vegetation except cone-bearing trees, and human effort was powerless to suppress it. The little Australian ladybird (*Vedalia cardinalis*) came to the rescue, and in an incredibly short time brought relief. This and many other beneficial insects have been introduced through the efforts of the State Board of Horticulture. There are other destructive scales which we have been fighting for twenty years with washes, sprays, fumigation, cutting off of tops, trunk scrubbing, etc., and have learned in the last few years to keep them fairly in check. In doing this, however, we have expended hundreds of thousands of dollars, and lost in quantity and quality of fruit and tree a vast sum of money, and the fight and expense still go on.

Except the cottony cushion, the most destructive scale to citrus trees, and among the most difficult to kill, is the red (*Aspidiotus aurantii*). The yellow (*Aspidiotus citrinus*) and the black (*Lecanium oleæ*) have also been a heavy tax on tree and purse. The deciduous trees (apricots, prunes, pears, etc.) have their share of scales.

With two exceptions, the codling-moth (*Carpocapsa pomonella*) and the purple scale (*Mytilaspis citricola*), there are, for all these hosts of harmful insects, legions of parasitic and predaceous ones to keep them restricted to comparatively harmless numbers.

Now it is not so much whether we have or have not parasites, as it is what they will accomplish. In order that we may have some idea as to what may reasonably be expected, we will refer to a few instances out of many as precedents for faith in their efficiency. Florida, about 1835-1840, believed her orange groves doomed to utter ruin, but they were rescued by a little chalcid fly. Australia had a like experience.

In the early fifties, according to reliable report, the orange groves of California were being destroyed by the soft brown scale (*Lecanium hesperidum*); some trees were killed, others were following to the same fate. No fight was made by the grower, except to cut off the tops and scrub the trunks of the trees; spray or fumigation not having been introduced. In time the chalcid fly (*Coccophagus lecani*) put in an appearance, freed the groves from the pest, and let them return to their former beauty and fruitfulness.

The citrus groves of the San Gabriel Valley, for many years greatly damaged by the yellow scale, have been freed by the golden chalcid fly (*Aspidiotophagus citrinus*). And now come reports from all along the coast of the disappearance of scales, especially of the black and San José, as result of the work of parasites.

In further evidence of the value of parasites, I will state conditions

found through recent personal investigation. In a district south of the City of Los Angeles, a number of old groves, which were once badly infested with red and black scales, are now practically free from both, without having been sprayed or fumigated for a period of from three to five years. The pepper trees in the vicinity are also clean and bright.

In the Santa Ana Valley of Orange County the same trees which for years were condemned and destroyed in large numbers because of the prolific breeding of black scales upon them, are now free from scales, and instead of being an injury to our valley, they have proven a benefit, inasmuch as they have served as a home and breeding-place for several useful ladybirds (especially the *Rhizobius ventralis*, which is both parasitic and predaceous), they having found their way from these to citrus trees, where they are now in considerable numbers, except where they have been destroyed by recent fumigation or spray.

After diligent search, I have been able to find only one small orange orchard and a solitary lime tree that have not been sprayed or fumigated within the past eighteen months. These have not been treated for more than four years and are now free from all scale pests, the black scales having been destroyed by the ladybirds, and the red, evidently, by the golden chalcid fly which was brought into the valley some years ago from San Gabriel, but whose work had attracted no attention until August last, when upon investigation, it was found in greater or less numbers over the entire valley. Where permitted, it is now doing a wonderful work, and but for having been held in check by annual fumigation or spraying, would have practically rid all orchards in the valley from the red scale.

We have also the Chinese red scale parasite, which is undoubtedly a valuable one.

In addition to the parasites mentioned, we have recently imported two for the black scale: *Coccophagus flaro scutellum* and the *Scutellista cyanea*, which have been pretty well distributed throughout the State by our horticultural quarantine officer and entomologist, Mr. Alexander Crow, who has rendered such splendid service.

We are now fighting the codling-moth and purple scale (*Mytilaspis citricola*) with artificial means, and it would be impossible to estimate the value of parasites for these pests. Recently I visited an orchard, which since August last has been fumigated twice, and sprayed once with distillate by the most approved method; and there are still enough live purple scales left to thoroughly infest the trees within twelve months, if no further treatment be resorted to. This scale fortunately spreads rather slowly, but is a persistent stayer when it makes lodgment.

Mr. Crow informs me that the State Board of Horticulture has knowledge of the whereabouts of a parasite for the scale just mentioned, and is making efforts to have it introduced.

We should not allow ourselves to be led into a fancied security because we have learned in some measure to control the pests we already have (nearly all of which have been imported), for there are many others, with the importation of which we are daily threatened, either from other States of our Union, or from foreign countries. I will mention only the white fly of Florida, the orange maggot of Mexico, and the melon maggot of Honolulu, any one or all of which may be brought in at any time, by the almost daily communication by rail or steamer.

To be properly safeguarded we should have a force of competent entomologists, backed by National as well as State laws, continually on the outlook to prevent the introduction of all harmful insects, and to seek the world over, if need be, for their parasites, should harmful insects in any manner escape the guards and enter the State. To do this will require a very small amount of money compared to the loss that must result from the introduction of even one of these pests, for instance, the orange maggot (*Trypeta ludens*), which is doing fearful mischief to the orange industry of some of the Mexican States—no fruit from the infested districts should be allowed admission into the United States.

Should not these facts convince us that our best and most rational method of fighting insect pests is to procure and protect their natural enemies?

Only a few of the most salient points of this broad and important subject have been touched upon in this paper.

VICE-PRESIDENT GRIFFITH. We will now have time for discussion of the papers that have been read.

MR. DORE. Mr. Chairman, I would like to ask Professor Cook if this insect is a half-brother or closer relation to the thrips that does us some harm in the grapevine industry by destroying the foliage?

MR. COOK. I do not suppose it is. The insect that has done so much damage in the Fresno region is not a thrips at all. I think it is an entirely different insect. Now, I think Mr. Cooper didn't emphasize too strongly yesterday the importance of this seeking of beneficial insects. It has seemed strange to me all these years that the fruit-growers do not demand that. And I was sorry yesterday that Mr. Cooper seemed discouraged, for I do not think we ought to get discouraged in a good cause, and should continue our efforts until we win. Ten years ago we were working to get a fertilizer law, and we didn't get it until this winter. And if you had heard from Sacramento, as I did, you would know that they took a big hold of it this winter. The Governor told me that he had had a great number of letters and telegrams against the signing of the bill. And two bills this winter we would not have gotten if it hadn't been for the talk we had, and we have got all the six laws we asked for. I think that is encouraging, and I believe if the gentlemen here will say,

"We will have a law of that kind next session," we will have it. And why shouldn't we? It would cost nothing compared with the advantages we would derive from it. When, as Dr. Wall says, it is probable that all of these insects have, in their native land, a natural enemy which will hold them in check, we are justified in the belief that if we could get these natural enemies here they will hold these insects in check here. I want to speak of something which occurred in Washington that has, I think, sublimity in it. Twelve years ago Professor Erwin Smith was appointed to look for the cause of peach yellows. You all know what a bad enemy that is to the peach. I hope we will never have anything like it in California. At the end of the first year he reported, "I do not know anything about it more than I did when I commenced." The Government said, "Go ahead." The second year he made a similar report, and the Government said, "Keep on." The third year he said, "We haven't anything important," and the Government said, "Persist." And so on, for all these years. There is not much discouragement about that. I say, let us not be discouraged, not give up, but let us go to the Legislature determined to win, and let us have a man appointed, to be kept in the field all the time—the best man we can get. We had a good one—the man who went off and was stolen away from us. I do not believe in trading off a good horse when in the middle of a stream, and I think probably he is just the man. But we ought to have a man there all the time, because it seems to me the possibilities of it would be just tremendous and would do away with this matter of spraying, fumigation, or anything else, in very many cases; and I hope we won't get discouraged, but demand this measure from our Legislature. Mr. Cooper said yesterday, "Let us go to Congress." I do not believe we would have half so good a chance there, because the whole country is not so interested as we are. Our interests are so concentrated; it is the fruit interest, and a matter of so much importance to us. And I believe that the place for us to work, and work effectively—and we can do it if we say we will—is with the next Legislature, and have some man go into this field and keep right at it all the time.

MR. SCOTT. I do not disagree with the gentleman. But I say that the fruit-growers are the people who are interested in this question and if we want any help we ought to help ourselves. We now have an organization down here for handling our fruit—citrus fruits, at any rate—and there is no reason why we could not do this work ourselves. If the growers will agree to subscribe one cent a box for all the fruit they ship, they can employ their own man to do this work—employ him and pay him well—one man or half a dozen, if you will. One cent a box will pay for all that work. There will be no politics in it, but work, and we will get done what we want. We can get half a dozen men all over the world to work for us for one cent a box, and we do not

need to ask the Government, or Sacramento, or anybody else, but do it ourselves.

PROFESSOR COOK. I would like to hear from Mr. Pease. He is a modest man, but he has done a lot of interesting work in this matter, and I would like to here from him.

MR. PEASE. That is on the subject of the thrips, I suppose?

VICE-PRESIDENT GRIFFITH. Yes, sir.

MR. PEASE. My attention was first called to the thrips business on the fourth day of February. A couple of gentlemen called with specimens. Some of these specimens had gone in a regular shipment of oranges to New York, and the fruit had been returned to show the condition in which they arrived in New York. The specimens were exhibited and the spots were dark brown. Where the thrips had done the work they were brown all around. The gentlemen were uncertain—did not know what was the cause of the spots. They came to me from Professor Cook, and asked me to send specimens to L. O. Howard. So I sent to Professor Howard, by express, a box of the oranges with spots on them, asking him, if possible, to take measures, even to the sending of a man here to find out what was the cause of the spotting. I also sent specimens by mail to Newton B. Pierce, of Santa Ana, who is in the Government employ. After I had sent those away I took my little glass—I carry a pretty good hand lens—and studied the orange a little myself. Right in the spots, on fresh specimens from the orchards, I found the molted skins of minute insects; and I wrote to Professor Cook what I had found, and said that from the nature of the work I should expect to find a minute sucking insect. On the 12th of February, eight days later, I went into the orchard where I had been told there was the worst spotting, and when I found the oranges that showed the fresh marks of the cutting, there I also found the insects at work, and I procured probably a hundred specimens by taking my knife and shaving off a little piece and dropping it into the phial. The first two times I went to the orchard I got all the way from one to fourteen insects from a single spot, showing that the insects are gregarious, that is, they go in numbers. I brought those specimens to Professor Cook, some of them, and sent some to L. O. Howard at Washington. By the way, after I had sent the box of fruit by express, I received from Washington a letter that was not very encouraging. Perhaps some of you may have noticed the newspaper controversy on the subject. L. O. Howard stated that placing a piece of the orange under a microscope failed to show any indication of insect work. But as soon as I found the insects I sent him a bottle of the specimens on those little chips that I had taken off and placed in diluted alcohol. And in answer to that letter he stated that I might be right. Or, by the way, C. L. Marlatt, assistant to Mr. Howard, in the first letter, in the absence of Mr. Howard, stated I might be right in assigning the damages to the oranges to these

insects, which were a species of thrips. And he gave the name of the insects as *Euthrips tritici*. But Mr. Cook gave the name of *Euthrips occidentalis*, and from later reading I am of the opinion that Professor Cook's name is the right one. I have occasionally found the black thrips with them, so I think there are two species. As I before stated, I also sent a phial of the specimens to Newton B. Pierce, of Santa Ana. The first letter of mine that he answered, he stated that I might be right. And the last one—perhaps I might read just an extract of the last. The letter is from Newton B. Pierce, dated Santa Ana, California, April 15, 1903. I sent specimens of apples to him, and after answering that, he referred to the orange trouble. He says: "Relative to the orange trouble, I will say that the study I have given it for years past shows no evidence of bacteria or a higher fungus present which could explain its causes, and is wholly in favor of your view and observation. Personally I think it probable that you are correct." So, you see the authorities are pretty well in line. Newton B. Pierce says I am right in assigning the damage to the thrips; L. O. Howard says I am right; C. L. Marlatt, assistant to L. O. Howard, says so; Professor Cook says so; and I think so. (Applause.)

MR. KOETHEN. It appears to me from this discussion that there must be several causes that have been at work spotting fruits throughout the past winter. In speaking to an inspector of fruit cars at Riverside the other day, he told me that he found that fruit which was picked while the dew was on the trees and brought to the packing-house would spot before it was packed, if it was kept there for a week or ten days. Now, it might possibly be that the injury was first made by some insect like this thrips, and that the moisture in that injury would cause the spotting. I raise this question for the purpose of finding out whether that is the case. Certain it is that he found—and he is perfectly competent to judge—that the spotting of the fruit was invariably before the fruit was thoroughly ripe, when it was picked with the dew on the trees. And he passed the word along the line to all the packers and the association for which he was working not to allow any fruit to be picked while the dew was on the trees, and it remedied the trouble at that time, while the fruit was still immature.

MR. PEASE. All this fruit that I have been examining has been good, and you can see the work of the insect before the fruit has ever been in the packing-house at all. You can find the work of the thrips without trouble, if you are looking for it. It is so slight that the graders can pick the fruit and pack it and get it out of the way. For that reason much of it gets into the shipments. In order to prove this theory, two packers have taken a dozen boxes of the fruit, marked them, and packed them away for the length of time the fruit would be in transit if sent to market, and at the end of the time the fruit was spotted, and in these spots are the thrips. Further than that, I have

found the thrips at work, and taken fourteen off of a single spot, and when you take those off you can see five or six thrips in a little piece that would go in a homeopathic phial. It is not a fungus. As you see, Newton B. Pierce acknowledges to having worked in his laboratory for the last three years or more on the fruit that was sent to him, and he says that he has never found evidence of bacteria or the higher fungus. So it is caused by the breaking down of the epidermal cells. And if the fruit is picked before that has time to heal over, it will become brown in spots; if it is left on the tree after it is first marked early in the season and the thrips leave it, that spot will heal over. I have seen a great many instances of that.

MR. STONE. When this experiment of the box was made, did you find the thrips on the spots?

MR. PEASE. If you pick an orange and drop it in the box, I will guarantee that you will not find a thrips there unless it is in the end of the Navel or it is living in the larval state. Mr. Marlatt said to me that it was not strange that they didn't find evidences of the thrips, or didn't find any thrips there, because evidently they had been brushed off while the specimens were in transit. They are on the surface, a small insect, and if you pick an orange and then drop it, the thrips will fall off.

MR. STONE. Had the fruit in the experimental box been brushed or washed, or simply taken from the tree and put directly into the box?

MR. PEASE. The oranges are taken as they are picked. The packers do not brush the oranges in this locality. The oranges are perfectly bright.

MR. CRISP. Two things have been brought out in this discussion: One is that the thrips thrives on all vegetation. The other is—or the deduction made from the statement would be reasonable—that it only works injury at a certain time of the year, because the statement was made that the fruit picked at a certain time showed injury, but if left on the trees the injuries would heal. And this fact was used as a double argument for picking fruit later, thereby avoiding the injury and at the same time giving more marketable fruit. Now, as a remedy has been offered in the distillate spray, how far should we extend that spray? Only to our lemon trees or orange trees? Or, what immunity would you get from merely spraying our fruit trees? If the thrips is such a universal menace it would seem that merely spraying our fruit trees would be of but temporary advantage. Then again, if it is determined that the thrips only thrive or do injury at a certain time of the year, it is important to know what that time of the year is, in order, if spraying is of advantage, to do it at the proper time.

MR. PEASE. I think I can answer part of that gentleman's question all right. You will understand that I took up this matter individually very late in the day. The gentleman who called my attention to it said

that the bad effect from the work of the thrips is seen some years as early as December. In following up my examination this year I found that the spotting kept up into February. Some of the oranges would spot as late as that, or until the fruit gets so ripe that the insects fail to work very much, and then they went onto the lemons. In our county we have one man whose business it is to follow up the thrips and note every change. For instance, one of his particular instructions is to watch and see when the thrips first go onto the new fruit. Further than that, I will say that the thrips do not affect all orchards alike. For instance, when I first went to find the work of the thrips, I was told that the worst spotted oranges came from a certain orchard. The fruit of that orchard was all picked. The next orchard was pretty nearly picked. And I went there to look for them, but I could not find either the spots or the thrips. So my idea is, if you want to know the proper time to spray your oranges to avoid damage by the thrips, have an inspection made, and when you find the thrips at work then is the time to spray.

MR. SMITH. I should like to ask Professor Cook whether he has noticed two kinds of thrips—one of them bright on the thorax and the other almost entirely dark? Those that are bright on the thorax hop away. Are very hard to catch. Have you noticed that kind?

PROFESSOR COOK. Yes, nearly all hop. They do not hop so much when they get more fully developed. In the larval state they are great hoppers. And there is a black thrips, but that is not the one that works here. This is a yellow thrips.

MR. SMITH. You think it is all one variety?

PROFESSOR COOK. I think those that I have seen working on the oranges here—the yellow—are. We feel very certain of four different kinds, but there is only one that works on oranges, so far as I know. And that may be *tritici*. I am not at all certain it is not. They are very much alike—very little difference, indeed, between those two species.

PROFESSOR PAINE. I can give you my observations on that point. They say they are upon lemons, and of course it is so. I have not noticed them on my lemons, but at one time I concluded that they were infesting the Navel orange, because of the housing it afforded them. At the same time that I saw they were abundant on the Navel orange I saw that they had crowded into the navel cavity, which seemed to shelter them both from its position and the overhanging way of the orange; and I found them very abundant, and early in the morning when it would be cold and damp they would be nearest that navel. Later in the day they would spread farther from it. And at the same time I would note my seedlings, Valencia Lates, St. Michaels, and Mediterranean Sweets; and at no time during the day did I find any thrips at all there. Later I have seen a few on some of those oranges, but very few indeed. I never saw any on my lemons.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. John Dore, chairman of the Committee on Resolutions, reported, for the committee, in favor of Mr. Griffith's resolution in regard to freight rates and time-limit of haul. The report was adopted, and, on motion of Mr. Berwick, the resolutions were adopted as presented.

Mr. Dore also reported favorably from the Committee on Resolutions the resolution asking assistance of State and Federal governments for scientific experimentation for the investigation of citrus-tree diseases. The report was accepted and the resolutions adopted, as follows:

Resolved, That it is the opinion of the fruit-growers assembled at this the twenty-eighth annual State Convention, that the time has come when the citrus interests of the State demand the assistance of either the State or Federal Government in the study of citrus-tree diseases, and methods of orchard care and packing from a scientific standpoint, and the establishment of an experiment station for this purpose.

Mr. Dore also reported favorably from the Committee on Resolutions Mr. Berwick's resolution asking for the establishment by the Federal Government of the parcels-post system, and on motion of Mr. Hartranft, the resolution was adopted.

RESOLUTIONS OF THANKS TO SENATOR BARD.

Mr. A. P. Griffith, chairman of the committee appointed to draft resolutions thanking Senator Bard for his stand in the Senate on the question of reciprocity, reported the following:

WHEREAS, The fruit, sugar, and other industries of our section demand a tariff protection to offset labor conditions of competing fruit and sugar producing countries and long freight haul to markets; and

WHEREAS By the treaty of reciprocity with Cuba, our nation is endeavoring to pay a debt of charity to a needy people, almost entirely at the expense of California producers; and

WHEREAS, In the position taken by our Senator, the Hon. Thomas R. Bard, our Senator stood almost alone in defense of our protection, even to antagonizing his party colleagues and the administration of our honored President, thus standing for principle; therefore, be it

Resolved, That the Hon. Thomas R. Bard, Senator from California, has done a service to his constituents and is entitled to our heartfelt thanks, and we California fruit-growers, in convention assembled, this 6th day of May, 1903, extend to Senator Bard our thanks for the stand he has taken in the apparently hopeless task of trying to defeat legislation which he thought, and we think, is inimical to our interests and unfair, in that it was attempted to pay a debt of our whole people at the expense of a few.

Resolved, That a copy of these resolutions be transmitted to Senator Thomas R. Bard, and to His Excellency the President of the United States.

On motion of Mr. Koethen, the resolutions were adopted by a rising vote.

On motion, a recess was taken until 8 o'clock Wednesday evening.

EVENING SESSION—SECOND DAY.

WEDNESDAY, May 6, 1903.

The Convention was called to order at 8 o'clock P. M. President Cooper in the chair.

ADVERTISING CALIFORNIA.

BY J. A. FILCHER, OF SAN FRANCISCO.

A consciousness of the fact that there are advantages for homeseekers in California greater than exist in older communities and which can not all be utilized by the present population, coupled with the further fact that more people mean more business and greater general prosperity for those already here, should give a stimulus to the work of advertising this State and insure the active co-operation of every enterprising citizen. It is true, to be sure, that well-intended efforts do not always meet with satisfactory results. Sometimes they fail for want of effective methods, sometimes for want of proper support, and sometimes for want of both.

Exploiting a great State like California, with its varied natural conditions and multiplied resources, is a stupendous undertaking, and to be successful must be entered upon with a proper conception of conditions abroad, with a knowledge of the State and its possibilities, and with a realization of the immensity of the field to be covered. Equipped with these essential requirements the work must be persisted in without any abatement of energy, and with a steady determination to utilize the best discriminating intelligence available in selecting those lines of effort that promise to be the most effective.

Many thousands of dollars have been wasted by well-intending organizations, because of their haste in accepting propositions made to them too often by parties who had a selfish interest to serve. Other thousands of dollars have been expended in costly literature, which failed of its purpose for want of proper distribution. There have been instances where as many copies of a costly pamphlet rotted in cellars or molded in garrets as were distributed; while tons of extra editions of papers and periodicals, printed to satisfy the advertiser or fulfill an unreasonable contract, have never seen the light of day. Not long ago the writer went into a county to plead with the Supervisors on the importance of supplying the State Board of Trade with literature on their locality. After he had concluded his remarks the clerk spoke up and

said they had a lot of printed matter that had been gotten out at the time of the Midwinter Fair, but nobody seemed to call for it. As a result a large edition of neat pamphlets was rescued from their hiding-place, and after they had been sent abroad on their mission through the agency of the State Board of Trade the result was so satisfactory that another edition was gotten out, and the county referred to has kept itself supplied with literature ever since.

This work pays when conducted on practical and intelligent lines. It especially pays California, which has so much to offer. That portion of our State comprising the counties embraced in the territory lying south of the Tehachapi range of mountains has expended in advertising some millions of dollars, and if the prestige gained to that section by reason of this expenditure were transferable it could not be bought for ten times what it cost.

Landholders in that part of the State began many years ago to send out literature calling attention to the advantages they had to offer. The investment proved profitable, and they have kept it up. Notwithstanding that the southern portion of California, by reason of this effort, is known abroad to-day better than any other part of the State, the people there are printing and distributing more literature than ever before.

In the northern and central portions of California more or less of the same kind of work has been done in the past years, but it has generally been spasmodic, and too often directed on impractical lines. Much of the time the body with which I am connected has been unable to get literature on the different counties north of Tehachapi, and has often been subjected to the humiliation of having to admit that it was out of pamphlets on this, that, or the other county which parties by letter or otherwise may have asked for. The southern counties never thus embarrassed us. Their literature has always been available, and there have been times when about all the printed matter on hand, except our own publications, was that relating to Southern California.

I am pleased to say that these conditions are rapidly changing for the better. Within the last few years there has been a general awakening in the northern and central portions of the State, until to-day nearly every county of prominence has one or more local organizations engaged in exploiting its advantages. The State Board of Trade now has pamphlets at its disposal on about thirty counties, and necessarily most of them are north of Tehachapi.

This new awakening and resulting improvement in the conditions are gratifying to all Californians, because, while it means no diminution of interest in Southern California, it means greater interest in the whole State, and the result is manifest in the fact that while the southern counties are still being crowded with newcomers, San Francisco is experiencing a phenomenal growth, and many portions of Northern and Central California are rapidly filling with a desirable population.

A great deal of the literature, however, lacks directness; but improvement in this as in other things will come from experience. The average inquirer wants specific information. To illustrate: Some time ago I received a letter from a man in Great Falls, Montana, who said: "I take the liberty of writing to you for such information as would be useful to a man who contemplates settling in your State and engaging in the fruit-raising business."

I sent him ten pamphlets on ten leading fruit counties, and in my letter I told him if he desired further or more specific information to let me hear from him again. In due time he wrote me another letter, as follows:

I have read the pamphlets you were kind enough to send me, and I confess they are interesting and rather alluring, but except the circular on "California's Climate," none of them tell what I want to know. I gather that fruit land rates from \$25 an acre up to higher than I would care to pay. I want to know what the conditions are that attach to different priced land? I would assume \$50 an acre as a medium. What kind of land can I buy for \$50 an acre? How far would it be from market? What could I raise on it? On an average, what would the crop be worth? What kind of people would I be among? What would be the school facilities? Would there be a church within reach? What is the cost of fencing and building material? What is the cost of living? Send me some grocery man's price list. What are the prices of farm animals, horses and cows particularly? I apologize for so many questions, but you see I want to know, before breaking up here, just what I can do with the means I will have when I get there.

We seldom get a letter that goes so far as this one in specific inquiries, but the general tenor of correspondence that comes to us indicates a desire for information more specific than is contained in the general run of California literature. The party who undertakes to write of California or of a county or locality should anticipate all these questions and all others that the inquirer is likely to ask.

Mr. W. H. Mills, who is very practical in this line of work, as in other things, evidently had in mind the wants of the average inquirer for specific information when he prepared the copy for "California's Industries," a pamphlet published by the Southern Pacific Company for distribution at the Pan-American Exposition two years ago. This pamphlet contained more of the kind of information prospective settlers desire than anything that has been published on California for a long time.

California is being advertised more now and better than ever before. The work, however, is yet inadequate and in many instances imperfect. When it shall be done as it ought to be every portion of the world that has a population from which it is desirable to recruit, will be made to know our physical and climatic conditions, and the advantages which this "Italy of America" offers to the settler over any other part of the western hemisphere. Every scrap of literature will be prepared with a special view to the purpose which it is intended to accomplish, and all that is prepared and printed will be distributed so judiciously that little

or none will fall on barren ground. To facilitate this work the man already here should bury his hatchet, take the brads from his heels, and throw away his hammer.

It is gratifying to note the rapid advancement toward these ends, and how readily interior organizations adapt their work to the best ideas. In Northern and Central California the local boards of trade, chambers of commerce, development associations, etc., are rendering the atmosphere unhealthy for that species of biped known as the "knocker," and he is either changing his profession or leaving the country. This is a very encouraging sign. It portends a healthy condition, and when there is a healthy public sentiment among a people in favor of the community in which they live, half the fight for the advancement of that community is won. Hence, if a local body does no more than kill or drive out the "knockers" it will have fully justified its existence and done enough to entitle it to the gratitude and support of every well-wisher of the community.

To indicate how inadequately this work is done at present and how much room there is for expansion, it is only necessary to note that last year the State Board of Trade distributed by mail and otherwise 250,000 pieces of California literature. This on its face seems a large quantity, and certainly its distribution involved a great deal of patient work and a big bill for postage, and yet assuming that none of this went into foreign countries it can be appreciated how thinly this amount would spread over the United States. It would be only one copy to each three hundred and twenty souls. At the same rate it would require three hundred and twenty years to send out one copy of our literature to each inhabitant of this country. At the end of that time the population would have more than doubled, so that at the same rate the State Board of Trade would be further behind in three hundred and twenty years from now in its endeavor to cover the field than it is at present. This calculation does not take into account the vast and fruitful foreign fields which must not be ignored in this line of work. But then the State Board of Trade is growing and its facilities are increasing. Besides, the burden is not all on its shoulders. Other bodies are helping with the work and are doing yeoman service, and these other bodies, we are pleased to say, are multiplying and growing in strength. In addition to these the transportation companies are mighty factors in advertising the State and promoting its development.

The southern counties, as we have said, have been organized a long time, and have been active and effective. The northern and central counties are organizing and are becoming effective. The work grows. All parts of the State appear to be awakening to the importance of advertising. The people, even in some of the remote counties, are becoming infected with a desire to do something for their respective

communities. Inyo is alive and advertising. Del Norte has a board of trade, and even Modoc wants to do something and has written to ask how to do it. They are finding out that money spent wisely in exploiting their resources is a profitable investment, and knowing that wisdom can only come from experience they are showing a disposition to start in the work and expend something to learn how. The south has done and is doing well, and the rest of the State is getting into line. California seems to be entering on a system of intelligent effort.

If we persevere, each institution working harmoniously for the good of all, and all for California first, and our immediate locality second, we will see the work grow as it deserves. The "knocker" will become as extinct as the mastodon, and men of spirit and of progress will be appreciated and emulated. Every good citizen will enlist in the cause, and the increased population and accompanying prosperity that will come to the State as a whole, and to every section thereof, will be so great that we will forget there was ever a time when men discouraged such effort or when one community in California was the least bit jealous of another.

ADVERTISING CALIFORNIA.

BY FRANK WIGGINS, OF LOS ANGELES.

Why this subject was assigned me is a question I am unable to answer. The Committee on Programme are men who have known me ever since my advent in the advertising business, and know I have done little else than advertise California, or a certain portion of it. My methods are familiar to all of you, and the result public property. Why not let it go at that, and not consume valuable time telling facts well known?

No intelligent merchant would nowadays dream of questioning the great value of advertising. The only question is as to the most effective method of advertising. That advertising of some kind must be undertaken to secure business is unanswerably admitted. The merchant who does not advertise might as well shut up shop. Even those who refuse to advertise recognize the utility of it. When they dress up a store window attractively, what is that but advertising?

What is true of an individual or a firm is equally true of a community. The section of country which blows its trumpet vigorously and makes itself heard abroad in the land is the one that forges to the front, provided always—and this is as true of communities as of individuals—that the goods are there when the customer comes to see them, and they are as represented. A big trade may be worked up by a merchant and a big immigration by a section through extensive advertising;

but neither the trade nor the immigration will be permanent unless the right kind of thing is offered to those who are attracted by the notices.

That California has an exceptionally choice assortment of "goods" to offer those who dwell in less favored climes none of us will surely undertake to deny. The thing to do is to place a description of our resources and attractions before as many people as possible who are likely to be tempted to seek a new place of residence. It is generally admitted that no place in the United States has been so thoroughly advertised all over the world as Los Angeles. As a result of this publicity, look at the wonderful growth of this city, from a population of 11,000 in 1890 to one of over 130,000 to-day. The same result would have accrued to the whole State had the same tactics been followed.

The main agencies in this advertising of the charms of Southern California have been the public-spirited press and the Los Angeles Chamber of Commerce and kindred associations. The daily and weekly newspapers and monthly magazines are never weary of telling the delights of life in this favored section. Many of them issue every year highly ornate illustrated numbers, which circulate all over the country and abroad by hundreds of thousands. The Chamber of Commerce works unceasingly by means of attractive exhibits, by circulating a vast amount of literature, and by making exhibits of products at various exhibitions in this country, and when opportunity offers, in foreign countries. It is this latter form of advertising that has done more to bring new settlers to Southern California than any other. The picture or the thing itself is more effective than the printed word with the great mass of people—a fact now generally admitted by publishers. So must an attractive exhibit of products be more effective than the most forceful description of the same. People may doubt the accuracy of written statements regarding our resources and attractions—our enormous pumpkins and our blooming orange groves, with snow-capped mountains in the background. They may even doubt the authenticity of the picture of these things; but when they can see and handle and even taste our products, then even a doubting Thomas must be convinced. These are items on the subject of advertising California.

What has been accomplished down here can be done all over the State; but it must be understood that when once begun you must keep everlastingly at it, and pay strict attention to the business of advertising and nothing else. No side issues can be carried along with this particular work. If you want to advertise the State as a whole, no section, locality, corporation, or individual can be taken in partnership. If it is a locality you wish to push forward, let it be that and nothing else. Individual interests must be dropped and "knocking" eliminated; and, in my estimation, the truth must be told in every instance, if you wish to make your work of a lasting character. You never heard of a busi-

ness enterprise successfully carried on by false representations and adverse criticism of competitors. It may do for awhile, but it will never wear, nor will it induce confidence. You have practical evidence all over California where this character of work has been done, and you, or at least most of you, are familiar with the results. Orchards have been dug up, mines abandoned, ranches and even towns forsaken, and the State given a black eye.

To sum up the matter of advertising California, I would do exactly as the State Board of Trade and the Los Angeles Chamber of Commerce are doing, only on a wholesale plan reduced to business principles: Make either one or both the nucleus for supplies and operating department, and, like the Fruit Sellers' Agency, establish agencies all over the United States, filled by men fully capable of talking any and all sections of California, who have no interest in any one section more than another—men who work more for the love of the State than for the salary (and let me say here that the salary should be a good one, a fact nearly always lost sight of), men who can be approached by the seeker of information with the confidence of being treated only as a Californian should treat a stranger. Make these agencies bureaus of information with exhibits attached, where a man can be supplied with demonstrated as well as illustrated information—these bureaus to be portable, taken from one section to another, when and where deemed advisable. Over these exhibits should be placed a capable chief, whose duty it will be to keep them in perfect condition and attractive, to replenish and discard as required. The one great drawback to exhibition work is that so few are posted sufficiently to properly care for exhibits. It is a science, and can only be learned by actual experience. I want to impress this as forcibly as possible. There is no one who can tell you *how* to put up an exhibit. Adaptability and experience are the only teachers.

To go back to the bureaus. Equip them with the most concise and up-to-date descriptive matter, dealing with everything a newcomer wants to know, combining a few industries but dealing separately with the majority. In illustrations show only that which is strictly Californian, nothing having the semblance of Eastern conditions. In this you get attention on the start, and increase the interest in us and our attractions. All the matter should be free of advertisement. Avoid being accused of inducing investments because of an advertisement that appears in your booklets or circulars. Never have to make an excuse for what you print or say.

The reader of this literature, when he or she visits any section of the State and finds it up to representation, will soon be doing a most effective advertising stunt for the State.

To the fruit-growers I want to say, you can do more to advertise California than any other agency. By sending to the East only your

best products in proper condition, and packed as represented, the top-layer method must be discontinued if you want to maintain a California reputation. With every package all layers must be top layers. How often do we hear it said by visitors in our exhibition hall: "Oh, yes; this fruit looks like the outside layers of those boxes we get East; but when you get down to the center, it is nothing but trash or unripe, knotty fruit, not fit to eat. Your peaches are not fit to eat, tough and tasteless." This complaint is on the increase, and unless the grower himself, or packer, uses commercial sense and changes the practice, California will be the loser.

The citrus fruit packer is getting "onto his job," and for attractive and uniform pack is gaining a reputation that counts; except in the one thing, that is, green fruit in the opening of the season. Better be late to market than hurt your trade with unripe stuff. Why can't you ship your deciduous fruit more nearly matured? It would better not last so long than to be unpalatable and tough. You all know the stomach is the place to tickle, if you want to make favorable impressions. Let us go into the tickling business and place the whole universe in a good humor over ourselves and our products.

Now for St. Louis. How many of you are preparing for the event of next year? To advertise California at St. Louis as she should be every section must be up and doing, and every grower setting aside certain patches of grain, certain trees, and certain vines from which to select specimens worthy of being placed beside those of other States and countries. We have been very slow in getting started, if we have started at all. Glassware should be ready to receive the early fruit; competent men employed to process it. Each section should be making its estimate on what it will do, the amount of space it will require, and the character of display it wishes to make. The State can not arrange to handle the proposition until it knows to a reasonable certainty just what to expect from its several divisions. How many are ready to give this information?

California has gained a reputation in the exposition line that must be maintained. If the grower does not do his share, we will not be able to maintain this reputation at St. Louis. Every mercantile establishment attempts to improve its advertising methods. We should do the same, and keep everlastingly at it, if we want to keep California always to the front.

ADVERTISING CALIFORNIA FRUIT PRODUCTS.

By W. D. CURTIS, OF LOS ANGELES.

I recently saw a statement to this effect: That the young man of to-day must know twice as much as his father did, or he would not be able to make one half as much money, or stand one half as well in the community. To my mind this statement will apply with equal force to the fruitmen of this State, for I believe that the California fruitmen of to-morrow must be twice as well informed as the fruitmen of yesterday, or they can not make one half the money, and their products will not receive one half the recognition in the markets of the world.

It has always seemed to me that the growers and packers of California fruit products were in a sort of comatose state. They listen to the story of their possible greatness in a half-awake condition, and then when that story is told they go to sleep again.

Before taking up the main subject for consideration I want to touch very briefly upon the duties that devolve upon the advertising man, and some of the principles that underlie all successful advertising.

I find many men to-day who still believe that an advertising man is simply a man who prepares, in an attractive way, advertising copy and places it in one or more periodicals. This is in reality but a small part of the work actually performed by an intelligent advertising director. The real student of modern-day publicity probes deeper than that. He is constantly endeavoring to get at the very root of the matter. He studies advertising much as the lawyer studies law, or the doctor medicine. He must be familiar with merchandising in all its phases. He is often called upon to shape the entire advertising campaign and business policy, and to fix the price. He must not only know the relative value of space in newspapers and magazines, on billboards and dead walls, and of the last space left on a programme—I say he must not only be familiar with all of these, but he must also know how to frame an advertisement that will be productive of results, and then after designing the label, and selecting the package or bottle, and preparing the follow-up letters, booklets, catalogues, and other literature, he has to see to it that the plan as a whole is carried out; and it is this last work that often means so much to the future success of an enterprise.

An advertising man is a sort of sponge; he absorbs ideas and methods from the brightest and brainiest men in every walk and vocation, and then allows himself to be squeezed by this client and that client who comes to him for help, until sometimes he feels that he has been squeezed very dry.

So much for the man. Now as to a few of the underlying principles. Advertising will probably never become an exact science—there is too

much of you and me in it for that. There does exist, however, some science in advertising, and it is by no means the gamble that some men believe it to be. In all advertising the great law of supply and demand must be taken into account, and care exercised as to what you advertise, to whom you advertise, and how, and when, and where. To present the wrong article in the wrong way to a disinterested class of people at an inopportune time is necessarily disastrous. A dyspeptic manager or a dyspeptic salesman can kill the effectiveness of a good advertisement.

Now, advertising is not the whole thing; it is only a cog in the wheel—a very important and necessary cog, however. I would not give much for a business wheel of to-day that did not have an advertising cog in it; nor would I give much for the future success of the fruit interests of this State unless an advertising cog is put in the marketing wheel.

Let me give you a definition of good advertising. Good advertising is accurate information happily brought to the attention of persons most likely to be influenced. I want you to get this thought fixed in your minds: That advertising is information, and that good advertising is accurate information. Accurate information is knowledge, and we all know that knowledge is power. Therefore, good advertising is a power, and you want to harness that power to every box of fruit in California.

Why is it that the public scan so closely the advertising columns of our present-day magazines if it is not on account of the information that these advertisements contain? Advertising answers human inquiry—What shall I eat? What shall I wear? How shall I furnish my home? And where shall I go in search of rest and recreation?

Advertising is everywhere recognized as an important factor in modern business, and I deem it of the utmost importance in its relations to the fruit interests of this great State. I haven't any doubt but that the future success of the fruit industry of this State depends to a great extent upon a wise and judicious use of printer's ink. The late Honorable William E. Gladstone once said that "nothing except the mint can make money without advertising."

Gentlemen, you have got to recognize the power of the press. The magazines and ladies' publications, the religious and farm papers of large circulation, and the daily newspapers all offer a great vehicle to carry your splendid fruit story to the consumers of this country. The better class of trade papers also offer an effective way of influencing the dealers.

The fruit-growers of California are not living up to their opportunities. We live in a grand State that has been advertised far and wide, and you want to take advantage of it. I want to say here that I believe State

promotion work is a benefit rather than a menace to our fruit products and every fruit-grower should contribute generously to the work now being done by commercial organizations. These public bodies, following close on the heels of the great advertising work of the railroads, have opened up a way, and, like the children of Israel, the fruitman can now go up (or rather east) and possess the land at a much less cost than it could otherwise be done for.

There is but one California. California is a good name to conjure with. California is a good brand to put on your fruit. The word California has an actual money value; it should be counted as one of your greatest assets, and protected. I wish I might dwell at length on the importance of protecting that name California, but time forbids.

You have a great educational work to do, first, with the growers; second, with the packers; then with the large distributors, followed by the large dealers, the small dealers, and last but by no means least, with the consumers. The advertising matter that goes to each of these classes must be of a nature to interest and instruct the person who receives it. It will be readily seen that you can not send the same advertising (the same information) to all. What would be beneficial to the dealer would not be particularly so to the consumer, and vice versa. If you will but keep in mind that advertising is information, and that information and knowledge about the true condition of affairs is what is wanted, you will better understand why good advertising will secure for you the desired end in all of your deliberations.

Good advertising will secure for you an increased number of consumers, a firmer market, less friction with the packer and seller, better transportation rates, better transportation facilities, satisfied growers, better prices; yes, and I will go further than this, advertising will route cars. I imagine I hear some of you asking the question, "How is advertising going to route cars?" I reply by referring to that definition of good advertising which I gave you a moment ago.

California fruits possess strong talking points, and there is no excuse or reason for telling any fairy tales. A prominent railroad official is credited with saying that you have to lie about California in order to tell the truth. I certainly believe in telling the truth, and while you are about it the whole truth; but I desire to impress upon you this fact, that in advertising it is never wise to make a statement that may not be believed by a majority of those who read it; in other words, your advertisements must be credible in order to be profitable.

The business and selling points of California fruits are good enough, and the half has not yet been told.

I have previously and at different times called attention to the paper wrappers around fruit being used for advertising purposes, and I understand that it is being done to a greater extent than heretofore. Some

very interesting fifty-word stories can be told in this way. They could contain information about California in general, the locality in which the fruit was grown, as well as the particular ranch. Historic points should also be made use of, the idea being to make your printed matter teem with interesting facts. The packing-house, the orchard, and last and by no means least the fruit itself should come in for a good business-bringing story.

The trouble with the average fruitman is he thinks that the public knows all about his product, when, as a matter of fact, the public is grossly ignorant. Signs on the freight cars make good advertising. The cars stand on the sidetracks where they can be seen by the inhabitants of the towns, especially the smaller places. These signs can be greatly improved; a few qualifying adjectives would enhance their value immensely.

You have gotten out some booklets; the one gotten out by the California Fruit Exchange and circulated extensively throughout the East was good, but do not stop with one. Millions of little inexpensive leaflets and letter inclosures should be printed for mailing purposes, and for distribution by the dealers. Some sort of an inexpensive sign should be devised on the under side of box covers, so that when the cover is removed it can be utilized as a clean, fresh sign that will serve to attract buyers. Well-written, strongly-displayed advertisements should be gotten up here in California, where men are familiar with the merits of our fruit, and these advertisements should be furnished dealers, free, throughout the country, for their use in local papers. You have got to furnish the talking points of your fruit, you must put the arguments into the mouths of all Eastern dealers.

Get up an advertisement like this, for instance:

FANCY ORANGES

FROM THE FAMOUS DUARTE DISTRICT, IN SOUTHERN CALIFORNIA.

NAVELS, MEDITERRANEAN SWEETS, ETC.

Each one selected, wrapped with great care in paper, and perfectly packed in boxes, delivered at your door, all charges paid, for —— a box, containing one hundred and fifty or more oranges, according to size.

These advertisements to be inserted in the daily papers by the local dealers at the most opportune time.

Oranges are regarded by many people as a luxury. Oranges are not a luxury. They are an important article of food. If people of means knew this they would use a dozen oranges where they now use one; and people in more moderate circumstances, if they realized that a little money spent in oranges would prevent serious sickness, would feel justified in spending many times as much for oranges as they do now. The trouble is *they don't know*. Why? The orange men have never told them.

Orange men agree that the production is increasing; that in a few years it may amount to from 30,000 to 40,000 carloads. They agree that this year the demand has been lighter than last year, and attribute this to various minor causes, all of which sum up into the broad fact that the people who eat your oranges have not eaten as many as they previously did.

In your anxiety you overhaul your selling agencies, you appeal to the railroads, you look for a dozen and one minor factors which we all know need looking after, but you overlook the one great factor to which you must turn for salvation—you leave out of account *the great consuming public*.

Your "market" is not an actual reality to you; it is simply some point to which you ship cars and where some man gets the most money he can out of the oranges. You must come to realize that your "market" is another set of human beings constituted the same as you and your families are; that they have daily needs to be supplied and pleasures to cater to; that they are open to argument about oranges, just as you are about Grape-Nuts or Sapolio or Force.

What I say regarding the orange can with some slight variation be applied to other fruit products. Our canned deciduous fruits, our seeded raisins, our splendid dried figs, our prunes and other dried fruits must and will some day be advertised in a systematic way.

There should be a general advertising fund created and a certain sum should be set aside each year for this purpose. I believe a tax (for want of a better word I say tax) of not less than one cent per box could be levied to advantage on every box of oranges and lemons, and on every case of dried or canned fruit that leaves the State. The fruit interests require and demand an advertising fund large enough to command the attention of the buying public, and there should be a fund of this kind created, so that when occasion requires, the necessary steps can be taken without upsetting the internal workings of the various fruit organizations on the Coast.

Taking it year by year, Southern California ships more than 20,000 carloads of oranges. There are 362 boxes in a carload. This gives the annual shipment of oranges as 7,240,000 boxes. Now assuming that the orange-growers felt the necessity of advertising oranges in order to increase consumption, just let us suppose that they decided to spend one cent per box for a year, and we will find that we have a sum of \$72,400. I am speaking very conservatively when I say one cent a box. It would not be unbusinesslike to spend ten cents a box, and this would yield a fund of \$724,000.

Wherever practical I have always advocated the individual package. A special brand is very desirable. It is not at all unlikely that we shall some day see oranges advertised under a brand. It remains for some

genius to evolve an inexpensive seal so that each orange as it is wrapped can be rapidly sealed by a slight hand pressure. An extensively advertised seal brand orange would attract much favorable attention, and if only choice fruit was wrapped in this manner it would be productive of much good to the California fruit industry.

General educational advertising without any reference to any particular brand would tend to increase consumption of our California fruit products, and I am inclined to believe that such work is practical at this time.

The fruit by-product manufacturers of this State are going to solve a very great problem with you, by utilizing a great deal of the fruit that would otherwise be a dead loss. I can see a great future for advertised California by-products.

Now, in all this advertising work you are bound to encounter obstacles. Plans will have to be carefully worked out and knotty problems solved, but you must ever keep in mind that increased consumption means a market for more fruit. Judicious advertising will sell all the fruit California can produce. Don't talk overproduction, talk advertising.

Gentlemen, I thank you for your kind attention.

ADVERTISING CALIFORNIA FRUIT PRODUCTS.

BY B. N. ROWLEY, OF SAN FRANCISCO.

This naturally means, Can the consumption of California fruit products be increased, and if so, how? This dual question is of profound interest to each orchardist, fruit-packer, and fruit-canner in this State, and is a matter of deep concern to the many shippers and handlers.

One has but to read regularly the representative agricultural and horticultural journals of the country to learn that the planting of fruit trees is going on year by year with great vigor and in a most wholesale way. It is a literal fact that to the creation of orchards there is no end. Almost from week to week one is told of that "greatest" orchard which is projected. Sometimes it is a peach planting; on another occasion it may be an apple orchard or a prune orchard; again it is a mixed orchard.

The number of peach trees in the State of Georgia alone is placed at 13,000,000, and all of these have been planted, practically, in the last decade or two. Texas, Alabama, and certain sections of the Carolinas are also witnessing a heavy planting of peach and other fruit trees. It really seems as though more fruit trees were now being planted, or

were about to be set out, than ever before. This, however, is simply impressional.

If that impression be accurate—and the very great part of these trees are being set out in territory which is nearer to the great markets of the country than is any point in California—is not one justified in coming to the conclusion that the advertising of California fruits and fruit products must be resorted to in order that the already large consumptive demand be further increased? A superficial glance at the question would certainly seem to warrant such a conclusion, and the writer has no hesitancy in saying that the consumption of California fruits can be largely increased by judicious advertising.

Starting, then, with the assumption that the use of California fruits can be extended, let us inquire how this desired end can be accomplished. There were shipped from this State during the year 1902, in carloads of ten tons each,

Green deciduous fruits	Carloads.
Citrus fruits	10,039
Dried fruits	22,566
Raisins	15,194
	4,757
Total	<u>52,556</u>

There are in this country incorporated cities of 5,000 inhabitants and over to the number of about 870; in addition to which there is an unknown number of unincorporated cities of 5,000 inhabitants and over, the New England States alone having sixty-two of them. It certainly is not outside the bounds of possibility, or even probability, if the right forces are set at work, to increase the consumption of California fruit products in all of these places.

We are aware that many of these towns are supplied by the jobbers doing business in the larger cities and shipping points, and should the attempt be made to serve the small places direct from a California central agency, the jobbers would take just that much less fruit. We believe it to be in the interest of the industry to protect the jobbers, but some plan should be devised by which they as a class should reach out further than has yet been perhaps attempted in the effort to cover as many towns of 5,000 population, or smaller, as well as the larger towns, as is possible.

California interests will make a mistake should they "cater to the people at both ends against the middle." The jobber is the real distributor, and he is the man who should be protected as far as possible. The man who only needs ten packages or less should buy from the jobber, who is the man who buys hundreds and thousands of packages and then sends out telegrams, letters, and postal cards everywhere in the effort to get rid of the fruit. He does more for the California grower, packer, and shipper than all the small buyers put together. The com-

petition among the jobbers will become stronger because of increased trade from the small dealers.

Foreign Markets.—Much can be done in aid of the good cause by developing foreign markets. Canada is a market susceptible of a steady increase. Germany offers a splendid field for exploitation, or it would were it not for the danger which results from the chronic agitation of the agrarians. Central Europe affords a market for some of California's surplus, particularly when it is remembered that there is no lack of people who know a good thing when they see it and have the means to purchase it. The United Kingdom is an enormous consumer of fruit and fruit products whenever the opportunity presents itself.

Most cured fruits are produced at the ratio of five or six pounds of fresh to one of cured. Others are produced at as low a ratio as two or two and a half pounds of fresh to one of cured. A fair average for the grand total, it is thought, when the waste is taken into consideration, would be, say four pounds of fresh to one of cured. This means that the grand total of cured fruits, cured prunes, and raisins finds in the fresh article an equivalent of 798,040 tons, or nearly eight times more than the shipments of fresh deciduous fruits amounted to in the same year. Generally speaking, it may be said that greater care must be given the curing process, as too much poor fruit is allowed to leave the drying-grounds; the matter of over-sulphuring should be avoided.

Our packages are adapted to the class of trade which is catered to, and no radical change need be suggested at this time. The packing should be more carefully done, however. Complaints are altogether too frequent of irregular, not to say, dishonest packing. A uniform pack tends to enlarge trade, always.

The Matter of Retail Prices.—Let it be said here, that we believe every one to be worthy of his hire; and second, on general principles, we believe it to be the best for all interests, that as many be given a chance to make a living as is possible, within reason. Should every producer sell direct to the consumer, a vast army of people would be deprived of a means of making a living and they would gravitate down into the ranks of the unemployed, and if not a menace would be a burden on the community, and thus lower the purchasing power of the entire country.

We have purchased at retail in a San Francisco market fresh apples at the rate of \$250 a ton. What did the grower receive? Every one is familiar with instances similar in character. So with cured fruits. What relation does the price received by the grower bear to the price which the consumer pays? It was in an effort to accurately answer this question that a Vacaville orchardist asked a relative, who was about to come to the Coast from London, to bring along with her samples

of cured fruits and a bill showing the price that was paid. The lady in the case recently reached Vacaville, and with her were one pound of cured peaches, one pound of apricots, and one pound of pears, all grown and cured in California. For the three pounds of fruit the lady paid 5 shillings and 6 pence, or \$1.32, an average of 44 cents a pound. An examination of the fruit showed that it graded as follows: apricots, fancy; pears, extra choice; and peaches, choice; the probable cost in California and the price paid to the grower being not more than 5 cents a pound for peaches, 6 cents a pound for pears, and $7\frac{1}{2}$ cents a pound for apricots. In other words, the entire three pounds probably brought the grower $18\frac{1}{2}$ cents, and the consumer paid \$1.32 for the same article in the London market; a difference of \$1.13 $\frac{1}{2}$. Out of that sum must be paid the cost of handling, freight, etc. The freight charge is relatively a small matter. There were three, or perhaps four, pairs of hands through which this cured fruit passed—the packer, the Eastern jobber, the London wholesaler, and the retailer. Allowing, as one may, for a liberal slice for each of these gentlemen, is there not an altogether too great difference between what the grower received and what the purchaser had to pay? No one, it is thought, will say “no” to this inquiry. The several handlers are entitled to a fair share in the series of transactions which brings the product of the orchardist to the table of the consumer; but no one can countenance any such excessive profits for the middlemen as is here instanced. It hurts the industry as a whole, and is another point for those interested to grapple with.

An undeniable influence in increasing the consumption of California fruit products, whether in this or in a foreign country, is an intelligently-conducted campaign of advertising. The efficacy of judiciously-placed and well-prepared advertising is too well appreciated to need other than passing mention. It is too late in the day to argue the value of advertising, of itself. In these times, when a score or more of merchants are each spending \$100,000 and upward yearly and employing men to conduct the department, at salaries ranging from \$5,000 to \$12,000 annually, it were idle to waste time in an effort to convince some one of the fact that “advertising pays,” to prove to some benighted individual that there is indeed virtue in printer’s ink.

It can be stated, however, that the general advertising of California fruits will not do. There must be something specific about the work. A system of brands should be introduced, and the use of them must be extended, and these should be hammered, through the press and possibly elsewhere, so that all shall in time become so familiar with the name or design of the brand that it, and what it represents, form one picture in the mind of the reader.

As to matters of publicity, it can be said that integrity as a basis, more than anything else, wins success. The advertisement may be

cleverly and attractively drawn, it may have the choicest of positions, the product offered at alluring prices may flatter itself with fine phrases, yet if the article advertised is deficient in real merit and not as advertised, it will fail to be a permanent success. Hold fast to the truth, and let the sentences be positive and powerful, though the language employed should be simple. Realize with pride the immensities of the opportunity. So-called catch phrases invariably stand out in the light. Use them, however, judiciously, and don't overdo the thing.

Some one has said that nine out of every ten advertisers are unsuccessful. It may be true that ninety per cent of publicity-seekers fail to achieve financial success. There is always just as much reason for failure as there is for success. Some fail because the goods lack merit; others fail because their products, full of merit, are improperly exploited.

In my judgment, it would not be advisable to outline a definite plan at this time for advertising California fruit products. It is too complicated a subject to be handled within the limited time in which to prepare an article of the kind for presentation to this Convention. Any plan worthy of consideration by the fruit-growers of this State will require both time and labor to outline and elaborate. I would suggest that a committee of five be appointed with instructions to take up the broad question of "Publicity—Advertising California Fruit Products," and evolve a plan, reporting at some future time.

ADVERTISING CALIFORNIA FRUIT PRODUCTS.

BY J. C. NEWITT, OF LOS ANGELES.

After the very able and thoughtful papers presented to this Convention, I shall not detain you with any extended discussion. What I shall have to say concerns the marketing as well as the advertising of California products.

In the first place, you can not take any old sort of a product and stiffen it up by inserting a backbone of advertising, and make a business success. Advertising never was, is not, and never will be the whole thing, and I say this after fifteen years' hand-to-hand experience with it.

Advertising is much like electricity. Turn on the current in the proper manner and you can do wonders with it; but pick it up in the wrong way and it will do wonders with you. My experience has demonstrated that finding a broad, growing market for California products hinges on two points: (1) Be sure your article is as good as you think it is; (2) Be sure it is put in the right size package, attractively labeled, keeping in mind the old saying that "the apparel oft proclaims the man," and what applies to a man applies as well to anything a woman buys.

The style and appearance of a package create the first impression for your product, good or bad; and you may attach importance to this or not, but I want to make the prediction that if this first impression is bad, your product is next door to a failure and all the advertising on earth won't save it—and it does not make much difference how good your article is, either.

If the jobber doesn't like the appearance of your product he will not buy it; if Mr. Grocer doesn't like the looks of it he will probably buy something else not so good that looks better to him; and if Mrs. Consumer is not impressed with the style of your goods, she is going to buy the goods she is impressed with—advertising or no advertising.

The Californian who seeks a market for his product through advertising has many points in his favor, as compared with an Eastern or foreign competitor. California products are held in high esteem in the Eastern market as far as these products are known; but the day has gone by when quality alone will create a world market for any sort of a product. Competition is too close, the inventive genius of man too great, for this style of merchandising. Every shrewd business man operating in the world markets to-day is taking a short cut for the biggest market. He is not waiting for his goods to sell themselves.

Most of us here can remember when Liebig's was the only beef extract known. It was the extract that every physician specified; it was the extract that every druggist recommended. One day, after an exhaustive talk with a Chicago advertising man, Mr. Philip D. Armour decided to make an appropriation of \$10,000 for advertising his products. What has been the result? A canvass of the drug-stores shows that out of every five calls for beef extract, four are for Armour's, and I suppose if the investigation was carried into the other products Mr. Armour advertised, the results would be the same. This does not mean that other makers of beef extracts are not selling just as many or more goods as they were before the Armours commenced their advertising campaign, but it does mean that advertising has increased the consumption of the article. The lesson in this is that there are any number of California products with which business can be developed the same as the Armours have developed their beef-extract trade.

If one cares to ascertain just how great this undeveloped field for California products is, ask any New York grocer what the best brand of California olives or olive oil is. Nine chances out of ten he can not recall the name of a single brand, good or bad. Not one retailer in a hundred in the East knows one brand of California wine or one brand of California fruit from another, with one or two exceptions. The Eastern retailer buys these articles just exactly as a hardware merchant buys pig-iron or as a dry-goods merchant buys so many bales of cotton bats; and just as long as the marketing of California products

is kept on this basis, just so long will California products pay a narrow margin of profit.

If you want to raise the profits of your business, you have first got to raise your product out of the rut, and the one lever to do this is judicious, common-sense advertising, combined with skillful business management and a sales organization that can not be impeached.

Elbert Hubbard, the genial editor of the "Philistine," in an address at Pasadena last Monday night said: "There are two ways to beat competition. One is to make the article cheaper, the other to make it *better*."

Let us put out our products in so much better and finer shape than the world has ever known and there will be no competition to beat. We can do it; Californians can do anything, especially if we "set our light upon the hill."

A little squib in three or four papers stating that a few drops of lemon juice in a glass of water will kill the typhoid germ is not going to move your lemon crop. Advertising prunes as a medicine is not going to raise the dignity and prestige of the fruit.

The advertising of any product must be done in such a manner as to inspire enthusiasm for California and confidence in the merit of the article advertised.

Let us suppose a case. Take oranges, for instance. Say we'll put \$100,000 into advertising oranges next year, commencing in October and ending in May or June. We'll call our brand the "Golden Globe," the most luscious of all California oranges—every one a perfect specimen of orange culture. We'll pack the "Golden Globes" with a sealed wrapper; we'll use a different and more attractive box; we'll put a little note in each box calling attention of the retail dealer to the exceptionally fine quality of the fruit and give him a few points on oranges so that he can talk "Golden Globe" to his customers. We'll say it costs another \$25,000 for the extra fine labels, packing, and incidentals.

Now what will \$125,000 expended that way accomplish? It will make oranges more popular than ever before. It will stiffen the entire market from California to Connecticut. But it will do more. It will sell direct 500,000 boxes of fruit at from 50 cents to \$1 per box more than unadvertised fruit brings, and this means that on the season's advertising there is \$125,000 clean profit.

Some who have not given this matter any great thought or had any very great experience with advertising as a means of advancing prices or profits, will say this is the idle dream of an idle dreamer; but I tell you, gentlemen, that just as sure as I stand here this thing will be done some day and the wonder then will be, "why didn't we think of this before?"

Mr. Post, of Battle Creek, Mich., has made millions in the last few years with his Grape-Nuts and Postum Cereal. He started his business in a little barn or shed and his first advertising bill hardly amounted

to more than thirty cents. His neighbors called him "bughouse," but they now read books from his free library and take their recreation in public parks he has made possible.

There are a dozen or more propositions lying around loose in the State of California that have as much merit as either one of Mr. Post's articles. All these propositions need is a good swift "Post" push.

California as a fruit producer is already advertised to the world, yet I want to put the question: Do you gentlemen think that if the Armour, or Mr. Post, or John Wanamaker, or Marshal Field, or the Cream of Wheat people were in the fruit business in California they would go along from year to year running their canneries without trying to create a special demand for their particular brand? Would not these gentlemen as soon as the season for canned fruits opened in the fall, begin a systematic campaign for their particular product in the journals that would reach the women of the world? Would not any one of these masters of commerce put up a good article of canned fruit, advertise it extensively, and have nerve enough to ask a price for it that would pay a handsome profit? Would they not have faith enough in advertising to know that the money so invested would secure to them the larger profit which they seek?

You do not find these gentlemen doing business on a pig-iron basis, and why should California products be degraded to that level?

Put out a good article, whether it is fruit, nuts, celery, or wine; give it a good name; give it a handsome label or package; put a progressive management and an alert salesman behind it; charge a good price for it; advertise it to the world, and you have got a success.

Heinz's pickles are no better than half a hundred obscure brands that might be picked up, but the advertising of fifty-seven varieties has made the Heinz people rich beyond their wildest dreams. What has been done in Pittsburg can be done in California.

Why does Mr. Snider hold the catsup business of America in the palm of his hand? We can raise better tomatoes and just as cheaply right here on this Coast as can be raised in Cincinnati, and we can raise them every month in the year.

As I see it, there is almost no limit to what can be done with and through the proper advertising of California products, especially California fruit products, but it must be done on a business basis. If you are going to let the Eastern grocer scoop your evaporated fruits out of boxes sitting around on his floor, you might as well stop advertising that evaporated fruit before you begin.

There is only one way to do it and that is the right way. An advertised article must be put up in an attractive package of a size and at a price which will be most convenient to the consumer. The moment you leave the slightest opportunity for a merchant to substitute some other

article or some other grade of goods for the particular brand which you are advertising, your advertising campaign is the deadest thing that ever happened.

In the last three or four years, more particularly the last two years, there have been a number of weak-kneed attempts to advertise California products in the East. Most of them have been signal failures, simply because advertisers thought they were going to make a fortune by merely taking an inch or two of space in Eastern publications at \$5 more or less per line. This good money was paid out to induce the retail buyer to call on the retail dealer in the hopes that the retail dealer would call on his jobber, whereat the jobber would get excited and at once telegraph a big order to California.

Some advertising men call this system of working, creating a demand or forcing the dealer. I call it "blowing your money." Before a California product can be successfully advertised, it must be fairly well grounded in the markets in which you are to operate.

Take, for instance, McClure's Magazine or the Delineator, or any other publication carrying a large volume of food-product advertising. Suppose you put your advertisement in these publications. Your goods are in Chicago, New York, Philadelphia, Boston, and other jobbing centers, or you have two or three good travelers booking orders from town to town. Can't you see that under those conditions you have more than a fighting chance for success? And can't you see that without the goods at the strategic points or without the traveler to blaze the way, your efforts are foreordained to defeat? The success of any advertising depends upon who uses it, when and how it is used. Those who have experience, money, confidence, and a good article to sell are in love with it. Those who have used it to head off competition and get the best of the other fellow, have no use for it.

Mr. Armour says the time has come when advertising *must* be done. Mr. Armour made a success by starting with \$10,000. Mr. Post made a success by starting without a cent. The question of capital in an advertising campaign, while an important one, is not the paramount issue. A good product, a good package, a good organization, and good common business sense, combined with enthusiasm in your proposition, are more vital than money.

A bright writer has said "that an advertisement is a thing that represents a man's goods and business at a place where the man and goods are not." There are just millions and millions of places in the United States where our goods are not and where California products should be represented.

PRESIDENT COOPER. The papers which have been read are now before the Convention for discussion.

MR. HARTRANFT. It seems a pity to say much more at this late hour, but I look on this evening's programme as one of the important sessions of the Convention. I am surprised at the modesty of our advertising friends to come in here and refer to \$100,000 appropriations. Our appropriation for citrus fruit this year was \$2,000,000. We kept our prices on Christmas oranges right up to the hilt, along some \$2.80 to \$3.25 a box; and when it passed the Christmas trade, with no method in marketing which tended to bring those prices down, the housewives of the country got the idea into their heads that oranges were pretty high. They stood it for Christmas-time, but they just simply laid them one side after Christmas, and we plunged on into the chasm of high prices and no consumption, or very little consumption, and pretty soon we had about a thousand cars a week rolling, or eight hundred for about eight weeks—we will figure it up roughly two million boxes—and we spent a \$2,000,000 appropriation there in a hurry. (Laughter.) Only we didn't give it to the newspapers, and I think the newspapers ought to have had it. That was all wrong. The consumers got it all. As soon as oranges went down to about \$2.25 a box, every little old Italian peddler in the country says: "No; I won't buy bananas this week," and up they went through the alleys in every direction spending our appropriation. And still we haven't got this good will that we would have had through natural advertising. I think that follows out in all lines, and I think we spend our appropriation every year, and I hope we will have enough of these advertising talks every year so we will get this advertising appropriation spent in the right direction finally. (Applause.)

At this time a recess was taken until Thursday morning at 9:30 o'clock.

PROCEEDINGS OF THIRD DAY.

THURSDAY, May 7, 1903.

The Convention was called to order at 9:30 o'clock A. M. President Cooper in the chair.

THE MARKETING OF WALNUTS AND DRIED FRUIT.

BY J. B. NEFF, OF ANAHEIM,

General Manager of California Fruit and Produce Exchange, Los Angeles.

Having been successful in growing and curing walnuts and deciduous fruit, the next thing which confronts the grower is the problem of getting the walnuts and dried fruit into market in such a manner that he will get a fair share of the price which consumers are willing to pay for them.

Marketing through, or by, associations is likely to be the plan that is finally decided upon, as associations in all other lines are much more effective than single efforts.

The first fruit associations of this State were loosely held together. Joining the association did not mean that the member was to ship his fruit through the association, unless it suited his pleasure at shipping time.

While this method was followed the association did not, and could not, give any better returns than any other shipper.

Experience has shown that membership in a co-operative marketing association must be accompanied by a contract which will secure to the association all of the product of its members, in order to be at all successful, and that the contract of membership should be for a long term of years. A joint stock company, or a co-operative association having a charter from the State, seems best suited to such cases.

Co-operation seems to move slowly among deciduous fruit-growers, while they are certainly the people who are to be most benefited by such movement when properly carried out. They seem to have a wonderful ability in drafting "resolutions" of good intentions, which are always passed unanimously—and then forgotten.

To succeed in forming a prosperous association there must be at least one man of moderate ability in the community who has the confidence of the growers and who is willing to do a large amount of work in that line, in season and out of season, without much compensation, though

all labor of this kind is very valuable to the producer and should be fully compensated.

Co-operative marketing was forced upon the citrus-growers because of the rapid increase of their product; but while the dried fruit product is very large and increasing, the producers seem to be at sea, so far as any concerted method of marketing is concerned. The walnut-growers have made more progress, but seem disposed to stop much short of the position they ought to occupy.

Nothing has been devised, so far, which gives as good results as the Exchange plan of marketing, either in walnuts or in dried fruit. The walnuts which have been marketed in that way during the past five years have averaged the growers more money than by any other method now in operation.

The local association fixes a price which the Exchange agents take as a minimum price, and by judicious handling and smaller selling charges succeed in paying the larger price.

It may be said that the growers do not get the money as soon as by the f. o. b. plan, but any one can get money for walnuts f. o. b. by paying from \$50 to \$200 per car for that privilege, the Exchange prices frequently being that much above the f. o. b. price, and payments are not delayed more than twenty days. This is a rate of interest which should satisfy the most exacting.

Some extracts taken from the last report of the Anaheim association will serve to illustrate this, when it is remembered that the price established on walnuts was: No. 1 softshells, 10 cents per pound; No. 2 softshells, 8 cents; No. 1 hardshells, $9\frac{1}{2}$ cents, and No. 2 hardshells, $7\frac{1}{2}$ cents, with a discount of 6 per cent to the selling agents.

The report read as follows: Paid to growers: For No. 1 softshells \$9.87 $\frac{1}{2}$ per 100 pounds; for No. 2 softshells, \$7.55 per 100 pounds; for No. 1 hardshells, \$9.51 $\frac{1}{2}$ per 100 pounds; for No. 2 hardshells, \$7.45 per 100 pounds. Also a reserve of 5 cents per 100 pounds was retained from net proceeds. These walnuts were all sold by the agents of the Southern California Fruit Exchange at prices ranging from 10 cents to 12 cents f. o. b. California, for No. 1 softshells, and, as appears from the report, the growers received the benefit in prices which have never been paid to growers before by any association.

The Anaheim association takes the walnuts from the grower as they come from the orchard, and does the bleaching, grading, etc., at a cost of 18 cents per 100 pounds, which is rather more than the cost to some associations having larger crops to handle, and this cuts down the net price by the amount of their expenses above that of other more favorably situated associations, and makes a very noticeable difference where the growers grade and bleach for themselves.

If the Anaheim growers had done their own bleaching and grading

they would have received \$10.05½ per 100 pounds for No. 1 softshells, and if the reserve had been paid, a total of \$10.10½ per 100 pounds would have been paid them; but this grading and bleaching are done cheaper and more uniform by the association than can be done by individuals.

The price received by the walnut-growers by marketing through the Exchange was about 50 cents per 100 pounds more than if marketed in the usual way.

Successful dried-fruit marketing will have to be conducted on the same lines, with the growers' agencies established in the distributing and consuming centers.

The growers must control their marketing agents in every respect as fully as they do their assistants in the orchard or packing-house. The saying that "no man can serve two masters" is also true when applied to fruit marketing.

It is not possible to have brokers who have several lines of goods and who are paid a percentage on their sales, work with the faithfulness of a man whose sole duty and business is that of selling the product of his employer.

If business in dried fruit is dull and sales hard to make, the broker would be more than human if he did not divert his attention to other lines, where sales were more readily made and commissions more easily earned.

Considerable has been said about f. o. b. sales at an established price, but it is not likely that dried-fruit producers will ever be able to realize the best prices by such sales. Conditions do arise when sales can be made at fair prices f. o. b. the producing point, but when that can be done better prices can usually be had nearer the consumer, and in these days of fierce competition, no manufacturer nor any producer except the farmer, thinks of waiting for some one to come to him to buy.

Growers' associations can agree on a minimum price and hold their product until such price can be obtained, if found advisable, and by having fruit stored near the consuming points and their own selling agents, they are likely to get all the product is worth, and that is all that can reasonably be expected.

WALNUT MARKETING.

BY FRANK E. KELLOGG, OF GOLETA.

There are just two things to be accomplished in marketing: the one is to sell the goods, and the other is to sell at the highest possible price. To accomplish these two things in the marketing of walnuts, the first consideration should be the quality of the nuts. The distinction between first-class and inferior nuts should be clearly and sharply defined, and

all goods that are marked first-class should invariably be such, while inferior nuts, if placed on the market at all, should be distinctly marked and sold as such. Southern California has justly gained the reputation of producing the finest walnuts in the world, and for this reason they command the highest price in the market. This preference can only be maintained by the continued excellence of our goods.

In the second place, the nuts should be made attractive. They should be thoroughly cleaned, either scoured or bleached by some harmless process; for the market demands and must have an article that is pleasing to the eye. But in cleansing, the quality of the nut should in no case be allowed to suffer any damage, for in the last analysis, the purpose of the nut is to be eaten, and not for ornamentation, and it will be valued at just what it is "cracked up to be."

In the third place, the nuts should be placed on the market just as early as possible. When they are ready for harvesting, the sooner it is done the less will be the liability of damage from early rains. Also nature has favored us by ripening our walnuts several weeks sooner than those of Europe, and the earlier we can reach the consumers with ours, the more completely we will shut off the foreign competition.

Furthermore, the sharpest demand for nuts is just before the holidays, when the generous impulses of the great American people express themselves in Christmas gifts. Let us see to it that the open-hearted kindness of the glad holiday is not restrained from any lack of large, clean, fresh, full-meated and delicious California walnuts.

Now abideth promptness of shipment, neatness of appearance, and the quality of the nuts; these three, but the greatest of these is the quality of the nuts. The only remaining question is, how can these three things be best secured? If unaided or unrestrained, the high standard of our goods will not be maintained by the individual growers.

Owing to the high price of nuts, as compared with other farm products, many walnut orchards have been planted regardless of the adaptability of the land or locality. Consequently many inferior nuts are being produced, and it is natural for the individual grower to try to reap the benefit of the good reputation of California walnuts, and try to get his inferior goods on the market as first-class nuts. The unavoidable results will be the lowering of our standard, the loss of our reputation, and a decline in prices. There is only one way to maintain the high standard of our goods, and that is to handle the nuts co-operatively. The individual plan regards only the present crop, while the co-operative plan broadly looks out for the future welfare of the industry. The individual plan is to make the good nuts sell the bad ones, which necessarily degrades our standard. The co-operative plan is to sharply discriminate between good and bad, and to put the former only in branded bags, and make the brand a sure guarantee of excellence, which inevitably elevates the standard.

Also, the co-operative plan, by subjecting all goods to rigid inspection, secures greater and more uniform care in the preparation for market and far greater promptness in shipment than is possible by the individual plan.

The great hope of the future for our industry lies in the success of the various walnut-growers' associations, and in their wise co-operation for the common welfare.

In addition to the securing of the three fundamental conditions of success already discussed, the co-operative plan, if entered into by all the growers, would entirely eliminate domestic competition among the growers, which is, to say the least, a very serious menace to good prices.

Perhaps the best way to exemplify the advantages of the co-operative plan would be to briefly review the history of the walnut-growers' associations. In the year 1896, the evils of home competition became so apparent that a general movement began in the way of organizing associations. The immediate effect was to remove competition from among the members of the respective associations, but there still existed competition between one association and another. The absolute necessity of consolidation of all their interests became so evident that in 1897 the various associations came together for the express purpose of putting a final end to domestic competition of all kinds, by agreeing upon a uniform price at which all would sell. When they adopted this plan, there were 414 carloads of nuts produced in the State, and the selling price for highest-grade softshell nuts was 7 cents per pound. Five years later, in 1902, they produced 811 carloads of nuts, and the price of first-grade softshells was 10 cents per pound. Thus you will see that although the quantity produced has almost doubled, yet the price has increased almost 43 per cent. The greatest difficulty with which the associations had to contend, in securing the maximum price possible, was to eliminate the element of speculation on the part of the buyer. They found him naturally inclined to "bear the market." The plan finally adopted was to employ brokers to sell the nuts to the jobbers or retailers, on a stated commission, and at the prices fixed by the executive committee, composed of representatives of all the associations. Usually the broker received 6 per cent, but it has now been reduced to 5 per cent of the gross sales. In consideration of this compensation, he not only agrees to procure the sale of the nuts, but also guarantees the collection of the money, by himself advancing the price of the nuts, less his commission, at the time they are loaded on the cars, and he assumes all the risks of collections and rejections at the point of final delivery. Thus the grower has the advantage of a cash f. o. b. sale. It would naturally be supposed that on this plan the interests of the broker would be identical with those of the grower in the matter of fixing a high price, for the higher the price the greater will be his commission; but there is

no rose without a thorn, and the thorn in this case is the man who refuses to join an association. In dealing with him, the broker prefers to become a buyer, and in order to get his nuts at a price low enough for speculative purposes, he naturally advises the fixing of a low price by the executive committee, for, to secure the outside nuts, he must pay about the same price received by the associations. Hence, so long as any considerable percentage of growers remain outside the associations, the interests of the brokers and growers will not be identical, but will actually be antagonistic, and the inevitable result of this antagonism is the fixing of prices below what the market would warrant, and all growers, inside and outside the associations, are selling their walnuts for less than the market would stand. If these outside growers would all identify themselves with the associations, then the interests of growers and brokers would be identical, and both parties would cordially unite to set the price as high as market conditions would warrant, and which, we believe, would be much above the present average price.

The plan which I have briefly outlined has proved itself to be very far in advance of the old method of individual marketing. It will doubtless be improved on as the years go by, and as the outside growers more generally unite with the associations, as they surely will do. I think that not more than 25 per cent of the growers have failed to unite already, and even they almost universally admit that the improvement in prices and general market conditions is directly attributable to the work of the associations. So powerful is the influence of the Walnut-Growers' Executive Committee, that no walnuts are any longer sold in the United States until the committee has announced its prices, or, if sold, they are only sold subject to prices to be fixed by the committee. When a little larger percentage of the growers unite with the associations, and there follows a little more centralization of authority, then the power to fix prices will only be limited by foreign competition and the conditions and demands of the market.

DECIDUOUS FRUITS IN THE SOUTH.

BY PROF. J. W. MILLS, OF POMONA.

It has been said by persons who are not posted that Southern California is not adapted to deciduous fruit-growing. That is a broad statement, not borne out by facts. It is true that certain lines of deciduous fruit-growing have received a severe blow during the last few years, owing to the long series of dry winters, and certain areas in which it is safe or not safe to plant have been clearly defined. This does not prove that the conditions in the south are not adapted to growing deciduous fruits; it only shows that we are in a better condition than ever to make a success of it.

About fifteen years ago large profits were made in growing prunes in the south. This stimulated planting until large areas were set to the trees, some of the land not being adapted to prune-growing under the most favorable conditions. To-day this same blunder is being made in planting citrus trees. It is a part of the evolution of fruit-growing in all countries. However, it has developed that the south, as a whole, is not a success as a prune district as compared with the north, and here is where we must admit that we fall short. But one swallow does not make a summer, and prunes do not necessarily define a fruit-growing district. Central California turns out the largest quantities of prunes of any one district on the Coast, but Oregon and Washington can produce a better grade of that fruit, and Montana carried off the cured prune prize at the Chicago fair with the Pacific Coast States in the field. Still we do not yield the palm to Montana in deciduous fruit-growing.

Aside from small areas in some of the cañons and mountain valleys, we can not produce cherries that can compare with those grown in the north, and must look to that region for the bulk of that luscious fruit.

But peaches! After having grown up in the peach district of the Sacramento Valley, I have yet to see and eat finer appearing and better flavored peaches than are now grown in the Chino Valley. It has been the habit of certain firms to ship peaches here from the north for canning purposes. This might lead us to think that we can not raise peaches good enough for that purpose; but the facts in the case are, that at the prices offered by canners, we can make more money raising other crops.

Some canners, getting tired of this order of things, are running nursery yards in connection with their legitimate business, and urging farmers to plant certain kinds of canning peaches, at the same time offering to buy their crops at higher prices than they have been in the habit of doing. These same men claim that they must have the best grade of canning peaches in order to compete with the best grades put up in the north. These facts sum up our ability to produce the goods without further talk.

A few months ago one of the largest buyers on the continent, a man who ships apples by the train load out of Pajaro Valley, told me that that section produced the finest Bellflower apples in the world—flavor, shipping, or storage qualities considered. He did not dwell on the qualities of other varieties, but said that that particular variety developed exceptional qualities in that particular locality.

I believe that the same principle finds application in many parts of Southern California. Before writing this article, I asked two buyers, shippers and retailers of fruit, where they obtained their best winter apples. They both said, without hesitation, that they have never been able to get better White Winter Pearmain than those grown at a certain

place on the Chino Ranch, in San Bernardino County. One of these men has shipped in, by the carload, apples grown in Oregon and east of the Missouri River.

The coast regions of certain parts of Southern California are becoming famous for their fine apples, while many of the mountain valleys have long enjoyed this distinction. When a connoisseur from the Michigan apple belt declares that the apples grown at Julian are as good as any he has ever tasted, we can not help thinking that the deciduous fruit belt really runs across us.

Julian brings us close to the extremes in climatic conditions in the south that are favorable to deciduous fruit-growing. In sight of this point in the mountains where apples of the finest quality are raised, is perhaps the earliest fruit district in the United States. From Julian, we look down on what was drifting sand that produced nothing but mesquit and other desert plants, but which now produces grapes and other deciduous fruits that are ripe and luscious a month or more earlier than those shipped from the heretofore early districts of the State. Raisins are here made by placing the fresh grapes on trays and stacking them up in the vineyard or under sheds, where they dry quicker than they do if spread out in the sun in the principal raisin section of the State. Besides, such fruit sells as bleached raisins and is produced at a much less cost than standard grades are elsewhere. Early shipments of Thomson's seedless have returned \$1 per vine from vines two years from the cuttings.

One hundred miles west of this and within the influence of the Pacific Ocean, are found large areas in which late varieties of fruit mature several weeks after the same varieties do in any other part of the State that has been so far devoted to fruit-growing.

Numerous other features favorable to deciduous fruit-growing in the south might be mentioned. There are also several things which have prevented the development of the industry in the south further than it is at present. The direct cause is the high price at which suitable land is held.

A large percentage of the lands which now produce alfalfa and walnuts would grow deciduous fruits to perfection; but when alfalfa hay sells for twice as much as it does in the large deciduous fruit districts, and when from five to seven crops of hay can be cut and cured in one season, there is little incentive to grow deciduous fruits.

Walnuts are an inexpensive crop to handle and pay larger profits than are ordinarily obtained for even exceptionally good crops of deciduous fruits.

On lands less valuable than those referred to above, eucalyptus trees have paid better than it is possible for any kind of fruit trees on like soil. We have a neighbor who paid \$250 per acre for land on which to

grow sugar-beets and alfalfa. A railroad afterward cut off a corner, which he planted to *Eucalyptus globulus*. At the end of ten years, he harvested his wood and found that it netted him 10 per cent annually on the investment, with practically no work after setting out the small trees.

With these conditions, we can not look for such development in deciduous fruit-growing as our neighbors in the north have enjoyed. Their cheaper lands which are in larger areas than we have here and with unlimited supplies of water, naturally preclude any such development.

PESTS AND DISEASES OF DECIDUOUS FRUITS.

BY JOHN ISAAC, OF SAN FRANCISCO.

You will often hear the statement made by people who look regretfully back to the good old times, that the fruit industry is going to the bow-wows, because there are such swarms of diseases and pests now to be combatted; and that, when they were boys, such things were unknown. Now, the fact is that, although not generally known, they existed as much then as they do to-day; but in those good old times, fruit-growing was an incident, not a business, and commercial orchards were rare. Our fathers grew a few trees for family use. If they bore good fruit, well and good; if the fruit was small and scrubby, no questions were asked as to the reason, and the young folks still ate it with a relish and remember its good qualities to-day. If the tree sickened and died, it couldn't be helped, and no especial attention was paid to it.

Of recent years, fruit-eating is becoming more and more general. Fruit has become an article of merchandise. It is found on every table and in various forms. In the struggle for a better market, a wider demand and larger prices, every class of fruit has been wonderfully improved, and the full strength of the tree has been forced into the fruit; while the tree itself, as a rule, has become more and more delicate, bearing at an earlier age, passing its season of usefulness sooner, and succumbing more readily to the attacks of disease and insects. Then, too, in our efforts to produce superior fruits, we have paid more attention to their ailments. We have studied their requirements and their sufferings closer, and are now aware of vegetable troubles that were wholly unknown or unnoticed by our ancestors. So much is this true, that vegetable pathology and entomology have practically stepped from the unknown into the ranks of the sciences, within the past century.

The reasons, then, why we have more troubles to overcome in our orchards than our ancestors had, are that we know more about those troubles, that we have more trees to be attacked, and that our trees are more delicate. There is yet another reason. In our efforts to get the best, we have scoured the world over for varieties, imported them from

all parts of the globe, and with them have also been imported pests and diseases that were hitherto unknown to us. There is no such thing, it is said, as unalloyed good, and so in this case, in our efforts to improve our stock, we have become the agents for the introduction of unnumbered ills and many pests, which were originally confined to a limited area, but which have now become almost world-wide.

Now, the matter that bothers us is, how to preserve what is good and eradicate that which is ill; and it is to this end that some of the ablest minds of the age have devoted their lives, and we have numerous methods, preventive and curative, adapted to the various diseases or pests to be reached.

Tree diseases may be roughly classed under two heads: fungous and bacterial. Among the former, we have peach curl-leaf, shot-hole fungus of the apricot, apple scab, rose rust, mildew, and many other forms with which we are all too well acquainted. The cause of curl-leaf is a parasitic fungus, *Exoascus deformans*. This disease appears early in the spring, at the time when the trees are making their most vigorous growth and the tender leaves offer it the most favorable conditions for growth. It has its origin from two sources: the perennial *Mycelium*, which remains dormant from a previous season, and from the dormant spores shed the preceding year, which have found lodgment on the twigs and branches of the tree, awaiting the favorable conditions for growth which the spring affords, when they spring into active life, attack the new leaves and tender growth, and spread with wonderful rapidity, very soon involving the whole tree. Moist conditions are favorable to the growth of this fungus; hence, we usually find it worse in wet seasons, or in sections where there is much moisture in the air, while it is less virulent in its attacks in the drier localities and dies out as the summer advances.

The history of the peach-tree curl-leaf is in a general way the history of most of the fungous diseases which attack our fruit, and their treatment is largely the same. For a winter wash, the salt, sulphur, and lime is the most approved of our known remedies. This is excellent, both as a fungicide and as an insecticide, and should be thoroughly applied as late in the season as it is safe to use it. When the young leaf or fruit buds begin to swell, it is too late to apply it. After the trees are in leaf, the Bordeaux mixture of reduced strength, two pounds of sulphate of copper, two pounds of lime, and fifty gallons of water, may be safely used and is recommended.

The second group of diseases are those of bacterial origin, and here we have a class that is more than usually difficult to reach. I believe it is even yet a mooted question whether these bacteria can be classified as of animal or vegetable origin, but it is certain that their work is carried on beneath the surface and spreads through the sap of the tree,

and we have so far discovered no remedy that does not damage or destroy the tree. In this class we find the pear-blight, which has wrought such destruction in our State, the olive-knot, and kindred diseases. The disease, in these cases, finds entrance in some tender part of the plant. In the case of the pear-blight, it is through the blossoms largely, and being taken up in the sap spreads through the cambium layer and gradually involves the whole tree. It is insidious in its work, and often passes unnoticed, until the greatest damage is accomplished. The germs in some of these diseases may be carried by the wind, but more frequently insects are the principal vehicles of their spread. In the case of pear-blight, there is little question but that our honey bees are an important source of infestation, flying as they do from blossom to blossom and carrying the germ to the most susceptible point of entry of the plant. At the same time I question very much the advisability of shutting the bees out of the orchards, as other insects and wild bees, which can not be removed, are equally culpable.

The remedy for this disease is to injure the trees. When the tree is making its most vigorous growth, the sap is flowing freely, and it is then that the germs spread most rapidly. As the season advances, the growth stops, the wood hardens, and the disease is checked. If the trees are neglected, uncared for, and stunted, the disease will be largely checked. The disease may be stopped to some extent if, when the first evidences of it are observed, the diseased portion is cut back well below the point of attack. The trees should be gone over in the fall, and all wood showing any indication of the disease removed; this should be followed during the growing season by the removal of all portions which have been attacked; and all wood removed from the trees should be burned, and all tools and implements used for pruning should be disinfected. For this purpose, a solution of 5 per cent carbolic acid is effective. Spraying, fumigating, and all other external remedies are utterly worthless, as the disease is in the sapwood of the tree, protected from all external influences.

There is yet another group of diseases, which have proved very serious, and which are as yet unclassified. These are such as the peach yellows, peach rosette, Littles, Anaheim disease, etc. It is not yet known what causes these diseases or what remedies can be applied. As they are not responsive to external remedies, however, it is quite probable that they are bacterial in their origin. Fortunately, except for the vine disease, these scourges are unknown to our fruit-growers, and by quarantining against the sections in which they exist, we may be able to prevent them from obtaining a foothold in California.

For practical purposes, pests of deciduous fruits, like the diseases, may be roughly classified under two heads—insects that gnaw, and insects that suck. Under the former classification, we include the larvæ of the

different moths and butterflies, all the beetles, and some others. These do damage in various ways, some by gnawing into the fruit, like the codling-moth; others by burrowing into the wood, like the peach-tree borer; others by eating the foliage or fruit, like the *Diabrotica*. Among this class we find some of the worst pests with which the orchardist has to contend, as many of them conduct their work under cover, where it is almost impossible to reach them, and their destruction involves the destruction of the fruit or great damage to the tree. The best means to circumvent this class of pests is preventive. Where their habits are known, methods should be taken to keep them out of our trees, and in this case an ounce of prevention is worth many pounds of cure. In the case of the peach-root borer, it is much easier to erect barriers against the parent moth to prevent her laying eggs on the tree, than it is to dig out the larvæ after they have become established. The protection of young trees from the sun by shading their trunks until they produce enough top to supply a natural protection will go far toward keeping out borers. But there is still a large class that can not be circumvented in this manner, and for these, the use of arsenical poisons has been found the best method of fighting. Paris green is the standard remedy for the codling-moth and all the leaf-eating insects; and while this method is a cumbersome and expensive way of fighting our little enemies, it is yet the best at our disposal. For the whole group of gnawing insects, then, the two standard remedies are preventives and poisons.

The second group are the sucking insects. Here we have a very large array of injurious insects, for while some suckers are beneficial, the great majority of them are destructive. In this group we have the large and serious family of Coccidæ, or scale insects. It is not necessary to take up your time by describing these, as you are probably as well aware of the damage done by them and the expense of fighting them as I am. There are in this family some 2,000 named species, some of which we have in California. The Aphis family also come under this class, and these two are probably the most numerous, widespread, and destructive of the sucking insects. Their method of operation is to insert their rostrum or beak into the sapwood of the host plant and deprive it of its life fluid as rapidly as possible. Their rapid increase causes them, when once started, to soon cover the plant which harbors them, and while one is insignificant, when they are at work by millions, the plant is soon weakened. Now, for this class of insects, of course, external poisonous applications are worthless, although I have met with people who had such faith in paris green that they used it for aphids. With their sucking beak inserted below the surface of the plant, no poison will reach them unless it could be forced through the sap of the tree, and this is not probable. To reach these, therefore, a different method

of attack is necessary. Preparations that kill by contact are necessary; whale-oil soap, the kerosene emulsion, or the resin wash are usually effective; and where these will not reach, or are ineffective, hydrocyanic acid gas will do the work.

It is not improbable that in time we shall be able to restore the balance of nature by the discovery, introduction, and distribution of parasitic and predaceous insects so that our present cumbersome, inefficient, and expensive methods of fighting pests will be largely, if not wholly, rendered needless. We have already by this means greatly reduced the number of our destructive insect enemies and are keeping those that we have reached in a state of "innocuous desuetude." At present there are not over a half dozen really serious pests of deciduous fruit trees, among which are the codling-moth, the woolly aphis, the peach-root borer, and the various forms of aphids. For the latter, the ladybirds are an efficient check, and while the pests appear in large numbers at some seasons, they also as rapidly disappear.

Even under the most favorable conditions, however, we can never hope to be free from insect pests, for there will always be occasional serious outbreaks; but with their natural checks thoroughly established, these outbreaks will be spasmodic and not continuous, as in some cases at present, and will continue only until their check can again overtake them. In the meantime, it behooves our orchardists who would have marketable fruit, or often any fruit, to watch and spray.

PRESIDENT COOPER. The papers you have heard read are all that are to be read at this morning's session, and they are now open for discussion.

PROFESSOR COOK. I have listened with a good deal of interest to this admirable paper which has just been read. In regard to the bacterial pests mentioned last, I think, as Professor Huxley said about the origination of organic from inorganic, that he had a scientific faith that it was so. So I guess most of us have a scientific faith that peach yellows are bacteria. Now, when the peach yellows came to St. Joseph, Michigan, the very unfortunate idea of "hush up" was in everybody's mind, and they said, "say nothing." As a result, the peach orchards all went to ruination and barely to-day have they recovered. While in South Haven the idea was to "cut back and root up," and to-day they have splendid orchards. I have known a single orchard to sell \$11,000 worth of peaches in that region. Where we found those blights, even though we may not know what they are, the matter of rooting up and cutting back is exceedingly valuable.

I wish to speak of another thing which comes in here very opportunely. The gentleman says that in fighting the sucking insects he would use the soap solutions and use the kerosene emulsion, which I

would never use again. I was once a very stout advocate of it. I am happy to change my mind when occasion comes to require it. I used to favor fumigation tremendously. I don't favor it a bit now, and I would never use kerosene emulsion any more, for the reason which I will give in a moment. Now, the gentleman mentions distillate, and his distillate means the distillate spray. Many of you have tried it and know of its value. It seems to me it is a wonderful insecticide. I have been surprised and astonished at its efficacy. The kerosene emulsion was faulty in this, that if the emulsion was not properly mixed it did a great deal of harm. It would be all kerosene, and then there would be no kerosene; everything would rise to the top, and below there would be no kerosene. And that faulty emulsion has been so often used that the kerosene emulsion has lost favor, and rightly so.

MR. BERWICK. It was not the emulsion's fault.

PROFESSOR COOK. Yes, it was; because it is so very difficult to make it, and Professor Riley did so much in that direction that his old formula, which is a very faulty one, has always been adhered to. I want to say that with cold and hard water you can't get any emulsion with that old formula. If you have got soft water and water warm or tepid you can get an emulsion; otherwise you can't. In the old kerosene emulsion we never used less than one twenty-fifth kerosene, and I used to put in as high as one twelfth. One twenty-fifth, I think, was the weakest I ever heard of anybody recommending it. With this distillate spray they use one fiftieth of the distillate, and it is marvelous what it does. I took one day, from an orchard where they were spraying, the leaves with the eggs of the red spider on them, treated in three ways: one with sulphur, one with distillate, and one with a wash, which I think probably was a resin wash. I put the leaves in confinement, and not a single egg hatched from either the spray with the distillate or with this other wash, whatever it may be, but those with the sulphur almost every egg hatched. The distillate spray has only been used one year, and still it is wonderfully effective, and in many places has given better satisfaction than fumigation. Now, there is one thing that works against this distillate spray, and that is, where the foliage is so dense as it is in the orange orchard, to get it on everything. The great point is "Dash!" It has to go on so that when it strikes the leaves it will fly everywhere. That is going to be the great point in favor of the distillate spray. For that reason, we ought not to have too large a nozzle and too little pressure. I am inclined to think that fumigation is going to go before it, although I am not ready to say that yet.

MR. BISHOP. I want to state my experience with distillate spray. I am favorable to it; I believe pretty near what Professor Cook says. But I employed a professional distillate sprayer, with good machinery, and I believe he is capable, to spray a little, just to see its effect and the

expense. I tried it on some pretty good-sized Mediterranean Sweet orange trees, and they are very compact, and he made it cost me 27 cents apiece to spray those trees, and I can fumigate them for that price. If it is at the same price, I prefer fumigation to the spray, because they didn't come anywhere near hitting all of the foliage, and trees right by the side of them that were not fumigated or sprayed either have just as little live scale on them as those that were sprayed. Consequently I believe the destruction of the scale on the unsprayed trees was the result of a parasitic or predaceous insect, or both.

MR. GRIFFITH. I can agree almost entirely with what Professor Cook has said, but I do not think he has gone far enough. I have always been a strong advocate of fumigation. I have become less confident in fumigation, because I am compelled to trust people who are irresponsible to fumigate while I sleep.

MR. HALL. It is a great pleasure to me to meet upon common ground with Professor Cook. Years past we have often disagreed, but always in a friendly way. And it is also another pleasure to see that the years we discuss these matters pro and con in this Convention gradually the sentiment has become a fixed one that you can kill scale by spraying. But there are two points that I want to make here that have not been made. There has been talk about the proper machine to use and the proper kerosene to use. There must be a distinction made, and many do not know the difference between distillate emulsion we used to buy and the keri-water. Distillate emulsion was made with a soapy mixture, and consequently you did the damage. Keri-water is different, which we mix with water. Properly mixed, it does the work.

MR. STONE. Does the gentleman mean that the kerosene is to be used in its crude state?

MR. HALL. The original keri-water was kerosene and water; but instead of kerosene we use the crude oil, which has a certain specific gravity.

PROFESSOR COOK. There are one or two things which ought to be said in regard to this. I want to plead guilty to my friend Mr. Griffith's charge in regard to my not saying everything. I want now to add one more caution. I would never spray an orchard when it was not in good condition, if I could help it; that is to say, I would want to irrigate before I sprayed, and have it in the best condition.

A MEMBER. Are all distillates uniform in quality?

PROFESSOR COOK. No; and, as Mr. Griffith says, there is the difficulty. But the Southern Refining Company, I am told, gives pretty uniformly a good article.

MR. HALL. I think our University will soon have out a bulletin. Professor Woodworth has been investigating this matter of distillate oil. It is not crude oil, but the by-products taken out and the crude oil left.

MR. BUDLONG. There is one thing that has not been covered entirely in this spraying proposition, and which is of vital importance. I have had six years' experience in charge of six or seven different spraying outfits; and I find that the great fault, and what I anticipate the greatest damage arises from in spraying, is in the application. It is not so much the mixture, it is not so much the percentage or the quality of the oil, as it is the application. You hire a man at a cent and a half a gallon to apply the distillate wash to your trees, and it is an incentive for him to put on a great quantity in order that he make a good price. You can mix up a solution of paris green and take a teaspoonful of it without any damage, whereas a bucketful would kill you. That is the effect the distillate has on the tree, the fruit, and the foliage. If you apply too much, get on a greater amount than is necessary, it does the damage. As to holding the nozzle and the application of the wash directly to the tree, I have never seen half a dozen men do it correctly and scientifically. I said I have had six years' experience. I believe my first experience in spraying was nineteen years ago in Los Angeles, and I have had more or less experience ever since. Now, in the application of any spray for any purpose to citrus trees or trees in leaf, if you apply a spray from the outside it mats down the leaves and the spray does not penetrate the inside of the tree. Thrust the nozzle inside of the tree, and throw the spray under high pressure along the branches and the twigs, and the leaves will stand out horizontally and get a thorough coating on all sides. Go around the tree, encircle the tree with that process, only giving a little on the outside to catch what you do not get inside, and you can effect a thorough application with one fourth, one fifth, or one sixth the amount of wash they generally put on citrus trees. As I said before, it is the quantity that does the damage, and you can get a better result by the process I have described of handling the rod and nozzle than you can by putting on six times the quantity. Another thing, about the pressure to be used and the size of the nozzle, the atomization of the spray as it leaves the nozzle. It can not be done with any diameter, if you use a nozzle that has an orifice of one eighth of an inch, as I have seen many of them do. It takes a small nozzle and heavy pressure to get thorough atomization. I have a theory I would like sprayers to think of and discuss with me at some future time. That is, that on account of high pressure, throwing the spray in fine mist, the volatile qualities of the distillate evaporate in the air; and that is what does the damage to the fruit.

MR. STONE. I desire to get back to the programme, the marketing of dried fruits. I have had some correspondence with some Fresno people who are endeavoring to get associations formed there similar to what was done in this hall several years ago. It was represented at Fresno that there was an exchange existing in Los Angeles. From what

I have heard in this paper this morning, I should imagine it was still in existence. The people around Fresno, for whom I think a Mr. Nourse is acting, are calling upon their communities to form separate associations and then to affiliate into an exchange, as was done in Los Angeles. The co-operation of growers is an imperative necessity if we want to prevent ourselves from absolutely going to the wall. We have each been cutting the other's throat for years in placing our products on the market perfectly regardless of whether the market wants as much as we want to put on it or not. Now, if this cutthroat business is to go on, I would much rather it went on in the original style. The point that I wish to bring before you is this, as I have brought it before the Fresno people by correspondence, that if they form another exchange at Fresno on the lines of the Los Angeles exchange, why that will be two strong men competing with each other in place of a lot of small men competing with one another, and in my judgment it will be more injurious than the old form of work. I have represented to Mr. Nourse that if the Los Angeles exchange is worthy of support, the Fresno people ought to make associations there and affiliate with the Los Angeles association. If the Los Angeles association is not worthy of support, let it be shown, and let the Los Angeles exchange be dissipated and let there be one formed at Fresno, if they can form a better one. Let there be but one exchange to operate the deciduous fruit business, just as there is one exchange to operate the citrus fruit business. The citrus fruit business has been conducted very successfully, and it has been accomplished by one central authority. I wish to represent, in the presence of Mr. Neff, who is the manager of this association, that there should be some official communication with the Fresno people to prevent the formation of two exchanges of the dried fruit people; that the two interests should be amalgamated. And I should like to know what Mr. Neff may have to say to that.

President Cooper announced that the Secretary had just received a telegram from Governor Pardee, presenting his regrets that he could not be with the Convention this evening, on account of having gone to Riverside to meet President Roosevelt, and that the Governor promised that on some other occasion he would meet with the fruit-growers.

MR. NEFF. There has been some correspondence between Mr. Nourse and myself with regard to the dried fruit business, but nothing definite. The intention there is to get the fruit together and hold it for free on board sales, instead of selling it in the East as we have done here through our own agents. And just at present I do not think that that thing can be done.

MR. HUTCHINSON. The gentleman says he thinks we can not sell our goods if we do not send them East. But I think in our part of the State there is no trouble about that. The men who have been in

that business there are willing to take hold of it and buy our fruit of us. We can put our fruit in storage there, and as they sell they will pay us for it. One of those firms told me they would rather do that than to take it as they do now, buy five or six hundred tons and store it and keep it. They would rather have a place they can go and get it any time they want it and furnish their customers with it.

VICE-PRESIDENT GRIFFITH. What proportion of the raisin crop is in the combine there?

MR. HUTCHINSON. Really, I don't know. Very nearly all of it.

VICE-PRESIDENT GRIFFITH. That makes a great deal of difference. If all the dried fruits were in the exchange, you could do as you pleased with it.

MR. HUTCHINSON. That is what we are trying to get—all—and all parts of the State. The northern part of the State has taken it up very vigorously, and they are all right. We have not got entirely organized yet, of course. That takes time. But I think that it will be thoroughly organized and we will have 75 to 90 per cent of the fruit of the State before it is time to deliver. That was the report I got from the president.

MR. DORE. So far as I understood Mr. Nourse in talking with him and in his public addresses, he has sought all the time to give the people in every locality the widest liberty in the expression of their views and in the carrying out of any plans of organization that would not be inconsistent with the general plan. There has been no cast-iron arrangement made by which the whole State should conform to a regulation of a body organized and started at Fresno—not by any manner of means. On the contrary, he has sought to have the whole State organized and then to have representatives from all parts of the State help to map out a plan of work for the organization, and particularly with regard to selling or holding. The great thing is to get together. If we haven't too many fruit-producers who, as stated by Mr. Naftzger yesterday, know more than everybody else, I think we will be able to get together.

MR. STONE. The great point which I wish to make, Mr. Chairman, is this, that the central exchange which they speak of forming at Fresno after they form their local associations is already in existence in Los Angeles. Now, if they would form their local associations and immediately every local association, as they are here, would affiliate with the Los Angeles association, all right. But when they ask that after they have formed their separate associations they shall then unite into another strong body, why, the strong body is actually in existence.

MR. DORE. I don't know as to that.

MR. STONE. That is the point which I wish to make. I wish to avoid another strong body of that kind being formed in Fresno, there

being one at Los Angeles. If they would make their separate associations like the citrus associations, and then form their local exchanges, for instance, like the Semi-Tropic and the Citrus Union, and Riverside, and so on, and then finally bring those local exchanges into the Los Angeles association or the Fresno association—I don't care which it is, but I do ask that there should not be two central agencies competing with each other.

MR. DORE. I would ask if the Los Angeles association has ever made any attempt to organize throughout the State—in the northern part of the State, Sacramento Valley and San Joaquin Valley?

MR. STONE. No.

MR. DORE. Then our people know nothing of this down here—I did not, and I presume the rest of them did not. Possibly Mr. Hutchinson may.

MR. THOMPSON. It seems strange to me that there is not some one in the house who can give us some light on this organization that Mr. Stone speaks of. I have only been in Southern California twenty-one years, and within ten miles of this organization; and I can not say that I know of its being in existence.

VICE-PRESIDENT GRIFFITH. I am a little surprised at what Mr. Thompson has stated about not knowing about that exchange. Five years ago it was born in this room. A committee was appointed here to draft by-laws and a constitution and perfect the organization in Southern California.

MR. THOMPSON. I do not wish it to be understood that I did not know when this child was born; but I did not know of its having nursed since that. I supposed it was dead.

MR. STONE. The difficulty at Fresno, Mr. Nourse has very frankly said in his correspondence with me, is one of money. He says that he and a friend or two have put up some money to exploit the thing in his district, and he thinks he ought not to be asked to put up any more. And I think that is very reasonable. Now, this ought not to be a thing for private enterprise, for men to pay out of their own pockets. When this exchange was formed in this room, there were a certain number of persons in the room who guaranteed funds until the exchange itself was in funds, when it was declared in this room that the funds would be returned to the subscribers. As I said just now, faith was broken in that respect, and from that moment I have never had any confidence in the Los Angeles Dried Fruit Exchange. Now, Mr. Neff, notwithstanding, represents that exchange, and it has funds. Now, can't we appeal to Mr. Neff to take the initiative in this thing and with funds at his disposal communicate with the Fresno people and enter upon a campaign on behalf of the dried fruit people of this State? I don't care whether the central selling authority is in Los Angeles or whether it is

in Fresno or San Francisco. It should be, I think, in the most central place. But there should not be more than one selling agency for the dried fruit, and as many as possible of the growers should be embraced in that union, and that can only be done by organizing and having an organizer in the field. Now, is Mr. Neff in a position to make us any proposition with regard to this, or any promise that he can undertake this? If not, it must be done by private enterprise.

MR. NEFF. I do not know that I could promise exactly to furnish the funds from the exchange, because we have never run the thing for profit. All the surplus, if there was any, has always been distributed, at the end of each year, to the persons or associations furnishing the product; so that we have very little surplus on hand.

MR. STONE. How many associations are affiliated with you?

MR. NEFF. About half a dozen.

MR. STONE. Couldn't you get a mandate from that half dozen to furnish an organizer in the field and furnish the funds?

MR. NEFF. It may be done. I will do what I can.

At this time a recess was taken until 2 o'clock this afternoon.

AFTERNOON SESSION—THIRD DAY.

THURSDAY, May 7, 1903.

The Convention was called to order at 2 o'clock P. M. President Cooper in the chair.

PRESIDENT COOPER. I understand that W. H. Paine has been successful with a sulphur wash in fighting the red spider. If he is here he might give his formula for the wash.

MR. PAINE. I can't say that it was my formula at all; but when the investigation of the red spider was going on down there, Mr. Volck—who, I believe, as much as anybody, ought to have the credit for it—he and I worked together very considerably at Azusa on that sulphur spray. I would not call it a wash. The formula that was used then was eleven pounds of sulphur to one pound of flour, mixed into a paste, and stirred into a barrel of water. I have been making some experiments with it, and I think that to do effective work on the orange trees half the amount of sulphur and half the amount of flour will be sufficient. That the sulphur spray is an absolute eradicator of red spider there is not a doubt. At Duarte, only recently, there were some orange

trees which were very badly infested with the red spider, and I told the owner of the orchard about this wash, and he applied it. It has eradicated the pest so that there is absolutely nothing there to-day.

A MEMBER. I would like to ask Mr. Paine if the sulphur wash he used destroys the eggs of the red spider?

MR. PAINE. No, it does not. The reason the sulphur is so beneficial is from the fact that it is not the actual spray itself which kills the spider. The paste is simply to hold the sulphur on the trees, and it is the action of the sun on the sulphur that forms the gas that does away with the red spider as it hatches out. It is identically the same with the sulphuring of grapes. The putting of sulphur on the grapes would not do any good to the grapes at all, but when the sun comes out it forms the gas which is the destroyer of the mildew fungus, and it is identically the same with the red spider. If the sulphur spray was used generally throughout the country, it would be only a short time before the red spider would be eradicated altogether.

A MEMBER. Is it necessary to wet all of the tree with this paste—thoroughly spray it on?

MR. PAINE. You have got to thoroughly spray it, but it does not require such a large amount of sulphur. I think that if you put about half a pound of the flour paste and about five or six pounds of sulphur into a barrel of water that is all that is requisite for spraying. The sulphur is dry sulphur. You don't have to boil the sulphur at all. But it is unquestionably an absolutely perfect cure. I see that Professor Woodworth is here. He can, perhaps, tell us something about it.

PROFESSOR WOODWORTH. It will kill the adults and young, but it will not kill all the molting forms or the eggs at the strength ordinarily used.

PRESIDENT COOPER. The next question in the box is: "What wages are paid farm help, including farms or citrus ranches?"

MR. BISHOP. The usual wages that have been paid are \$1.25 per day, if they are on long time, where the men board themselves. The orange-pickers have been paid \$1.75, or 17½ cents an hour, through this season; but it is difficult to furnish ten hours work a day.

PRESIDENT COOPER. The next question is: "What percentage of distillate spray is used in spraying oranges, lemons, and rose bushes?"

MR. BISHOP. Two per cent is about the usual formula; not much greater; and sometimes one and a half.

A MEMBER. I would like to ask if it is 2 per cent that is used for oranges, and if it is not a stronger per cent that is used for lemons? I think I have seen it stated that it is sometimes as high as 3½ per cent for lemons. I may be mistaken. I would like to know if any person here has ever used it for the aphids on rose bushes.

A MEMBER. I have used 2 per cent on rose bushes and it kills them.

PRESIDENT COOPER. How about lemons? What per cent is used for spraying lemons?

A MEMBER. Mr. Allen of San Diego has used very successfully 3 per cent on lemons, but found it too strong for oranges. Not more than 2 per cent should be used for oranges, and sometimes hardly that.

PRESIDENT COOPER. Mr. Frank Collis, please answer that question—the percentage of distillate spray used on oranges, lemons, and rose bushes.

MR. COLLIS. I always used 3 per cent of distillate on lemons—I have no oranges to spray—and I found it very effective and without doing any injury whatever. I understand that the sprayers down south use a 2 per cent mixture on oranges. Why they use it weaker on oranges than on lemons I can't state. On roses I would not use it to kill aphids, which are very easily killed. If I used it at all, it would not be more than one half per cent, because aphids are very easily killed, and rose bushes can not stand a strong spray of any kind. A good soapsuds spray will kill the aphis eggs just as well as distillate or anything else.

MR. BERWICK. Might I remark on one of yesterday's essays?

PRESIDENT COOPER. It is in order.

MR. BERWICK. There was a talk yesterday regarding apple culture in this southern region. I believe the scientists have a maxim that altitude is equal to latitude. That means that by getting up high you can get a cool climate in a tropical region. And I don't see why you people should not raise apples on your heights, as you are trying to do, except for one reason. When you get up high I think it is rather hard to get irrigating water. I am not familiar with your hillsides here, but I should judge that on most of your hillsides suitable for apple-growing it would be rather hard to get water, and I think your annual rainfall is insufficient to grow good, juicy apples. I live in the Carmel Valley. Our average there is thirteen and a fraction inches, and we supplement that with all the water we can get, in the winter time more especially. It was also mentioned that the Bellflower was the one apple produced in the Pajaro Valley. The Pajaro Valley also produces in large quantities the Yellow Newtown Pippin, one of the best winter apples grown in California, one of the highest-priced dessert apples in the world. I doubt if you people here would find it profitable to compete with the Pajaro Valley, because the conditions there are favorable to the production of fruit, except one—that is, nature has been so lavish there that the orchardists have become lazy and allowed the bugs to get a very strong hold, so that last year they lost as high as 50 per cent of their apples by the codling-moth. But Professor Woodworth is here to-day. I think he could tell us something about that. He is engaged in investigating there and knows more regarding these things than I do.

PROFESSOR WOODWORTH. We have just undertaken the investigation in the Pajaro Valley, so as yet we have no results to show. The record of last year, according to their own estimate, is that they lost 50 per cent. It is possible, of course, that this estimate was somewhat overestimated; that it may not have been so heavy. But still it was a loss of a great many thousands of carloads, I should judge, from the way they are telling me of the loss of hundreds of carloads at one place and another. Anyway, we estimate that the loss was a half million of dollars. We have undertaken the investigation under very favorable auspices. I hope that at the end of the season we will be able to show some very practical results. The amount of spraying that is being done in that valley now is, I guess, tenfold greater than in previous years. There are now some fourteen power outfits, and the valley is not over ten miles in any direction from Watsonville. Perhaps half of the valley is not yet in bearing.

MR. BERWICK. How often do they spray?

PROFESSOR WOODWORTH. Some places once and some ten times. At the end of the year we will tell you what is the most practical and when you can safely leave off spraying. No one knows now when we can. It probably differs very greatly in different localities. I have no doubt that the programme which will finally be decided upon for the Pajaro Valley would be essentially different from what would be practical in Fresno or Sacramento regions.

MR. BERWICK. Have you found, so far, any parasite preying on the codling-moth or its pupa?

PROFESSOR WOODWORTH. Not to amount to anything.

MR. STONE. What spray is used?

PROFESSOR WOODWORTH. As to the spray that is mainly used up there, they are all arsenides, of course. Paris green is used to a larger extent than any other. But we are experimenting with all the arsenides—of lead, and lime and so on.

MR. KRAMER. What effect does spraying have on trees in bloom?

PROFESSOR WOODWORTH. I will say that so far as we can see now those that were sprayed when in bloom have shown no bad effects. But we can not tell for certain until after a little more time has elapsed.

MR. KRAMER. Don't the moths lay their eggs in the bloom?

PROFESSOR WOODWORTH. I am certain they do not. No one has seen the egg of the first generation, so far as I am aware; but in later generations the moths certainly lay their eggs on smooth surfaces. And the bloom is thoroughly woolly. I can not think they lay their eggs in the bloom.

A MEMBER. What do you find in regard to the quality of paris green this year in the market?

PROFESSOR WOODWORTH. There has not been any bad paris green in the Watsonville market this year.

A MEMBER. What brand do you find good?

PROFESSOR WOODWORTH. There are only two brands really for sale there. What they call the Block brand and the Horticultural brand.

A MEMBER. I would like to ask, for information, if in this State there have been any experiments made so that comparison can be had between dust spraying and water spraying?

PROFESSOR WOODWORTH. We are trying the dry method as well as the wet method. Of course we can't say anything until we see what the results have been.

PROFESSOR COOK. I want to tell our friend, Mr. Berwick, who is not acquainted down south, that we raise the best apples that are grown in California. At the New Orleans Exposition, Southern California got the premium over the whole United States. And I want to tell him further that in our best apple regions we have no trouble from the codling-moth. They have never gotten in there, and we think we have the brains to keep them out. And that is in the region of San Diego County, away up in the mountains; and also in San Bernardino County. It seems to me it ought to be stated that we have splendid apple orchards. They are not large, but there are a number of them away up in the valleys, and we raise magnificent apples. I have never seen better apples anywhere than those near Julian, in San Diego County. The Spitzenberg, which we like so well East, is just as good down there as in New York or Michigan. Now, I don't think anybody should spray fruit trees in bloom. I know this; I don't guess at it. Especially is this so if there are bees.

MARKETING CITRUS FRUITS.

By COL. F. M. CHAPMAN, OF COVINA.

This subject having been assigned me, I will discuss it from the point of view of the grower. We must recognize that this is a very large subject to be fully covered in one paper. I shall therefore not attempt to go into detail, but will only touch upon a few of the important phases as seen by a grower of citrus fruits.

The area in which citrus fruits, and especially California's pride, the Washington Navel, can be grown in its perfection is so limited, and the demand so constantly on the increase, that it must be apparent that the industry is of great importance. It should be, and is, one of the happiest callings in which man can engage to-day.

In growing citrus fruits for the market, quality is always of greatest importance. Clean, attractive fruit is always worth more than scaly, coarse stuff. The orchardist who grows inferior fruits should not

expect the same financial returns as he who takes the very best care of his grove. The man who uses plenty of fertilizer, cultivates deep and frequently, and keeps his orchard clean of scale pests which infest neglected trees to the detriment of the crop and the community, is the one who succeeds. He who will not take the proper care of his orchard should get out of the business, in justice to his neighbors.

After we have grown the crop we come to the important subject of how to reach the consumer, and what method should be adopted. I believe it to be impractical to adopt any one cast-iron rule that would apply to growers, shippers, and buyers alike, because some people desire to do business in one way and some in another, which is perfectly proper, just so long as they do not crowd down the market, and no longer.

About seventy-five per cent of the shipments this season have gone to the five principal markets, namely, New York, Boston, Chicago, Philadelphia, and Pittsburg, and have kept them in a congested state, and these are the markets which make the price for the whole country. Frequently thirty or forty cars would be sold, or offered for sale, in one day in a single market, with one hundred cars or more in sight, awaiting their turn at the next sale. Would you call this "business"? Yes, business for the middlemen; but how about the grower?

What part of the price paid by the consumer would be a just and fair proportion for the grower to receive as his part, considering that he invests his capital in the grove, takes all the risks of growing the crop (and these are many), with guarantee of freight and brokerage? In fact, the grower assumes all of the liabilities. From the best information at hand, the consumer pays an average of \$5 per box, or 40 cents per dozen, for fancy and choice California Navel oranges, while the grower has for the past three years received about 75 cents to \$1 per box for the same grade. I have reference to first-class fruit, properly grown, and put up by first-class packers.

Now, judging from the above figures, would it not seem that either the grower has been receiving too little or the consumer has been paying too much? For the difference between 75 cents and \$5 is certainly more than should be required by the middleman for marketing a box of oranges.

It would appear to the grower that a more equitable division of the proceeds would be to give the grower 25 per cent, or \$1.25 per box; railroads, 90 cents; packers, 50 cents; leaving \$2.35 for the middlemen. I am attempting to take a general average price. I know that extreme cases can be cited where the grower has received as much as \$10 per box for oranges, but it is also true that others have received "red ink" for their labors, and have been called upon to put up a considerable amount of money, in addition to the fruit, in order to cover expenses.

My information is that first-class fruit always retails at about the same price, regardless of the auction and wholesale prices. I would recommend that the grower do a little investigating on his own account. Write to some of your Eastern friends, and ask them what they are paying for good oranges.

Frequently you are shown telegrams from many markets stating, "Good oranges are selling at \$2.75 to \$3.25 per box. Can handle several cars." Auction sales quote the same figures. At these prices the grower should receive at least \$1.50 per box. Do you get it? For an answer I refer you to your own account sales.

A market journal states: "At the time the new marketing agency was formed, there were two thousand five hundred tramp cars of oranges in transit East, one firm alone having one hundred and nineteen cars rolling." These were being offered for diversion. If this state of affairs would not "hoodoo" any market, I do not know what would. I do not wish any better evidence of the disaster of this kind of business than the fact that, just as soon as the new "marketing agency" was formed, and steps taken to remedy this business, the market improved and assumed a healthy condition.

I never could see any merit in the "sell delivered" method. Whenever the grower loses all control of the fruit, it is up to the buyer to say what he will allow you for the fruit. You may take what he offers, or divert it to some other market and sell it as rejected fruit, which is always classed as second-rate stuff.

When the far away East has the fruit and the money, with the grower's guarantee for the freight and other expenses, "Where are we at?"

Considering the tariff we have to pay, the railroad service should be very much better. The time made by the "Fruit Express" between Los Angeles and the East will not average more than eight miles an hour, and frequently will not exceed five miles an hour. This is much slower service than we had seven or eight years ago. We should have an average of at least fifteen miles an hour. With greater speed there will be no shortage of cars, as the railroads have plenty of refrigerator cars if they run them at a reasonable speed, instead of using them for cold-storage warehouses. And further, we should have a flat rate of \$1 per hundred pounds—a flat rate that would include England, for with a quicker service we could use the English market to advantage. Also, we should not be required to put the same amount of fruit in cars of different sizes. Three hundred and sixty-two boxes should be the maximum for long cars, and scale down in proportion to the length of the car, as it certainly is detrimental to stack fruit in cars without sufficient ventilation. At the present time we are required to put the same number of boxes in a car 34 feet long as in cars of 40 feet length.

And again, growers are entitled to fair treatment by the "press." We

have no desire to discuss this question of marketing in any spirit other than that which will contribute to the greatest good to all. We should never be subjected to abuse just because some grower happens to see this great and vital question in a light different from some editor who has no financial interests whatsoever involved in the business of fruit-growing. I would therefore urge the press to treat all fairly. Be generous, gentlemen, who sit in your well-appointed offices; be fair to the grower who tills the soil and contributes liberally to the support of the press.

What is the cause of and what the remedy for the ills of the grower? Your physician would look for the cause, and then apply the remedy. I am of the opinion that he would pronounce the grower's ailment "Marketing diversionitis." It is a case for the surgeon, and there is but one remedy for the disease—the knife, amputation. Diversion of cars lies at the root of the whole trouble. I know that at first glance this will be somewhat startling to some people, but after a sober second thought you will agree with me that the diversion of cars is detrimental to the best interests of all concerned—grower, shipper, broker, commission man, jobber, and retailer alike, the only exception to the rule being a class of brokers who deal in tramp cars. It is the tramp car that plays "hob" with the market.

I had some experience in diverting cars, away back thirty years ago in shipping apples; and as long as we continued to do so, we had trouble. The trade got into the habit of placing orders for several cars, anticipating an advance in price, intending that if prices declined to have cars diverted. When once it became known that the fruit would be consumed in that particular market, there was no more turning down of cars or further trouble along that line.

Would it not be better to force the sale of fruit at the point to which it is consigned, than to divert the same? Also you should know pretty thoroughly what market is to take the fruit before it is picked, for it is better by far that the fruit remain on the tree, which costs nothing, than to have it rotting in the cars running over the country in search of a market that will take it at its own price, and then be called upon to make good the commission, brokerage, and freight.

Brokers frequently wire to as many as one hundred different dealers, offering a tramp car they have rolling. Now when several brokers are doing the same thing, I ask, in the name of common sense, "What would you expect?"

And again, no dealer would be justified in placing an order for several cars, when his market was likely any day to be flooded with cars which have been "hawked" about the country, from place to place, seeking some one to devour it at his own price. If a car is rejected I should sell it in that market. Don't hammer down some other market

with a rejected car, which is always sold as second-rate goods, generally bringing little more than freight. Rather than do this you would better by far keep the fruit in your packing-house, or better still, on your trees, until you know where it is going. The dealer would look ahead and provide for his market. But under the "sell delivered" method, they are looking for tramp cars to buy at a bargain—and they generally find plenty of them. If the railroad companies wished to do the industry a great benefit they would decline to divert, except by the payment of the regular tariff; and I, for one, earnestly hope to see this brought about soon.

Some dealers, for personal reasons, will be expected to be opposed to this method, but I hope that, in the interest of legitimate business, the foregoing thoughts may receive deliberate consideration. These plans once adopted will insure a proper distribution of the crop, which all must concede necessary to insure the consumption of our fruit at a fair price.

Also, keep a string on your fruit. Don't haul it to some packing-house, and pass it in saying "Good-bye, Good-bye," and go home hoping that you may at least get something for it. I repeat, keep a string on your fruit, so that if at any time it should be improperly handled, for the purpose of hammering the market or punishing some real or imaginary enemy, you can prevent such a practice. Men who own the fruit never hammer down the market, you can depend upon that. It is always some one who has had the fruit furnished free, with a full guarantee of all expenses. Don't be alarmed that the buyers won't take your fruit. They are only too anxious to get full control of the same, and get it rolling. Sell your fruit for cash, and as near the tree as possible, and let the other fellow assume some of the liabilities.

Growers should not fall out among themselves, and go to devouring one another. We have about all we can do to keep from being devoured by the other fellow.

The only rivalry which ought to exist between growers should be to see who could produce the best fruit, and the contest should be continued between the packers, to see who could put up the best pack. Brands should become so well established that prices would be quoted on brands.

DIFFERENT VARIETIES OF ORANGES AND THEIR RESPECTIVE MERITS.

BY CHAS. C. CHAPMAN, OF FULLERTON.

The California fruit-grower is among the most enterprising horticulturists in this or any other country. He keeps in close touch with the markets, receiving daily telegraphic reports from the leading cities of the country. The slightest indication of a want by a market for any particular fruit or special variety is quickly noted by him, and straightway he sets about endeavoring to supply the demand thus indicated. Not always even does he wait for the consumer to make known his desires in this respect, but frequently he creates a demand for his product. There is, however, one unfortunate feature in this attempt to meet such demand. Every fruit-grower is kept so well posted by attendance upon farmers' clubs and institutes, and through the numerous horticultural journals, that there is at once a movement all along the line to grow fruit to meet the indicated want. The uttermost parts of the earth are called upon to supply the stock from which to make the start, or the genius of some grower develops from his own orchard the desired fruit, or one that meets favor with the trade.

It is quite natural that every orchardist should want to grow fruit which meets the most ready demand at remunerative prices. Although experience has quite fully demonstrated the merits (or lack of it) of practically all the well-known varieties, the question, however, under discussion is an important one. It requires a number of years of expensive attention from the setting of a grove to its yielding a crop. A grower, therefore, contemplating putting out an orchard or the rebudding of one already in bearing, is considering a question of great interest to him. He should carefully weigh the merits and weaknesses of the various varieties from all the essential points. Marketing conditions during the interval from the setting of an orchard to its bearing may radically change, or a prospective favorite may develop a weakness that will make it wholly undesirable. This has been the experience of many growers who have seen their coveted wealth gradually and slowly but surely vanish. To avoid these expensive and exasperating mistakes growers should do a little careful figuring and thinking for themselves. It will not do to follow blindly and *en masse* in the footsteps of any grower who may have made something of a success along some particular line. There has been a great deal of thoughtless work done by growers following some neighbor who has set out a particular variety, which under his management and also under conditions not enjoyed by all, has proven successful. Thus a sentiment in behalf of this variety is created, and often without good judgment, or even a fair degree of

common sense, it is very generally adopted and set out, later to be found wholly undesirable and not adapted to existing conditions or localities, or perchance results in an overproduction. There are varieties of citrus fruits which may be grown to a limited extent with profit, but would result in disaster if very generally cultivated. Take, for instance, the Tangerines, the Satsumas, the Kumquats, the Malta or Ruby Blood, or grape-fruit. There is a demand, at good prices, for a limited quantity of these varieties. Owing, however, to their peculiar characteristics, when this demand is supplied, they will not go into general consumption, except at prices that would be wholly unprofitable.

In the brief discussion of the merits of the various varieties of the orange grown commercially in California, I shall not attempt to give a description of either the trees or the fruit. The mere mention of the names, I take it, will be quite sufficient, their characteristics being well known.

In seeking a desirable orange tree, the grower must take into consideration many points. The ideal tree must be hardy, so that it will stand a low degree of temperature with little or no injury, and will also thrive with light irrigation and even with indifferent cultivation. It should be a vigorous grower, a heavy and regular bearer, thornless, and its fruitage season must come when the orange is needed by the Eastern consumer and must extend over a long period of time so that advantage may be taken of favorable market conditions. Such a tree must grow an orange neither too large nor too small, of attractive color, shapely, and of fine texture. It must be heavy of juice, of good flavor, the grain fine, meat show rich color, and should have no seeds or but few. Furthermore, it must have fine keeping and shipping qualities, for, however superior an orange may be, it is a failure unless it can be put upon the market in sound condition.

The Washington Navel has justly won its title to be called the "King of Oranges." It is the ideal California orange, being especially adapted to conditions as they exist here. The splendid quality of the Washington Navel has won for Southern California favorable recognition throughout this country and England as an orange district. The tree is an early as well as a regular and heavy bearer, and the fruit is of attractive color, desirable size, a good keeper, and is susceptible of exceedingly high development along these lines.

We may have other excellent varieties introduced into California, but I believe that the Washington Navel will continue to hold the first place as California's standard growing and shipping orange. While it is an imported variety, yet commercially it is distinctly a product of Southern California, and has no competitor in Florida, Louisiana, or in any foreign country. It is marketable at the season when an orange is most needed and meets with a general demand throughout the country, and

so far as present indications point it will be difficult to produce more of this fruit than the markets can take care of at reasonably profitable prices; provided, however, that the growers send to market only a superior article, such as the Washington Navel is capable of being made; and further provided, that the transportation companies will deliver them promptly and with the least possible injury.

The Australian Navel was introduced into Southern California at about the same time as the Washington Navel. As every grower knows, the tree of the Australian is a more vigorous grower than the Washington, but is a shy and irregular bearer. It is not the province of this paper to enter into a discussion of the difference between the Washington and the Australian Navel, and how these differences may have been brought about. Suffice it to say that there is a radical difference in the shape and growth of the tree as well as in the character of the fruit.

Unfortunately the Australian has been well scattered through the orchards of Southern California. In the early days it was supposed by many to be identical with the Washington Navel, and no particular care was taken in securing buds for nursery stock. Orchards generally were thus badly spotted with the Australian; but many orchardists have very wisely rebudded to the more popular variety.

The continued demand for a better orange is imperative, and it behooves every grower, in order to make his business a success and to keep California in the lead as an orange-producing section, to grow only the best fruit, and the Australian Navel does not possess merit sufficient to warrant any grower in retaining it in his orchard, especially since it has been thoroughly demonstrated that large trees may be successfully budded. The Australian comes in a little later than the Washington Navel, and has at times in the past on this account found a good demand after the Washingtons have been marketed. I believe, however, that when the Valencia Late comes to be more plentiful, which it evidently will in the near future, or the Navelencia proves to be all that it is claimed for it, the Australian Navel will go begging, not finding any so poor as to want it at any price.

Recently the Valencia Late has won favor with both the grower and the trade. In fact, from the phenomenally high prices received, especially last year, it may be said that it has become famous as a profitable orange to grow. Not only in Southern California has the Valencia Late won favor, but growers north of the Tehachapi have been attracted by it. The result is, this variety has perhaps been more extensively set out during the last two years than any other. Especially is this true if we are to take into consideration other varieties which have been rebudded to it. We may, therefore, soon expect a very large annual increase in the yield of this splendid orange. We are not prepared to predict with certainty just what the marketing results of this

will be. It is certain, however, that there must be a large increase in the demand for a summer orange, or there will be serious disappointment among Valencia growers.

I may be charged with selfishness in expressing such pessimistic views with reference to the future of the Valencia. As I have as little to fear of an overproduction as any other grower, I believe I can speak on this subject with a reasonable degree of honesty. Conditions, however, may radically change, and I trust they will. While I am convinced that a greater demand than now exists may be created for this orange, as indeed we have seen it rapidly increase during the last two years, yet I doubt that the demand will keep pace with the enormous increase in production which we must look for. The Valencia is not a heavy annual bearer. After the tree is fully matured it is inclined to produce a good crop only biennially. When these crops are supplemented by heavy deciduous crops, low prices must be expected. It must also be understood that it costs more to market a summer orange than it does other varieties. Extra expense is incurred not only by grower and shipper, but likewise by the Eastern handler.

While I regard the Valencia grown under favorable conditions as the best orange, all things considered, known here or elsewhere the world over, it has its objections as a standard orange for the general grower, or as the best orange suited to the most favorable marketing period, and these are conditions which must prevail if we expect to make the culture of the orange uniformly profitable. In many districts where it may be grown, so far as the abundance of crops is concerned, the Valencia can not be held, without deteriorating, until there is a demand for it at remunerative prices. It loses color, flavor, and fineness of texture, and thus in all the essentials of a superior orange becomes a failure. It comes to its best after the markets have been supplied for six months or more with other varieties, and when both California and Eastern deciduous fruits and berries are in greatest abundance. People therefore naturally turn from the orange and thus materially reduce the demand for a summer orange.

Many of the smaller cities, those ranging from 10,000 to 15,000 inhabitants, and which are large consumers of oranges during the winter and spring months, can not take care of a car of oranges after the Fourth of July at such prices as will make it profitable.

In order that we might get a correct idea about prices received for the Valencia, and also to remove false impressions created by the high prices obtained during the close of the last two seasons, I have estimated the average price received from shipments I made during the months of July and August for the past six years. I take these months, because practically the entire crop is usually shipped by the first of September, and also because with most growers it is necessary to ship by that time.

the fruit deteriorating if left on the trees longer. Judging from "Fruit World" reports I believe that during these years the prices I have received have, on the average, been the maximum. As these were the returns with a limited supply upon the market and when every other condition was the most favorable, the growers can speculate as to what they will reach when the supply is greatly augmented, as it must certainly soon be.

The average price received for fruit shipped during the time above mentioned was \$1.64 per box on the tree. Some of this fruit was sold in New York as late as September 20th. This is a most excellent showing, and could it be maintained ought to satisfy the most grasping. Yet it seems not to be as much as many growers have the impression the fruit brought. Occasionally a car would sell at high prices, and it was such reports that made the false impressions. The average, however, gives the correct basis from which to judge of its merit as a marketing orange.

In discussing the merits of the Valencia Late it should be understood that I embrace the orange known as Hart's Tardiff, for if there be a difference between the two it is but slight. I also notice the tendency of growers and shippers of Hart's Tardiff to abandon that name, evidently preferring that of the Valencia Late, it, for the present at least, being the more popular. Nurserymen who have heretofore advertised the Hart's Tardiff have also fallen into line, and now from the same stock are able to supply the trade with the Valencia Late.

One of the best oranges in many respects, and one of the most profitable that is grown in Southern California, is the St. Michael. There are at least three distinct varieties called the St. Michael. One, however, the Red St. Michael, will not rank with the others; it is not extensively grown, nor is it worthy of consideration by growers. The two kinds that are well known are the small, round variety known as the paper rind, and the large, flat variety. Both have thin rinds and may be properly called paper rind, the appellation commonly given the St. Michael in general. The former I would shun, the tree being more of a dwarf, the fruit small and more inclined to drop than the other variety, which even with it is a serious weakness. All oranges should be marketed when in their prime, but it seems that this variety suffers more by neglect in this respect than any other. The tree of the larger specimen is large, hardy, and a regular and heavy bearer. The fruit runs to small sizes, and going on the market when oranges are usually higher than they are earlier in the season, enables the retailer to sell at a nominal price per dozen, and also it largely supplies the summer hotel trade. This variety has merit and may be commended to those seeking a first-class orange, especially for heavy or medium-heavy soil. I mention this kind of soil, not because the St. Michael can not be grown in

light soil, but it being a vigorous grower and heavy bearer, in order that the fruit may attain large and desirable sizes it must be supplied with plenty of plant food such as these rich, heavy soils usually contain.

There are two varieties of the Blood orange well scattered throughout the orange districts of Southern California. These are the Malta and the Ruby Blood. The former was imported early in the history of orange culture here, and has proven generally profitable. It does not show the color indicated by its name to the extent that the Ruby variety does. It is, however, regarded by many as the superior orange, being more uniform in size and of better shape and flavor. A limited quantity of either of these varieties may be profitably grown.

The Mediterranean Sweet, which was regarded with great favor some years ago, and was extensively planted, has proven a disappointment. The tree is tender and an irregular bearer, and the tendency of the fruit to puff and its poor keeping quality have made it generally an unsatisfactory orange. Extensive rebudding of the Sweet has been carried on the last few years, and even for this it is not desirable, although it may be successfully changed in this way to any other variety. In justice to this much-abused variety, I will say that it has behaved itself very well the last two years. The yield has been heavy, the quality good, and its greatest weakness, that of puffing, has been largely overcome. Supplementing these improvements were most satisfactory prices. In this respect it starts off well this season. The prices thus far realized, taken in connection with the fairly good crop, make one hesitate to undertake further rebudding. There is no doubt that with proper treatment the Sweet will do better than it did for years previous.

The California orange-grower has not only materially developed imported varieties, but has by his genius propagated new ones. Notably among these are Thompson's Improved Navel and the Navelencia. The former has been pretty well disseminated throughout Southern California, and its qualities and merits are quite well known. I think I am justified in saying that the introduction of this orange has not generally met the high expectations some growers entertained for it two or three years ago. Every section is not so well adapted to its culture as that about Duarte, nor is every grower so careful and painstaking in his farming as is Mr. Thompson. These may account, in part, for the failure of growers who secured buds from the parent grove, or set out nursery stock supposed to have been budded from it, to produce an orange altogether satisfactory. It lacks the essential qualities of a fine eating orange. A fruit-dealer of Philadelphia recently stated that some of this fruit sold on that market at a good price, but at the next sale when the fruit was cut, on account of its poor showing, prices fell on an average of 50 cents per box. I think, however, while the orange may lack in quantity of juice and quality of flavor, it has proven a better keeper than was first supposed.

The Navelencia, being so more recently introduced, is not so well known. Mr. Thompson has displayed commendable enterprise in giving us the Improved Navel and the Navelencia. Some recent sales of this latter variety have shown up well. Some specimens I have seen were attractive as to texture, size, and color. Disappointment has attended the introduction of so many varieties that it might not be prudent for growers to be too hasty in extensively setting out this new orange. However, those who care to experiment with what gives promise of being a fine orange will find this variety worthy of their attention.

The Navelencia is an orange supposed to follow the Navel season and in a measure, I presume, take the place of the Mediterranean Sweet. The Washington Navel is, however, so extensively grown in Southern California and under such widely different conditions that some sections are able to hold it in good shipping condition until the Valencia comes in. When this is the case there would, in our judgment, be but little call for an orange to supply the demand of this particular season.

There are other varieties to be found here and there throughout the orange districts, but none, so far as I know, have sufficient merit to make them worthy of consideration by one contemplating setting out an orchard. I think I have named what may be termed the standard commercial varieties. These have been tested by both the grower and the trade, and seem pretty generally, with the exceptions noted, to meet the wants of each. In choosing varieties local conditions must have some weight. These questions well considered by the grower, his orchard well cared for from its setting out until maturity, and even better after that, with due attention given to the care and marketing of fruit after it is grown, will in most cases make the orange business not only reasonably profitable, but perhaps as desirable an occupation as any other we may select.

PRUNING TO IMPROVE THE ORANGE.

BY C. R. PAINE, OF REDLANDS.

Pruning fruit trees and vines to improve the product is a very common practice, known from a distant period

The orange tree in its youth has done so well with little or no pruning that the practice has been quite general to let it go virtually untended in this respect, at least until some irregular growth demands removal. Many orchards, perhaps most, have passed from youth through years of bearing satisfactory quantities and qualities of fruit with little increase of care in pruning, so that a habit has been formed among many of regarding the pruning of an orange tree as a species of work rarely necessary.

There arises the question, occasionally, whether it is worth while to undertake the "appalling task of getting into the inside of an old orange tree to saw and cut off and drag out the dead wood." Perhaps it is not, if that is all that is contemplated by pruning. It gives content and repose to consider that it is nature's way of disposing of old and useless growth by deadening it; the brush takes but little room, and does no harm.

There is, however, one kind of cutting that is usually done, for it is plainly seen that it is misdirected energy of plant life—that is, the removal of suckers from the body of the tree.

Neither sort of interference with the tree is the result of a studied system of pruning the orange, either for the good of the tree, as a regular and thrifty fruit-bearer, or for the good of the owner, in producing the best quality of fruit.

There are some exceptions to this general custom, who have founded their practice on good judgment and experience; and, I think, the tide has turned in favor of more pruning than in earlier times. But the minority is a small one who have reasoned, observed, and acted according to sound reasoning and careful observation in regular pruning of the orange tree as a necessary feature of the work to be done in securing the best outcome; and few there are of this minority who can cut, with that unconcern which marks the pruner of deciduous fruit trees, the limbs or twigs that have any promise of fruitage.

There is no reason in laws of growth why the orange tree should be an exception to the general rule that pruning should be done to secure: "(a) Convenience of the grower; (b) Health and strength of the tree; (c) Regulation of heat and light; (d) Attainment of strong bearing wood; (e) Attainment of size and quality of fruit; and (f) Promotion of regular bearing."

I quote from Wickson's "California Fruits," the best authority in the State, the above statement of the objects of pruning. They were made with especial reference, I presume, to deciduous fruits.

There is no orchard work more systematically and thoroughly done in California than the pruning of deciduous fruit trees, particularly by those engaged in growing the fruit for Eastern shipment. There is no work of the sort more uniform over large areas of orchard. By this means, and it could be done by no other, there is grown fruit of fine quality, of good average size, and of such value as to stand shipment across the continent. Thinning is, to be sure, an adjunct of this process, but not sufficient in itself. In fact, pruning of this or any kind of fruit tree is one form of intense culture.

With the exception of many orange-growers, it is agreed that pruning is an essential for excellence of results. Man is satisfied only with the best products obtainable by the most skillful and costly efforts in direct-

ing nature's forces. A good market is impossible without prime quality. Quantity is an acceptable accompaniment to the grower.

There is no doubt that in any given locality, favorable seasonal conditions are the first requisite in fruit culture. Man can combat unfavorable weather by slightly protective or modifying measures only. It is left with him to improve varieties, to till and fertilize the soil, and to train and care for the tree or vine that bears his fruit. He early learns that nature is not a fruit-grower, but a seed-producer. She is a good mother, but it is not her forte to be a disciplinarian, in the fruitman's business, at least. If he forgets this fact, or neglects to act upon it, nature may do well without his aid for a time, while the plant is young, and grow the fruit as man delights to have it, as well as the seed for reproduction. Eventually she falls back upon the performance of her function, with undesirable results for the fruit-grower. Then wisdom comes to him, and he so directs the energies of growth that a fruitage rich and fair is the reward of his labor and skill. May it be so with the orange-grower.*

There is no question that we need to improve the quality of our oranges. A better orange than the Washington Navel may appear, but it is now this superb variety which has come to need improvement, for there are far too few of them of that high quality we once knew. In the most crowded market, high-grade fruit is the kind that sells, and sells to advantage. Neither our trees, nor our wagons, nor our packing-houses, nor the railroad trains should be burdened with such a disproportion of second-grade fruit, amounting often to one half that is grown.

To a certain extent every year this condition is beyond remedy or change; for without doubt the character of the season is the most potent cause affecting the amount and quality of the crop. Judicious and abundant fertilizing, proper irrigation, and thorough cultivation are rightly regarded as necessary factors in bringing about a good result. Some orchards, or parts of orchards, have naturally differing products, which treatments will not avail to change.

Already, to a limited extent, the proper pruning of the orange tree has been shown in actual practice to have a beneficial effect in the production of fine fruit; but when other controlling influences have not been sufficient, or of the right sort, correct pruning alone can not bring about desired improvement.

In one of these instances of thorough pruning with a well-defined purpose and plan, so thoroughly carried out on some old trees that only four of them could be treated in a day, a traceable effect was seen the same season, almost wonderful as compared with former years. The parts removed, dead and living, littered the ground beneath and around and seemed equal in quantity to the branches remaining. The trees

took on new life, blossomed freely on the limited growth of the preceding season, put forth new shoots, and bore a fine crop. Every branch of the diminished number was an efficient fruit-bearer, save a few, still crowded, which the pruner was too timid to cut off. The fruit was strikingly uniform in size, appearance, and regularity of shape, and of superior flavor. It was plainly of higher grade and in greater quantity than that on adjacent trees on similar soil, with the same treatment except as to pruning.

If orange trees should be pruned, and if the pruning is of great importance in growing high-grade fruit in large ratio, and in producing good crops, undiminished in quantity by the process, especially in merchantable quantity, then there must be a certain shape and condition of the tree aimed at in the work. The mind of the pruner will entertain an ideal form to which he will try to bring the tree; but as ideals are always in practice unattainable, he will come far short of the perfect shape he desires, especially if the tree has been neglected.

At the foundation of the methods of procedure there must be principles governing the work. These principles can not be arbitrary, the dictum of a sensible, experienced man—to say nothing of a crank—but must be founded on well-known laws of the life and growth of plants; nor must we be tempted, in acting according to our knowledge of particular laws applicable to the work, to disregard other laws or to assume too much knowledge and go astray riding a hobby.

The forming of the young tree is admirably described in Wickson's "California Fruits," after the method of J. H. Reed, of Riverside.

This paper will have to do with some of the principles and work that apply to bearing trees. The ideal object to be kept in mind by the pruner is to cause the bearing orange tree, just like the well-formed young tree, to have only such limbs grow as radiate outward from the trunk or divided stem. The lower limbs, as they have served as fruit bearers, will curve downward, and the higher ones will extend upward at an angle more or less acute, according to their age and bearing stage. Then each limb, if its vigor entitles it to remain, is to be treated as an independent unit and provided with ample space for the work of its foliage. The shoots, often quite large, that grow vigorously upright from the outward extending limbs, and the suckers—sometimes as large as principal limbs, if natural growth has not been interfered with—originating in the body of the tree and towering up through the favored branches with intent to form a second story, must be taken out. In some trees such treatment becomes at times heroic, if neglect has prevailed. In others, a choice must sometimes be made in their favor, if they have continued so long as to leave the original top branches diminutive and weak. In general, if these aspiring growths remain, they will ultimately dominate the tree and change it to a wood-forming or timber

tree, in so far as this condition is predominant. The wood thus formed and located will, it is true, eventually become the home of fruit, but at the immediate expense of the regular fruiting limbs and the injury of the quantity and quality of both their fruit and their provision of new fruit twigs. These vigorous upstarts, when becoming productive, will bear fruit of a coarseness commensurate with their own rank growth. Besides advancing the tree top to an inconvenient height, they interfere seriously with the true fruit limbs—and hold their own fruit exposed to weather injury.

Checking the upward flow of sap by restricting wood growth, so far as possible, to outward and declining limbs, tends to multiplication of fruits and to fineness of grain and richness of flavor, because all rank growth of branch or product is rare in pendent limbs.

When each remaining limb, selected according to its worth, has been so pruned that its branches have clear action, comparable to the human arm with its hand and outstretched fingers, executive of the body, as the limbs and branches are of the body of the tree, and has such exposure as to give its foliage free access to its air food and to the light by which it may use it, then the fruits borne among its leaves, and the fruit twigs and spurs there formed for the succeeding crop, having the best of facilities and the unwasted vigor of life, will be prime in quality and abundant in quantity.

The method of pruning to produce such excellent results, just outlined in its main features to consist of forming the tree of radiating limbs only, each given space for activity, depends, as has been said, upon laws of plant life.

The grower naturally gives his thought and care chiefly to his soil, because it is the tree's visible and tangible support and affords a well-known food supply—forgetful of the truth that the largest portion of the solid matter of his tree and fruit comes from the atmosphere surrounding it.

No soil, however rich, can support to full-headed grain, a multitude of stalks of wheat or corn; they may grow as spindling weaklings to some height, but they can scarcely reproduce the seed that gave them life. Doubtless the roots lack space in the ground, but the blades, also, are too numerous for each to benefit by the air conditions.

As a boy, I used to see masses of wood piled closely in a rounded heap, then sodded over carefully to exclude the air, save by slight openings around the base. Then it was burned slowly, day and night, for many days. In due time the fire was extinguished by closure of drafts, and the cover of sod removed. There stood the pile, to my surprise almost as large as before it was burned, all black charcoal, nearly pure carbon.

This it is that is derived wholly from the air as the plant is growing.

It is diffused in the air, in very small proportion, it is true—only about four parts in ten thousand—in the form of a gas, carbon dioxid. It never accumulates, though constantly given off by animal respiration and decay of organic matter.

As a correlative operation of nature, the green tissues of vegetation absorb this gas and convert it into essential elements of their solid structure. In the form of gas the carbon dioxid enters the epidermal tissues of the leaf, a watery layer; here it becomes carbonic acid, and, no longer a gas, but dissolved in water, it enters the true laboratory cells of the leaf, those containing chlorophyll granules, that give the leaves their greenness. In these this raw material, drawn from the air, is worked up by decomposing the carbon and oxygen and recombining in marvelous ways.

The simple experiment of putting a freshly plucked leaf into a glass of water and setting it in the sunlight will aid somewhat in making visible this activity of the leaf. In a little while the leaf will be covered with bubbles of a gas which may be determined to be oxygen, the gas thrown off in the water in the decomposition of carbon dioxid absorbed.

If, at the same time the glass of water with the leaf is placed in the sunshine, another similar one is put beneath an unpruned orange tree so burdened with foliage and débris that within it is a chamber of darkness, it will be a long wait before any like sign of leaf action will be observed.

It is well known how plants behave toward light. The colorless potato plant in the cellar will grow a long way toward an opening. I have just noted, while writing, a whole bunch of California poppies stretching sidewise from an overhanging alder limb. Seedling orange trees uniformly bear heaviest crops on the south side of an orchard, though adjacent to old Navel orange trees, with interlacing roots. It is quite noticeable with them, on account of the contrast of shade within the orchard which their high and broad tops produce. In cool seasons, in northern latitudes, budding and blossoming are most abundant on the south side of trees. It was observed by many that in the backward spring of 1902, Navel oranges set more heavily on the south side of the trees. In early April of this year I noted that blossom buds averaged a greater number from the axils of the outer leaf than from even the next within. The botanists tell us, what is easy to note for ourselves, that leaves are so arranged that one does not stand in another's light.

The absorption of the constituents of the air by the foliage eludes observation, but reflection makes it reasonable that man should lend his hand to favor the exposure of the leaf to the vital energies of the sun's rays, and that he can profit thereby by going beyond nature's efforts in the same direction.

The oxygen of the air, though not requiring light for its admission to the laboratory of the leaf, is as essential as the carbon dioxid. We know how poorly a fire burns when the pieces of fuel, be they wood or coal, lie close, excluding free circulation of oxygen. When it is understood that the air food of the plant, the carbon dioxid, can not be obtained except by free admission of the light, and that the oxygen of the air is not available unless free circulation is provided, the work the pruner has to do is made clear, if he would have the leaf organs most efficient. The laws of nature, operative in the atmosphere, plainly point his way and become his guiding principles.

If the laws of nature are so potent, why disturb our trees at all? Like their forest companions, why may they not care for themselves? As the interior branches die, new ones spring from the exterior, and thrift goes on. If a thicket springs up, the strongest survive, excluding light and air, and so bring death to the weaker. If the leaf is the organ which absorbs from the air the gases needful for respiration and plant nutrition, if to it is carried through the channels of the new wood from the rootlets the gathered soil salts, all food material from earthy and aërial environments, there to be assimilated and elaborated into plant food and fruit, why cut away a single one?

The philosophy implied in this comports with the ease and comfort of the grower, and consoles him for leaving undone what may seem needless work. It is good enough philosophy while the tree is young, perhaps—save for the sucker growth—because no foliage is so far from the surface as not to have sufficient exposure; but as the arms of the tree lengthen and reach abroad, there are struggling limbs and leaves in the rear, and the host of leaves is made up of the weak and strong, the dead and dying among them all. What would be the strength of an army thus incumbered?

Theory, and experience as well, show that when relief is given by the hand of man, the response rewards the effort. Take away the dead and finish the dying with the knife, not permitting them to be the victims of nature, then the living become more lively.

The dead branches in the center and the dead twigs clear to the outside among the overlapping branches have not died because, having fulfilled their functions, they are of no further use; many are found which have had no opportunity to become useful. If, as coroners, we should hold an autopsy on their remains, we would bring in a verdict, "Died for want of breath."

Nature's way of smothering is all right for her ends, perpetuation of the species, but we have other ends in view. Nature does her part in plant growth and will brook no unwarranted interference, but when there is added requirement for our purpose, we must share the work and expense with her and not depend on natural selection to do what, as part of nature ourselves, we are competent to decide on and perform.

Passing from the general to the particular, a few details further will suffice to make the method clear.

How shall the pruner, having got out the brush and cut off the upstarts, distinguish among the outgrowing branches the ones to be pruned away, that the best may remain and be given their freedom? Mainly by their helpless situation. If the sap has left certain branches for a freer flow in others, as shown by their appearance of thrift, the first must be relentlessly cut away. If this does not give room enough, thin the remainder. With care, no large openings need be made, save sometimes by taking out large upright growths, which, destined to ruin the tree as a bearer of prime fruit, should be cut out as soon as discovered.

This way of pruning provides locations for the much prized inside oranges—not the pale, insipid, easily puffing ones that grow in darkness, but those that grow within the shelter of the foliage that has an inner and an outer wall, permeable to sifted rays of light and currents of air.

The work having been all done within at first, the outer circumference now demands some attention. Pruning here should be light, for it is on dangerous ground. The orange tree is a sun-loving plant, and its outer leaves should be treated with great respect. Heavy one-sided growth should be diminished and symmetry be sought for.

If it is desirable to cut, as is often the case, the shoots that are too long, and to prepare them for future fruiting, a mere clip at the ends or a division among the small leaves near the origin of a shoot will result in new shoot growth from each leaf axil remaining, while, if the cut is made elsewhere, only a cluster of long shoots will follow.

If the tree is aging, renewal pruning is advisable, which is done by cutting back unthrifty terminals.

In thus advocating pruning in a definite and easily followed way, there is no intent to go counter to any of "the holy laws of nature," as some critics may charge, but rather to indicate methods that will render these laws operative in order that best fruiting may result.

MR. CARROLL B. SMITH. With reference to Professor Paine's paper about pruning to improve the orange, the principle that he has there stated, that light admitted by cutting out influences the new growth, should guide every one in the use of the knife. I cite as illustration a honeysuckle vine against a house, the inside of which is all dead wood, while the outside is healthy and green. Also the Baronio system of pruning the lemon. Light is let in at the top, and the new growth is violent and uncontrollable. If the tips of limbs about the outside of the tree are cut off, growth is stimulated at the points where the cut was made, and the whole tree soon blanketed with surface growth which shuts out the light and causes a formation of dead wood on the inside, just as the side of a house does with the honeysuckle vine.

By taking out the whole limb here and there the whole interior of the tree is illuminated and both growth and fruit will appear on the inside. In this way the whole tree shares the burden of the crop, and the fruit-bearing area is increased. Besides this the expense of removing dead wood is saved.

MR. GRIFFITH. Before proceeding to discuss the papers, I want to call for the report of the Committee on the President's Address.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

To the State Fruit-Growers' Convention:

Your committee, to whom was referred the President's annual address, present the following report:

We commend the address to the careful consideration of all concerned in the fruit business.

We request especially that every member of the next Legislature of this State should read and digest the statement relative to the importation of parasitic and predaceous insects, and bear in mind, in the enactment of laws, the primary importance of the fruit interests. For their convenience, we recommend that a copy of the address be placed upon the desk of each member in the halls of legislature.

We call the attention, also, of the same body of men to the great need of efficient provisions for the enforcement of laws concerning the adulteration of foods, drugs, and drinks, so fully discussed in the address.

We commend the wise persistency manifested in this and previous addresses that has been instrumental in securing results important to our large industry and that may avail for future good.

We should take to heart the cautions given to deciduous and citrus fruit-growers about extending areas of planting.

Renewed advice upon the subjects of care in growing and packing of fruits and upon marketing methods deserves our approval.

We particularly commend the appeal urging growers and shippers of fruits and vegetables to endeavor to secure, in return from transportation companies for payment to them of \$18,000,000 annually, a more efficient and speedy service.

(Signed:) CHAS. R. PAINE,
THOMAS STONE,
C. C. TEAGUE,

Committee on Annual Address of the President of the
State Fruit-Growers' Convention.

President Cooper announced that owing to the incompleteness of the memorial to President Roosevelt it would be necessary for an adjournment or recess until to-morrow morning, in order that the committee might perfect its report and present it to the Convention.

MR. DORE. Discussion of the papers just read being now in order, I would like to ask the gentleman who read the paper in regard to orange trees a question. I notice in Southern California, in very many orange groves, that the branches are lying upon the ground or touch the ground, and in some of them that the fruit lies upon the ground. Is that good form?

PROFESSOR PAINE. That is an excellent form, particularly in bearing fruit. In that sense it is good form, because the best fruit is

borne on the lower branches. It is not subject to weather conditions. As matter of convenience it is not good form. It seems more desirable in old trees with large extending branches to cultivate more beneath the tree.

MR. DORE. How far from the ground would you consider the branches should be on a Navel orange tree?

PROFESSOR PAINE. In the nursery the tree is topped to be about 3 or 3½ feet.

A MEMBER. I want to ask a question which bears upon both papers. There was a very valuable suggestion in the first one in regard to having a tree that would stand the greatest amount of frost, and the other suggestion comes in under Professor Paine's paper as to the form of the tree—broad and turning downward instead of growing upward. I do not know whether any one here is acquainted with the *trifoliata* of Florida. The *trifoliata* stock it is claimed will raise trees as far north as Washington. The stock is so hardy that it would harden our trees and make them frost-resistant. It is also broad, low, and drooping, and would spread out its branches to receive the sunlight and the air which are so necessary. It seems to me that if that tree was introduced here you would introduce with it those two very valuable ideas.

PROFESSOR PAINE. I do not want to go into a discussion of the *trifoliata* now. I know something about it from seeing the reports to the State Board of Horticulture in Florida. It is dwarfy in character, and that makes it a good fruit-producer. When budded to our varieties it will bring fruit much earlier and produce oranges of good quality and abundantly. While I know from the authorities that it is very resistant to frost, I want to say something in regard to the matter of pruning the orange trees to give air and light, upon the point that some of you may have thought that in so doing you will expose your fruit to frost. Now, it is the exposed oranges upon the outside that are frosted, and they are frosted in the points where they are exposed. For instance, an orange that stands somewhat upward would be frosted on its upper side if there is no foliage over it. And again, if it was exposed near its stem, there the frost would appear in perhaps a little spot not greater than the end of my finger. If you have a protection of leaves over an orange, the orange is protected from frost. It is the blanket over the particular fruit that is the protection. It does not need a mass of foliage.

MR. STONE. There was a very important paper read last night, of which no notice whatever has been taken. It was well delivered. That was on the subject of advertising. I refer to the paper read by Mr. Curtis. It seems to me that some practical action should be taken with regard to advertising California products. It has occurred to me whether the Southern California Fruit Exchange could not take that up and have an advertising department—an officer who should attend

to the advertising of the products in all parts of the world. For we look not only to the United States markets to consume the products of California, but to all the countries of the world. And it seems to me that there is no orange-grower, for instance, or deciduous fruit-grower, who would object to paying a tax of one cent per box, or, if necessary, two cents per box, in order to get the products of this State brought thoroughly before all the countries of the world. And I think, perhaps, for two cents a box it might be done. That would produce something over \$200,000 a year, and I think \$200,000 a year would be a very moderate amount indeed to expend in advertising the products of California throughout the world. There are plenty of individual men who do that to advertise a single article. If anything could be done to bring this thing to a practical head it would be worth an enormous amount of money to us. My suggestion is that the California Fruit Agency or Exchange, as the case may be, take up and attach to itself an advertising department.

MR. GRIFFITH. The California Fruit Exchange does not control enough fruit to make that revenue. The California Fruit Agency will control about 90 per cent of 74,000,000 boxes, or \$74,000. With the shipment of 20,000 cars that would bring a revenue of about \$74,000 at one cent a box. The California Fruit Exchange only controls one half of nine tenths of that.

MR. STONE. It would be not only the fruit marketed by the Exchange, but that marketed by everybody else, the Agency also, and the deciduous fruit-growers and the wine-growers should all combine to pay their proportion of the advertising. We can not advertise our products too much.

MR. HUTCHINSON. It seems to me that every part of the State should advertise the principal product that they raise, and advertise it very thoroughly. My part of the State has taken that up now, and we are advertising a little differently from what we are told here to advertise. We have got out a good many hundred thousand recipes, and we put one in each package of seeded raisins. The seeded raisins have got an immense circulation now—the cartons. And we are going to advertise that way. The Chamber of Commerce of Fresno took that up some time ago, and they do that. It is a very heavy expense upon us to pay that. But if a person gets a one-pound package of seeded raisins, and is told how he can use those raisins in so many different ways, it certainly should open a market for them. So it is with the oranges. If all those things that you who are in the business think of and know more about than I do, could be put into a box or into each package, so that everybody getting them could read it, it seems to me it would strengthen the market. We took up this matter of advertising, from the fact that in packing raisins many of our girls would put in a little note, "Packed

by me—such a person—at such a date, and raised on such a piece of land. Please inform us if this is satisfactory.” Something of that kind. In very many instances we got answers from them. Nothing, of course, was ever put in except something of that kind, to know whether the packing or the fruit was satisfactory and equal to others that was delivered. And it seems to me that if each part of the State would take that upon their shoulders and advertise it thoroughly, all parts of the State would then be benefited.

On motion of Mr. Dore, the Convention passed a vote of thanks to the press for their report of the proceedings of the Convention, and to the Chamber of Commerce for its endeavor to supply the Convention's wants.

An invitation was read from the San José Chamber of Commerce to the Convention to hold its next session in that city, and asked a favorable consideration of the request.

On motion of Mr. Griffith, a vote of thanks was extended to the visiting brothers of the north for their attendance upon the Convention, and also to the chairman who presided over the Convention.

President Cooper announced that the next session of the Convention would be held in December, the first or second week, at some point to be hereafter selected.

At this point a recess was taken until Friday morning at 10 o'clock.

PROCEEDINGS OF FOURTH DAY.

FRIDAY, May 8, 1903.

The Convention was called to order at 10 o'clock A. M. President Cooper in the chair.

PRESIDENT COOPER. The business before the Convention this morning is the consideration of the report of the committee to memorialize President Roosevelt, and as chairman of that committee I would report that arrangements have been made with Secretary Loeb, whereby we shall be able to present our memorial to the President this afternoon, and the following has been prepared:

To His Excellency THEODORE ROOSEVELT, President:

The Fruit-Growers of California, in convention assembled, at the City of Los Angeles, May 6, 1903, have appointed a committee for the purpose of extending their thankful appreciation of your efforts to place yourself in sympathy with the people of our great Nation, and to present to you some of the ills under which they now suffer, and for which they seek redress by the General Government:

First—The horticultural industry of California is now a most important one, involving millions of dollars of capital, and giving employment and livelihood to thousands of families; shipping some 65,000 carloads of produce annually, at the expense for freight of \$19,000,000. Its requirements are therefore worthy of serious consideration.

Second—The time now required to carry fruit, a perishable product, from California to Eastern points, is from eighteen to twenty-five days. This fruit is largely shipped in ventilator cars, which to be effective must be in motion. The long time consumed, however, leads to their being side-tracked, often on hot deserts, and the fruit spoils, in consequence, causing heavy loss to the grower.

Third—From present indications we may safely conclude that the acreage in fruits and vegetables will double in the next decade. Our present railroads lack equipment for adequate service. These, and those projected, will be unable to meet the increasing demands for transportation.

Fourth—A very large portion of the arid West, now uninhabitable, will be reclaimed within the next few years. The work is now in progress. This region, now sparingly settled, will support a dense farming population and ought to bring great prosperity to the Pacific Coast and to the United States.

Fifth—Your interest in the Isthmian Canal, and the promise of the completion of that great enterprise in the near future, has won from California enthusiastic appreciation. We, the Fruit-Growers of California, representing its most important industry, are more than hopeful that you will lend your assistance to the greater and more greatly needed work of the construction of a double-track railroad from the *Atlantic* to the *Pacific* seaboard, to be owned and controlled by the General Government, as the present facilities are entirely inadequate to our needs.

Sixth—That we be secured for our perishable product an eight-day freight service to New York and a six-day service to Chicago, which more than doubles the present passenger time.

Seventh—We would respectfully, yet most earnestly urge upon your attention the necessity of maintaining the present tariff rates upon citrus fruits and upon fruit products in general, and stoutly urge that even with the present duty the California grower

is seriously handicapped because of the competition of Europe and the West Indies. From these islands the fruit can be landed fresh in New York, in less than four days, and at a freight rate per box of from 60 to 70 cents less than that charged on California fruit. Yet we must pay much more for labor. Any lowering of the present tariff rates would work incalculable injury to our great industry, and bring ruin to many of the growers.

Eighth—We would also urge upon your attention the great need of a postal parcel system, in which respect we are behind many European countries, and even our neighboring republic of Mexico. Its introduction in our country would be an inestimable boon to our orchardists and to all other classes of our people.

Ninth—We wish to call your attention to the magnitude of our citrus industry, and the insidious nature of destructive fungi and bacteria, and to urge strongly the desirability of a specialist to give his exclusive attention to citrus fruit diseases.

Tenth—We would be gratified if you should deem it in line with public interests that you appoint a commission to investigate the complaints of California fruit-growers, which commission should be empowered to redress such of these grievances as are grounded in fact.

On motion, the report was adopted and the Convention adjourned *sine die*.

JOHN ISAAC,
SECRETARY.

ELLWOOD COOPER,
PRESIDENT.

OFFICIAL REPORT

OF THE

TWENTY-NINTH

FRUIT-GROWERS' CONVENTION

OF THE

STATE OF CALIFORNIA

HELD UNDER THE AUSPICES OF THE STATE HORTICULTURAL COMMISSION,
AT FRESNO, COMMENCING TUESDAY, DECEMBER 8TH, AND
ENDING FRIDAY, DECEMBER 11TH, 1903.



SACRAMENTO:

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1904.

CALIFORNIA STATE HORTICULTURAL COMMISSION.

ELLWOOD COOPER, - - - *Horticultural Commissioner.*
ALEXANDER CRAW, - *Deputy Horticultural Commissioner.*
JOHN ISAAC, - - - - - - - - *Clerk.*

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SYNOPSIS OF THE PROCEEDINGS

OF THE

Twenty-ninth State Fruit-Growers' Convention,

HELD UNDER THE AUSPICES OF THE

STATE HORTICULTURAL COMMISSION,

FRESNO, DECEMBER 8-11, 1903.

FRESNO, Tuesday, December 8, 1903.

Pursuant to call, the Convention met in Armory Hall at 9:30 o'clock A. M., December 8, 1903.

President ELLWOOD COOPER, State Horticultural Commissioner, called the Convention to order.

REV. THOMAS BOYD, of Fresno, opened the proceedings with prayer.

PRESIDENT COOPER. The address of welcome will be made by the Honorable Mayor of Fresno, Mr. Stephens.

ADDRESS OF WELCOME.

HON. L. O. STEPHENS, Mayor of the city of Fresno, delivered an address of welcome, as follows:

Mr. President and Members of the Convention: I assure you that I feel it to be not only a privilege, but also an honor to be invited to say a few words to the members of this Convention, and especially do I deem it a pleasure to extend to you a welcome on behalf of the city which I as Mayor represent. I believe that a fruit-growers' convention should be held in a fruit-growing county, and, looking at the question from that standpoint, this Convention is called together in the proper place, for Fresno is not only a fruit-growing county of considerable magnitude, but it is also a growing fruit-growing county. We appreciate the fact that your deliberations here will be of much benefit to us, and we also believe that your visit here can be made one of pleasure and interest to you. We trust that while you are here you will make

a visit to our surrounding country and, as the spider said to the fly, "We have many pretty things to show you while you are here." We will show you an irrigation system which has reached a high degree of perfection; one which has few equals anywhere in the world, and none in this part of the country; one which carries the life-giving waters from the snows of the Sierras down to the plains and delivers them to our vineyards and our orchards and our alfalfa fields just as surely as the venous system carries the blood all over our bodies. I know you will enjoy a visit to our vineyards and our orchards, and perhaps to the orange groves which lie in the hills out yonder in the citrus belt, and when you return to our city we will open our doors to you. We welcome you to our public institutions. We invite you to inspect our schools, for we are proud of them. We have an energetic Chamber of Commerce, which lives in its own little home down in the park by the depot, and we are proud of it and the energy it displays here.

I now formally give into your hands the keys of our city, the old and rusty keys, but they express to you the welcome which we extend to you. We trust that your deliberations here will be both pleasant and profitable, and that when you have finished them and go to your several homes you will take with you pleasant recollections of your visit here and that you will always speak kind words of us, as we shall of you, for we will always like you better for having known you better. I thank you and I welcome you.

H. P. STABLER, of Yuba City, and A. M. DREW and W. R. McINTOSH, of Fresno, were chosen Vice-Presidents.

PRESIDENT COOPER. MR. JOHN ISAAC will act as Secretary of this Convention. He is here at my right hand.

ANNUAL ADDRESS OF HORTICULTURAL COMMISSIONER, HON. ELLWOOD COOPER.

Ladies and Gentlemen Fruit-Growers: This is the Twenty-ninth State Fruit-Growers' Convention, and the second held under the auspices of the State Horticultural Commission.

We have met here to discuss fruit subjects and to improve our knowledge so that we may be more successful in our undertakings and be better able to confront the difficulties which beset us on every hand.

It is to be hoped that the widest range of ideas will be brought out—ideas bearing directly upon the main issues of the three leading questions that menace our prosperity: *First*, selling our fruits; *second*, transportation; and, *third*, insect pests.

Formerly, when the production was not equal to the demand, there did not seem to be the same necessity for combined effort, for prices

were active and there was no danger of neighbors competing with neighbors and selling at rates ruinous to the growers. Co-operation will prevent all such ruinous competition. It does not partake of the nature of a trust, as each individual manages his own orchard, reaps the benefit of his labor and expenditures, has a voice in what should be fixed as a fair price for the quality of the fruit he has to dispose of, and, at the same time, has the consciousness of dealing fairly with his neighbor. This question was very ably discussed by A. H. Naftzger in a paper read before the Twenty-fifth Fruit-Growers' Convention. (See Seventh Biennial Report, page 127.)

Fruit-Growing.—The season just closed has not been as disastrous as that of 1902. The walnut-growers have received higher prices than ever before, at least since any considerable quantity has been produced, but there exist grave doubts as to the future of this industry. A fungoid disease, known as "walnut blight," has in some districts reduced the crop one half. The spread of this malady is very much feared. The Walnut-Growers' Association has offered a prize of \$20,000 for a feasible remedy. Spraying with the Bordeaux mixture has lessened the loss in some orchards, but this remedy is impracticable on full-grown trees.

The citrus industry was never more depressed than during the past year. Orange shipments were not successful; shipments of lemons were worse. Some lemon-growers are intending to bud oranges on their trees, others to root them out and plant something else. Notwithstanding the future uncertainty, I have, in my travels, observed new plantings in almost every locality adapted to citrus-growing. My fears were fully expressed at the Twenty-eighth Fruit-Growers' Convention. (See Report, pages 10 and 17.)

Shipments of table grapes, of large and fine varieties, have given excellent results. Wine grapes have not sold at prices that would pay for their production.

Olive-growing remains uncertain as to the future in oil-making, by reason of substitutions and adulterations and the forcing of our oil on the market at ruinous prices, in an effort to compete with all sorts of abominations, the public not being educated as to the extent of the frauds or the danger in consuming substitutes. The ripe-olive pickle, however, is in great demand, and a large market offers to those who will give to this branch of the business that care and attention which are required to produce an article that is marketable.

Shipments of deciduous fruits have given fairly good results for the last crop.

Almonds have been sold at higher prices than for many years past, but, considering the sparse crops in some years, the danger of frost, and the average result in a decade, further planting can not be encouraged.

In regard to prunes, the result is uncertain and will remain so until all dissensions among growers are harmonized.

We are in the raisin district, and during the sessions of this Convention we will hear all about the prosperity in raisin-growing.

The program as presented is a very elaborate one. The papers promised will no doubt discuss in the most able manner every phase of the fruit question, so that it would be out of place in the opening address to take up any special part that others have been invited to discuss.

The Panama Canal.—It is greatly regretted that the treaty which was made was not confirmed by the Colombian government, so that this gigantic work could have been commenced and the canal built without unnecessary delay. It is gratifying, however, to read the following from President Roosevelt's message to Congress: "If they will come to an agreement with us in a straightforward fashion we shall in turn act not only with justice but with generosity, but if they fail to come to such an agreement with us we must forthwith take the matter into our hands." [Since the above was written, the Panama government has signed the treaty and it is now before the United States Senate.]

The advantages of an interoceanic canal to the fruit-growers of California have been discussed by Edward Berwiek at several of our sessions. At the Los Angeles Convention, held in May of this year, the question of a cross-continent double-track railroad, to be built and operated by the Government, was considered and thought to be of much greater importance than the canal. The President was memorialized regarding such an undertaking. (See official report of the Twenty-eighth Fruit-Growers' Convention, page 181.) The feasibility of such an undertaking and its importance to the advancement and prosperity of the great body of the American people were ably discussed in a paper presented by F. E. Kellogg, to be found in the Eighth Biennial Report, page 319.

New York Obelisk.—The removal of Cleopatra's Needle (known as the New York obelisk) to California, as mentioned at two former conventions, has claimed a continuance of my efforts, but without the least apparent success. In correspondence from the Park Commissioners of New York, they declare that the obelisk is not scaling off; that no such proposition as removal would be entertained; that if it was a fact that the obelisk was undergoing disintegration, they would build over it a glass house and protect it. Since the date of the said letter, I have seen it reported that the obelisk is scaling off. No effort has been made to protect it. This ancient relic of a former civilization should claim the attention of every intelligent citizen.

Consular Reports.—As requested by the fruit-growers in convention at Los Angeles, I made arrangements with the Commercial Museum to give me the consular reports as soon as received. I found that all of the machinery for the circulation of these reports was in motion through that body, and to establish an independent source would take time and could not be completed for the then growing crops. These reports require much time to get out and mail, there being a large number sent out each time. We have been obliged to purchase not only a mimeograph, but also an addressing machine, with the necessary appliances, at a cost of over \$150, and in addition, to get an assistant on certain days, so as not to delay the mailing. The information can be condensed, and in some cases very important news can be cabled. But to organize a complete system it will be necessary for me to visit Washington and arrange in person with the Secretary of State. This I hope to do the coming year; in the meantime, however, we will send the reports as received.

Irrigation.—The Eleventh Annual Irrigation Congress, which was held at Ogden, September 15th–18th, was one of more than ordinary interest to California, and was very largely attended by delegates from this State. California is more deeply interested in the irrigation problem than any other section of the United States, and the fact that the General Government has taken up the work of redeeming our arid wastes, by bringing them under water, should receive attention from this Convention, and we should, while expressing our gratitude for small favors already received, place ourselves on record by demanding from Congress such aid as will ultimately husband our entire water supply and carry it to the lands where it will do the most good, thereby providing homes for tens of thousands more people, and adding millions to the wealth of our State and nation.

In connection with this subject of irrigation, there is another question which greatly interests the people of the San Joaquin Valley, and especially those of Fresno, and that is the matter of drainage. These two questions must go together; they are complements of each other, for unless we have perfect drainage, irrigation will in time fill the soil with water, and bring to the surface deleterious salts, which will prove injurious to our trees and vines. This is a matter which I think properly comes before this Convention for consideration in connection with the larger one of conserving and applying our water for irrigation.

St. Louis Exposition.—In the coming spring there will open in St. Louis the largest world's fair ever held in this or any other country. At it will be gathered representatives from all the nations of the earth. People will go there to be educated, and they will go there for business. California has never been found lagging behind in events of this char-

acter, nor will she be now, for we have a good working commission, which is already making its work known. But it is at once our duty and our interest to take part in this affair as the organized fruit-growers of the leading fruit section of the world, and I would suggest that some measures to this end be taken at this Convention. We shall have Mr. Filcher, one of the commissioners, with us, and can learn from him what course would be best to pursue in harmony with the work already done.

Commerce in Fruit in San Francisco.—The matter of the exactions of the middlemen has often come before our conventions, but we have not as yet reached any sure method of escape from their often unfair and sometimes dishonest treatment. I understand that there is, at the present time, a combine among the fruit commission men of San Francisco, which has established rules regulating the retail trade, and has even undertaken to prevent the growers selling in the open market by punishing with the boycott and other un-American methods the retailer who dares to purchase from others than members of the combine. This is a matter well worthy of our consideration and one which should receive attention.

Food Adulteration.—My remarks on this subject at the Los Angeles Convention in May last were very full. I shall not dwell upon it at this meeting. Suffice it to say that Congress is now in session. This is what is known as the "long term," and we should urge our representatives to lose no opportunity in securing the passage of an interstate pure food law, similar to that passed by the House of Representatives during the session of the previous winter. The olive industry can never be successful until such an Act becomes the law of the land, and our California law, now on the statute book, fully carried out.

In the present advanced age of civilization and progress, it is difficult to conceive how the human family could permit any tampering with food products. Yet this has been going on year after year, so that scarcely any food is what it purports to be. This false labeling can only be prevented by positive law, swift in its execution and severe in its punishment. While we have many able engineers engaged in the investigation of the sanitary conditions of our cities, and some of our best people devoting their lives to the improvement of the homes of the great mass of people, and devising means to give them better ventilation and more sunlight, thereby endeavoring to make life more cheerful, we have, on the other hand, neglected the most important of all, the nourishment of our bodies. I copy from the Chicago "Record-Herald" an extract written by William E. Curtis:

Impure and adulterated foods leave a trail of human woe. We do not realize the amount of disease that is due to poisonous and indigestible substances that are mixed

in with the things we eat. Along this trail are sufferers from dyspepsia, rheumatism, appendicitis, all sorts of liver and kidney diseases, impure blood, impure complexions, and all forms of stomach and bowel complaints. More suicides, crimes, vice, unhappiness, divorces, business incompetency, and ugly tempers are due to bad cooking and impure food than to any other cause.

The desideratum of this life is good health, and the sooner we devote our energies to secure this, the sooner the greatest blessing that is possible on this earth will be realized.

Insect Pests and Fungoid Diseases.—While the devastation by insect pests is less by reason of a better knowledge of how to reach them by sprays and fumigation and, more particularly, by the discovery and distribution of parasitic insects, the fungoid diseases become more and more alarming. We have no knowledge of how they appear, or of how they spread. The mysterious vine disease, formerly confined to a small area in southern California, is now in various localities in many parts of the State, and just what will be the final result is a problem yet to be determined. The pear blight is extending, and the large interests in this branch of the fruit industry are liable to be very much reduced. The walnut blight is terribly alarming. This fruit heretofore has been considered the least susceptible to injury, and the easiest to manage in gathering and marketing, requiring less labor for the returns, and, in fair seasons, reasonably profitable. But our experience in the past few years has made it uncertain how long we will continue to grow walnuts.

At the Los Angeles meeting I pointed out the danger, notwithstanding our efficient quarantine laws, of introducing insect pests worse than those that have so far appeared in this State. These are the gypsy moth, the Morelos orange-maggot, the Australian fruit-fly, and the Hawaiian melon-maggot. As we extend our tree-planting, we broaden the territory and increase the danger. It seems to me that from past experience, we should realize the necessity of keeping more than one competent investigator traveling in foreign countries. Only a few days ago two carloads of Mexican oranges were ready for shipment to California. The Southern Pacific Company, being aware of the danger of introducing insect pests into the State, refused to haul them. We have always found the railroad companies ready and willing to assist us in enforcing our quarantine laws.

I have received reports from nearly all the County Horticultural Commissioners in the State, in regard to the fruit conditions in their respective counties, and in all of them appears the statement that the codling-moth is very bad. Regarding this pest, which is prevalent in every apple-growing district, I have copied the following extract from the report of George Compere, published in the journal of the Department of Agriculture of Western Australia, August, 1903, page 143:

My attention was directed to that of the codling-moth (*Carpocapsa pomonella*). This resulted in the discovery of no less than eight different species of parasites which

destroy this moth, and one species, in particular, if properly introduced into a new country infested with the moth, leaving behind the secondary form, would soon bring the moth into subjection. It is interesting to watch the performance of this ichneumon fly in her search over the stem of an apple tree for the hiding place of a codling-moth larva; where one was located, she would at once elevate her long ovipositor in a loop over her back, with its tip on the bark directly over the place where the moth larva or pupa would be located, and as soon as the opening by which the larva had entered was found, she would then make a derriek out of her body, and with great skill would proceed to search for the moth grub with her long ovipositor, and as soon as it would come into contact with one, she would immediately deposit her egg in the pupa or grub of the moth. In one instance, a grub, when it found it was being attacked, made a hasty exit from beneath the bark and proceeded to crawl up the stem of the tree, but before it had proceeded more than one inch, was discovered by the fly, who at once changed her position and attacked the naked grub, in which an egg was deposited. This grub was placed in a breeding tube, where it at once assumed the chrysalis form, and from this was reared a parasite.

I have received letters from fruit-growers asking if such was the fact, and urging the importance of its introduction into California. It is to be hoped that we will be able, before the apple trees bloom in the coming spring, to send George Compere to Europe to collect these parasites and to have them distributed in California. Mr. Compere is now in the service of the Agricultural Department of Western Australia and is traveling in India in search of the parasite of the fruit-fly.

The Horticultural Commission, which I direct under the charge of the Governor, will have at the St. Louis Exposition a cabinet containing the noxious insects which have disturbed our fruit and fruit trees, with their parasites and predaceous insects, side by side, to be viewed through a microscope. The purpose of this exhibit is the hope that such an object lesson will give new impulse to the principle of keeping in check, by means of their natural enemies, all noxious insects that disturb plant life and its fruits. The practical demonstration of this principle, which exists through all nature, is one of the great discoveries of the age, and ought to place California fruit-growers on a higher plane of economics than can be claimed by any other people. We will have, also, a cabinet containing copies of all the reports and bulletins issued by the State Board of Horticulture from its organization down to the present time, and which will include the report of the proceedings of this Convention.

Forestry and Rainfall.—The subject of the preservation of forests and the planting of forest trees, on which I have discoursed in previous addresses, has been omitted, for the reason that the National Government has taken up this important work, as have also boards of trade, chambers of commerce, and other local organizations, so that anything I could say would not materially increase the interest. However, having received the Government's official report of the rainfall in the Middle West, it might be interesting to show the gradual decrease in each decade for the past fifty years. I quote the following:

It is frequently said that the rainfall of the Mississippi Valley States is not as heavy

as it was fifty years ago. A record which has been kept for fifty years at a point in east central Iowa shows that there is a good foundation for this belief. The record by decades is as follows:

	Average Inches.
First decade to 1849.....	51.73
Second decade to 1859.....	48.82
Third decade to 1869.....	39.73
Fourth decade to 1879.....	34.68
Fifth decade to 1889.....	32.30
Sixth decade to 1899.....	30.66

The marked change in the volume of the water in all the rivers and lakes of the Mississippi Valley territory would seem to harmonize with the above record. The problem in the near future would seem to be, not how to get rid of the rainfall, but how best to conserve it.

The condition of the prairie lands in the Middle West in 1849, with the condition of the forests in the Northwest, would seemingly account for this lessened rainfall, as well as the unprecedented floods of the past summer. A lumber merchant of San Francisco, who visited sawmills in Minnesota the past summer, related to me the destruction going on in the lumber districts. He stated that he saw logs being cut which were so small that they would square but one piece 4 by 4. Fifty years ago a vast area of the Middle West was covered with prairie grass, the top soil being a mass of roots, which would probably absorb and hold at one time ten or more inches of rain. This rainfall would percolate the soil below and leave the surface root-mass to absorb the succeeding rains; and this moisture would be given out by means of springs and evaporation, which would cause rains throughout the season. It would be the same in the forests; the roots would absorb a great many inches of rain. Farming operations have changed all this. If something is not done, the floods will increase and be more and more disastrous.

Statistics of the rainfall in southern California, from records kept during a period of thirty years, and which do not include the winter of 1902-03, show that there was a period of six years, not including the past winter, in which the rainfall was much less than the normal. Dividing the thirty years into periods of six years, we find the following:

- First period of six years averages over 20 inches.
- Second period of six years averages about 21 inches.
- Third period of six years averages about 20 inches.
- Fourth period of six years averages over 19 inches.
- Fifth period of six years an average of less than 14 inches.

Showing that we were short in the last period of six years from 40 to 42 inches. There is more holding power, or rather more power to absorb rain, in the way this section is farmed and planted than ever there was when it was devoted entirely to pasturage; and hence the hope, and real prospect, that our rainfall will not diminish.

I refer this address to the consideration of the members of the Convention.

MR. STEPHENS. Mr. Chairman, I move that a committee of five be appointed upon the President's address, to be composed of the following gentlemen: John Markley of Sonoma, George L. Hunt of Sacramento, Edward Berwick of Monterey, A. N. Judd of Watsonville, and W. R. McIntosh of Fresno.

Adopted.

THE FARMER AS A TAXPAYER.

BY JOHN TUOHY, OF TULARE.

Taxation is incidental to and an essential of civilized government, as much as government is incidental to and an essential of a civilized people. Every right-thinking citizen understands this and realizes the importance and the necessity of it. The problem is, how to make a tax just, equitable, and right? Is our tax system all that?

The proper treatment of the subject on which I am addressing you requires a consideration of what taxes are for, who pays them, and who should pay them. Taxes are that which we pay the government for its protection of our persons and property. As every citizen receives from the government the protection of his person and property, so every citizen of right should, in proportion to the protection of his person and property, contribute, in taxes, to the support of the government. I doubt not every citizen would freely, readily, and willingly do this, could he be satisfied that every other citizen was as freely and readily paying his tax. Could a system of taxation be evolved by which every citizen must pay his just share of tax, based upon the ability to pay and the protection received, it would be an ideal system never yet attained. Such a system of equitable taxation has never been formulated because, owing to conditions, some citizens and some classes and industries have to contribute toward the support of the government more than their equitable share of taxes, and because many who are able, and very able, to pay their pro rata of tax do not do so owing to their ability to evade the law. All systems of taxation are more or less defective. As a taxpayer, does the farmer pay more or less than his fair and equitable share?

The Constitution of California provides for a system of taxation. Article XIII, Section 1, reads: "All property in the State, not exempt under the laws of the United States, shall be taxed in proportion to its value, to be ascertained as provided by law." In the ascertainment of property for taxation, all realty, and every improvement on realty, not capable of being concealed, are listed. Personal property which is non-concealable or undeniable is listed; all other personal property, for the most part, pays no taxes.

On referring to the report of the State Controller for 1900-1902, I find that the assessors of the several counties of the State, in real

estate return about four times the assessed value that they do on personal property, including money and solvent credits, so that real estate, in California, pays four times the amount of taxes that personal property does. Does any one here believe that the *cash* value of real estate is four times greater than that of personal property? The same discrepancy prevails in every State depending on a general property tax for a State revenue. The assessors are not to blame. The system is the cause. The system should be changed. To make the change the Constitution must be amended so as to enable us to have a system of taxation which will be more equitable, more in accordance with a progressive people, and more in accordance with the changed conditions of industries and commerce to what they were when our Constitution was adopted.

The property of the farmer is, perhaps, nine tenths real estate and improvements, all of which is listed for taxation; in addition, his personal property is listed in greater detail than is that of any other industry or pursuit. Of no other calling or industry is such a detailed, minute list of taxable property required, and for this reason the farmer, on his personal property, in both amount and assessed value thereof, pays a very much greater tax than does any other industry or calling. The farmer, considering that a very large percentage of his property is realty, considering the scrutiny with which his personal property is listed, compared with any and all other classes of taxpayers, pays a tax out of all proportion to his ability to pay. It will, of necessity, be so until we have a better and more equitable system of taxation.

The system of a general property tax for purposes of State, county, and township revenue is now antiquated. At the time the first Constitution of California was adopted in 1850, now more than half a century ago, considering our industrial condition, it was then, perhaps, as good a system as could have been selected; but that half century has brought wonderful developments in every science, in education, in every industry, in every calling, in fact such progress has been made, in that period, as the world had not made for centuries before. In our revenue laws, California has made no progress; they should now be made adequate to the progressive times in which we live. How to do that I am not, now, ready to discuss. It requires much careful thought and long consideration, and I believe that this State Fruit-Growers' Convention should appoint a committee of five, to co-operate with a like committee of the State Grange, Patrons of Husbandry, appointed at its last session, for the purpose of studying the subject and reporting to the next State meetings, when the subject could be considered and an amendment to the Constitution be formulated which will enable California to have a model form of revenue laws, from which other States can copy. I believe, too, that the committee which this Conven-

tion selects, if it does select one, and the committee selected by the State Grange, should attend the next State Republican and Democratic conventions, and have them, in their platforms, advocate the revision of the revenue laws of California as we contemplate. With the indorsement of these conventions, and the interest we hope to have the public take in the matter, we have no fear of a failure.

On this subject of a general property tax, his Excellency Governor Pardee, in his inaugural address, dwelt quite fully as to its workings in California and in other States; he also told what other States are doing to remedy the defects of the general property tax system.

Many of the States have appointed commissions to study and report on the subject. Perhaps the report of expert George Clapperton, to the United States Industrial Commission, is as complete as any. This report has special reference to Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Indiana, Michigan, Illinois, Wisconsin, Iowa, and Texas. While the findings and conclusions of the expert are full and very interesting, it would, to quote therefrom, take more of the time of this convention than I desire to occupy. They are such as your committee can consider very profitably. Of the States before named, Massachusetts, Ohio, New York, Indiana, Michigan, Illinois, Iowa, and Texas have a general property tax, but get much of their revenue for State purposes from other sources. In New York the State Controller, in his report of 1898, commenting on the State revenue laws, while most of the State's income is from other sources than a property tax, says: "It must be confessed that nearly all our tax laws are legislative makeshifts and many of them blunders." Connecticut, New Jersey, Pennsylvania, and Wisconsin derive no State revenue by a tax on property. Pennsylvania taxes no real or personal property, for State purposes, except under certain conditions; a small amount of personal property is taxed, and three fourths of the revenue therefrom is returned to the counties; nor is personal or corporate property taxed for county, township, or borough purposes. Eastman, on taxation for State purposes in Pennsylvania, says: "In closing this sketch it may be said that, while the State tax system of Pennsylvania can doubtless be improved, in many respects the system itself is a very excellent one. The burdens of taxation for State purposes are almost wholly placed upon corporations, leaving individual taxables subject to taxation for local purposes only, except that the mortgages, bonds, and other classes of personal property taxable under the laws of the State held by them, pay a State tax, but three fourths of even this tax is returned to the counties to relieve burdens of local taxation."

Contrast that with the opening remarks of Prof. Carl C. Plehn, in his "General Property Tax in California," who says: "The general property tax is a failure in the United States. It has proved itself to

be unsuited to modern economic conditions. Nowhere has it been found possible to administer it with any approach to justice. Even if the assessment and collection could, by any yet undiscovered means, be made with such exactness as to fulfill every requirement of the law, yet the tax would still be unequal and ill-adjusted to the tax-paying strength of the citizens. The tax systems of most of the American commonwealths must be reformed."

Again, he says: "To ascertain what is the total amount of property in a State is impossible when the forms which property takes are as numerous and as complicated as at present. Under modern economic conditions the general property tax is fundamentally wrong in principle. At the present time property is not a fair indication of ability to contribute to the support of the Government."

In Wisconsin there is a tax commission appointed by the Governor and holding office for ten years. This commission prepared a bill, which was passed by the Legislature in May last, which substitutes an ad valorem tax on all railroads operating in the State for the license tax now required, and which the commission believes will provide all necessary State revenue without further State tax. The tax commission, which is also a State board of assessment, will, in ways prescribed by the Act, ascertain and determine the amount and cash value of all taxable property in the State, also the amount necessary to pay all State, county, and local expenses. The board will then calculate and determine the necessary assessment on all the property of the State, to pay this indebtedness and expense. This will be the tax rate on the property of all railroad companies, who will pay the same into the State treasury for State purposes, and this exempts the railroads from all further county or township assessments, except assessments for local improvements. The taxation on all other corporations (insurance, telegraph, telephone, electric light, etc.) stands as it was—mostly a license tax based on incomes.

Since the appointment of the Wisconsin tax commission in 1899, it has made two annual reports, which are valuable literary and educational contributions to the science of taxation, particularly in reference to corporate taxation. In 1901, the Wisconsin tax commission made its first annual report, in which it does some interesting figuring. Letters of inquiry were sent to about six thousand representative farmers of the State. These letters desired information relative to the proportion of expense to gross income, per cent paid in taxes to gross income, what relation personal property (including implements and live stock) bears to total assessment, and the farmer's opinion of the ratio of the assessed value of his farm to the true value of the same. To this last question, 1,124 replied 38 per cent; to a similar inquiry

among manufacturers, the reply was 37.2 per cent. 954 farmers in sixty-four counties stated that their gross earnings amounted to \$871,357, and their taxes \$37,297, or about 4.2 per cent of gross receipts. 656 farmers reported from fifty-eight counties, giving their gross income \$687,469, and their income less expenses \$204,152, the ratio being 70.3; the taxes of these 656 farmers being 13 per cent of income. Of 592 farmers the ratio of assessed to true value was, land 38, implements 28.7, live stock 45.2. Except land, live stock is assessed closer to its amount and closer to its real value than is any other class of property.

In California, Professor Plehn, in his "General Property Tax in California," says: "The census estimates of the true value of farming property are more reliable than are the census returns on the true valuation of city real estate, because the value of farming property was ascertained by the enumerators." In 1890 and 1891 the assessed value of the farm lands and improvements was between 62 and 66 per cent of the true valuation. In the same years the assessed value of city real estate was 54 per cent and 55 per cent. Continuing, Professor Plehn says: "It would seem, then, that the average farmer's real estate, which constitutes 90 per cent of all his taxed property, is probably assessed at from 8 to 12 per cent higher than the average townsman's real estate, which forms but 80 per cent of all taxed property. It is undoubtedly true that the 90 per cent represents more nearly the true proportion between the farmer's real estate and his personal property than the 80 per cent does the proportion between the real estate and the personal property in towns."

Justice Cooley, in his work on taxation, says: "The assessment of personal property reaches so small a portion of the amount really protected by government that it might almost be said that laws for the purpose remain on the statute books rather as incentives to evasion and fraud in the dealings of the citizen with the State than as a means of raising a revenue for public purposes." This might aptly be applied to the system for the taxation of corporations as well as intangible personalty in many of the States, *a system that puts a premium upon evasion and inflicts a penalty upon honesty and weakness.*

The remedies seem to lie in the adoption, by the several States working in harmony so far as may be, of new and modern methods based on correct principles for the taxation of special forms of property, separate and distinct from the general property tax in respect to both valuation and rates of taxation, and a thorough administration thereof.

In the States investigated there has been more or less departure from the general property tax toward the adoption of special methods for the taxation of corporations. With few exceptions, however, efforts in that direction have thus far been devoid of real method or design,

and upon the whole "chaos" is the only descriptive term applicable to existing conditions in commonwealth taxation.

There is a marked tendency in all these States toward making earning power the basis of taxation for quasi-public corporations. Properly directed, this must be regarded as the correct principle and capable of practical application to such corporations under existing industrial conditions. There is also, however, a strong inclination to cling to the old system in part, and to use this principle in conjunction with some feature or factor of the property tax, more particularly to use earning power as a basis of property valuations in connection with property tax or "uniform" rates.

A mistaken conception of the property tax theory of "uniformity," and a general disposition to apply the misleading iron rule of equal taxation to all forms of property, are revealed in most of these States, so far as public sentiment is concerned. As bearing upon this observation, the following is quoted from the case of *Pacific Express Company vs. Seibert*, 142 U. S. Supreme Court Reports, page 351: "This court has repeatedly laid down the doctrine that diversity of taxation, both with respect to the amount imposed and the various species of property selected either for bearing its burdens or for being exempt from them, is not inconsistent with a perfect uniformity and equality of taxation in the proper sense of those terms; and that a system which imposes the same tax upon every species of property, irrespective of its nature, condition, or class, will be destructive of the principle of uniformity and equality in taxation and of a just adaptation of property to its burdens."

The great problem of commonwealth taxation, of commanding interest in all States, consists practically of reform in the methods of taxing corporations and individual personalty of an intangible character, and an improved administration of a circumscribed property tax.

The principle that taxes should be levied in proportion to ability to pay, and that, even under the general property system, they are designed to be upon persons rather than upon property, is generally recognized. Under existing economic conditions property is no longer regarded as an adequate test of ability to contribute to the support of the Government. Hence, the marked tendency to apply different tests to special classes of property owners. There is a growing class of citizens who receive large incomes or salaries, and enjoy all the advantages of society and good government, who, though possessed of abundant ability to pay taxes, are, under existing systems, practically exempt from taxation or are inadequately taxed. This class is receiving, and must continue to receive, especial attention in the revision or reformation of taxing systems in the several States.

While a tax upon individual incomes is generally conceded to be just and equitable in principle, it has been received with disfavor and regarded as impractical in its operation. It is apparent, however, to the careful student of commonwealth taxation, that because of its justice and the increasing efficiency of State administrative methods that are being evolved, the idea of a limited supplementary State income tax is growing in favor and coming to be more generally regarded as a practical measure under State supervision. Such a tax has always prevailed in Massachusetts; the present law of that commonwealth, which the Legislature recently refused to abandon, imposing a tax upon so much of the income of a profession, trade, or employment as exceeds the sum of \$2,000, but exempting incomes derived from property subject to taxation. While this law is imperfectly administered, it is not infrequently suggested by eminent authorities upon the subject that a supplementary income tax of that character, imposed directly by the States, under modern methods of administration, would become an efficient and practical source of State revenue. In conjunction with the principle of taxing corporations upon earning capacity, it seems destined to receive increasing consideration in the several States.

I deem it unnecessary to go into further details, as it is manifest, from what I have said, that the farmer pays a pro rata of tax greatly out of proportion to any other class of taxpayers, the value of his property and his ability being considered. This, undoubtedly, is due to the defective system of taxation in California, a system utterly unsuited to the needs and economic conditions of a great and progressive State and people. In consequence of the changes made by the State Board of Equalization in this year's assessment, never in the history of the State have the incidents of an assessment, under our defective system of taxation, been so glaringly brought to public attention, never has the public mind been so well prepared to consider, investigate, and approve a better system, when presented, than now. Let the farmers of California be the first to advocate the necessary change in our tax system. It is their right, it is their duty to do it.

MR. STEPHENS. Mr. President, I move that the paper be received and placed on file, and that a committee of five be appointed by the Chair to consider and hereafter report upon the matters set forth therein.

Adopted.

DISCUSSION ON TAXATION.

PRESIDENT COOPER. We have about three-quarters of an hour before the time to take a recess, and while I do not wish to discuss the propositions laid down, I want to make a statement. There are a great many serious questions involved in this matter of taxation. Many of the suggestions which you have heard are practically impossible, because you can not get at the truth. Another thing: It is very expensive to change the Constitution of the State, and it is not certain that it would be any better when changed. I was once called upon to suggest a plan for taxation, and did suggest a plan. It was published in several newspapers of the State, and there it ended, and, really, I have forgotten all about it, myself. I wish to speak of the method of taxation adopted by a West Indian country where I lived for ten years, the Republic of Hayti. No industry, no land was taxed in the whole republic. They taxed everything that was exported. Everything exported had to go through the custom-house. And they levied a tax on all imports. A tax on these two things was levied to get all the revenue that was necessary to run the government. It was feasible, because they had only to go to the records for the past year, if they wanted more money, in order to ascertain the revenue derived from exports and imports. In time every means of taxation will equalize and regulate itself. The less cumbersome the system is, the greater facility in its execution and the more equally you reach all the people. That was the plan of taxation in Hayti, and it was a very successful one.

VICE-PRESIDENT McINTOSH. Ladies and gentlemen of the Convention: Since your President has felt called upon to make a statement respecting the paper just read by Mr. Tuohy, I presume a general discussion of this question would be in order at this time, as we have about thirty minutes at our disposal. I should be glad to hear from at least half a dozen gentlemen whom I see on this floor, respecting this very important subject.

MR. KELLOGG. I would like to speak a moment on this question. I know an incorporated city that has, practically, no city tax whatever. You know we have two kind of taxes—a direct and an indirect tax. The reason this city has no city tax whatever is because it owns its water works, and the sale of water pays all the expenses of the town. Now, that was an experiment on a small scale. I want to call attention to the government experiment station of the world to-day, an experiment station for all mankind. It has a full-fledged government, with large cities and all the industries of any government. That is New Zealand, and I want to call attention to its system of taxation. They do away with the indirect tax, the tax paid to corporations, by the people themselves, going into certain industries—not all industries, but

certain industries. They proceed on the principle that those things which are used by all the people in common, like the postoffice, should be owned and operated by all the people in common, so New Zealand has gone not only into the business of postoffices, but also into that of government banks, life and fire insurance, and of railroads, and the cities own their own water works, they own their telegraph and telephone systems, and thus revenue comes in from these public utilities which the people themselves own, and thus taxation has been reduced to a very small fraction of what we pay in this country. The direct taxes which the people have to pay to support the government are very small. They proceed on the principle that on the amount of land a man requires he should no more pay a tax than he does for the sunshine, or for the air which he breathes, and if he only owns \$2,500 worth of land he pays no tax whatever. He needs that much for the support of himself and his family. When he goes beyond that, he is carrying on a business for profit. He has more land than he needs, and in consideration of the profits which he enjoys he is required to pay a tax to the government which protects him in the enjoyment of that property. The tax is small at first and increases as his estate increases. The larger his holdings, the higher his rate of taxation, and it automatically fixes a limit to this question of land monopoly. There is a point beyond which no man can go. That is one branch of their tax system. Another branch is this: Up to the limit of \$1,500 a year a man pays no tax on his income, on the theory that he needs that much to be able to live and support his family; but when his income exceeds \$1,500, then his taxation begins and goes on with an ever-increasing ratio, the higher his income, the higher the rate of taxation; and in that little country of New Zealand, that experiment station of the world, this system has succeeded so admirably that in the period of ten years the number of people who own homes there has increased 50 per cent. It is a wonderful success, and I think it is a system of taxation we should have everywhere.

MR. BERWICK. I want to tell you that Germany made a revenue last year—a profit last year—of 53,000,000 marks from her postal system, and carried packages of 110 pounds anywhere in Germany or Austro-Hungary, as much as 1500 miles, for 60 cents. Great Britain carried 90,300,000 packages at the rate of 25 cents for an 11-pound package, and made a profit of \$22,500,000. Quite an alleviation of taxation. That is all I wish to say this morning.

MR. SPRAGUE. I would say that I am entirely in accord with the views of my friend from Santa Barbara. These are not merely speculations, but are in the line of ascertainable facts. It is possible for the State of California to work out these theories here, not all at

once, but gradually. One of the greatest incubuses which rest upon the commonwealth of California to-day consists of the enormous tracts of land held under single ownership, for purposes which do not develop the population and prosperity of the State. How to get rid of that condition of things is, perhaps, one of the most important questions before us. I believe the method is clearly indicated by the experience of New Zealand. I believe it to be of the supremest interest that we should take this under consideration.

MR. COOK. Mr. President, this is a very great, a very important question. We have tried a little experiment in our place. We were paying \$2.50 a month for the privilege of talking with our neighbors, and thought it too much. We adopted a telephone system of our own—a local affair. It has been very successful. It now costs us only \$1 a month, and we have increased our number very greatly. It simply shows what will come when we carry into effect the propositions suggested by my friend Mr. Kellogg. When we own our franchises we will have enough revenue and to spare to pay our taxes. We also have a local insurance company that has been quite successful—a mutual fire insurance company, which has bettered our condition about six times—have only to pay about one sixth of what we formerly did for insurance. Five years ago we started this, and we have had three fires since, and all we have paid in has accumulated. If we do not have more fires than heretofore I don't know when we will have another assessment. It looks as though we have enough money to pay for all fires we might have in the future. It simply shows how much we have been paying for those great buildings in the Eastern cities and to support those men who really have no interest in the affairs which concern us. Let us own our own franchises, as we ought to, and it seems to me that the tax question will be at least partly solved.

MR. JUDD. Mr. Chairman, this subject of taxation has worried the best minds of this State for a great many years. The manner of our taxation at present is unjust in a great many respects, and more particularly to the agricultural and horticultural interests than to any other. In Santa Cruz County the farmer is taxed for road purposes forty cents more on the \$100 than the people living within the incorporated cities. How are they exempted from bearing any part of the burden of keeping up the public roads outside of the limits of the incorporated towns and cities? I don't see any provision for that in the Constitution, but it is done to-day, and there does not seem to be any particular "kick" about it. Here is another proposition: In one county perhaps apple trees are taxed on a valuation equivalent to a dollar a tree, and right across the river, in another county, they are only taxed at one fourth that. And still another proposition: Here is a vineyard in the mountains. The law says that lands similarly

situated shall be taxed the same, improvements separate. A man, at a cost of \$50 or \$60 an acre, cleans off a hillside where you can buy the land adjoining for \$1.25 or less an acre; he put in a vineyard, and the vines are assessed for at least \$15 or \$20 an acre, yet it is impossible to get an assessor or his deputy to go up on the hillside and assess the land adjoining for anything worth mentioning. I do not think it is so much the fault of the Constitution as it is owing to the sleepy condition of the agricultural and horticultural interests in the State. They do not look after their own rights. When there come up in the Legislature those bills putting a burden upon them greater than they were bearing before, they simply look around like a person who has been hit with a club, waiting for another lick, and that is the end of it.

At this time a recess was taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FIRST DAY.

TUESDAY, December 8, 1903.

The Convention was called to order at 1:30 o'clock. President Cooper in the chair.

PRESIDENT COOPER. I will announce the committees that have already been named:

Committee on Taxation—Hon. John Tuohy, of Tulare; John S. Dore, of Fresno; Hon. A. M. Drew, of Fresno; S. P. Saunders, of San Jose; Frank E. Kellogg, of Santa Barbara.

Committee on President's Address—John Markley, of Sonoma; George L. Hunt, of Sacramento; Edward Berwick, of Monterey; A. N. Judd, of Watsonville; W. R. McIntosh, of Fresno.

Committee on Resolutions—John Markley, Mrs. Dr. Sherman, Mrs. B. F. Walton, Prof. A. J. Cook, and Frank E. Kellogg.

WHAT THE POSTOFFICE MIGHT DO FOR THE FRUIT-GROWER.

BY EDWARD BERWICK, OF PACIFIC GROVE.

I appear before you this afternoon in a position in which I was placed by the last convention at Los Angeles, in default of more available timber, that of President of the California Postal Progress League. I demurred to the action of the Convention, but I told them I would accept the office under the condition that I might pass it on to a bigger man, mentally and financially, the first chance I got. I have not found any bigger man, or smaller man, ready to take the office at any price. If he is here to-day, I would like to have him come forward and

say so, because I took this office with considerable hesitancy. It is an up-hill proposition to buck against the powers that be, and that is what this thing means. I am glad to say that when I was made president of the league I had some success in enlisting under me as vice-presidents some of the leading men of the State. Our worthy President here kindly undertook to be one, Governor Pardee another, Dr. Wheeler of Berkeley another, Dr. Jordan of Stanford, Mayor Schmitz of San Francisco, and various leading men of prominence of the State of California, so I trust to that extent I did your mandate to your satisfaction. I am going to ask you all to come in and help, and this is a fruit-growers' movement. I don't want to have you say: "Oh, it is a good thing, it will come." I never heard of a fruit-grower acting on that principle in his own business. He never expects an orchard to "come" unless he plants it. Years ago I heard "benevolence" defined something this way: Benevolence is a consultation between Brown and Jones to discover what Smith ought to do to help Robinson. Now if you know what the next fellow ought to do to help this thing along, I hope you know primarily what you ought to do. If you think this cause is worth any trouble at all and worth my efforts, I want you to sustain me by adding your name to the association, if it does cost you one dollar to do it. That is our membership fee, because, although I agreed to be the president of the league, I did not agree to carry on the duties and meet the requirements of the position at my personal expense, and when you start out to fight battles you have got to have "the sinews of war." Since last May I have given daily, or almost daily, from one to three hours of my time, and from one to twenty-four hours of my best brain-power to help this movement along. I found out certain things that nobody appears to have known, or, if they did, they kept them very quietly to themselves. Now, as you know, the fruit-growers' great trouble in life for years past has been the transportation problem. It has sometimes taken the great bulk of your year's receipts and has at times landed you in markets entirely unprofitable, but you had to pay the freight. It mattered not how long your products were delayed in transit, you had to pay the freight, all the same. The loss was yours. Now in Los Angeles all concurred in the belief that there was one method of helping us in this transportation question; there was one factor found available in other lands that we in this land have neglected. Germany has found it possible to ship 150,000,000 packages annually by parcels post at a trifling cost and to make money on the operation. Now the postoffice is a branch of what we call "our public service." Those are three common, but exceedingly important, words. "Service" implies a master to be served. There must be a master to direct the service, if he would be well served. The word

“public” tells who that master is. The people is the master to direct that service. “Our” indicates that we are the people.

I want to know now who there is here that knows the various classes of postal matter that we have in the United States and the rates on that postal matter? Anybody? No. Well, you see, you can't direct our public service unless you know about things. Now, may I tell you that there are four classes. The first class consists of letters and postal cards. The rate on them you know. On letters it is 2 cents for one ounce or fraction thereof; postal cards, 1 cent apiece. The second class is newspapers and serials. They are sent from the publisher to the subscriber at 1 cent per pound, and if you or I send them out, 1 cent for four ounces. They charge us four times the rate which they charge the publisher. The third class is books and other printed matter, including seeds and scions—some concession to the fruit-grower. They are sent at the rate of 1 cent for two ounces. The fourth class is any other merchandise of any description that is mailable. The rate on that is 1 cent per ounce, with a limit of four pounds in a package.

Now then, I am sure you all want our public service to be strictly modern and up to date, as good as any other country's public service, and just a little better. You wouldn't be Americans if you didn't. Well, is that our condition at present? Regarding our first-class matter I have given you the rates already. Germany sends an 8-ounce letter for $2\frac{1}{2}$ cents, and Switzerland sends an 8-ounce letter for 1 cent to any postoffice in Switzerland, and delivers the same letter on the highest mountain peak in Switzerland—quite a climb sometimes—for 1 cent more—2 cents for half a pound, delivered. Great Britain charges 2 cents for four ounces. So much for first-class matter. Now for second class matter: Our neighbor, Canada, provides the same service for half our rates. She sends newspapers for half a cent a pound anywhere, not only in Canada, but also in the United States and in Great Britain, anywhere for half a cent a pound. Within 300 miles of the sending office she delivers them free of all charges. Regarding third-class—and with the third class I will include fourth-class matter, any merchandise of any kind—you know we pay to send from San Francisco to Oakland, or from Fresno to Madera, or anywhere around here, 64 cents for 4 pounds. Germany sends an 11-pound package 1,500 miles—an 11-pound package for 12 cents; the same package 46 miles for 6 cents. She sends 110 pounds anywhere in Germany or Austro-Hungary for 60 cents, which is less than the price we pay from San Francisco to Oakland on 4 pounds. Now you can see how your present rates compare with the rates of other countries. Not only are these rates given to the public, but a profit is made at these rates by the German and English governments. You will remember that this

morning I told you Great Britain made about \$22,500,000 on her postoffice last year and that Germany made 53,000,000 marks. Switzerland made over 1,000,000 francs profit on her postal service, and France made over 20,000,000 francs profit on her postal service.

Now there are many reasons why our Government should undertake this business of giving us an up-to-date parcels post. You all know how handy it would be for you fruit-growers to be able to send off your produce with safety and celerity direct to the consumer. The great science of commerce, as I understand it, is to bring the producer and consumer together with as little friction from intermediaries as possible. It enables the producer to get a higher price for his produce, and it enables the consumer to pay a lower price for what he consumes. It helps to dispose of the intermediaries—the commission men, the jobbers, and all that class. Another reason is, it has been found that the postoffice sends things quicker than the express does. In a hundred parcels given to the postoffice and a hundred to the express companies it was found that the postoffice used twenty per cent more dispatch in delivering the packages. Another reason is shown on the subjoined chart. There are a great many more postoffices in the country than there are express offices. These figures are taken from the Congressional Record of the year 1900, which was the latest information I could get when I made these charts, and the figures are modifiable to a certain extent to bring them up to date, but they are substantially correct to-day.

States.	Express Offices.	Post Offices.	11 lbs. Express from New York	German Post Rate	Saving at German Post Rate	German P.P. 58c; this lower than American Express Rates by	Mexican P.P. 66c; this lower than American Express Rates by
Alabama-----	334	2,445	\$1 33	\$0 12	\$1 21	\$0 75	\$0 67
Alaska-----	3	53	3 89	12	3 77	3 31	3 23
Arizona-----	41	202	3 89	12	3 77	3 31	3 23
California-----	586	1,659	3 16	12	3 04	2 58	2 50
Florida-----	283	1,126	1 66	12	1 54	1 08	1 00
Idaho-----	49	424	2 43	12	2 31	1 85	1 77
Michigan-----	737	2,161	1 22	12	1 10	64	56
Nevada-----	35	186	3 89	12	3 77	3 31	3 23
Virginia-----	263	3,468	1 22	12	1 10	64	56
Wyoming-----	64	312	3 16	12	3 04	2 58	2 50

British Domestic Parcels Post.

Year.	Number of Parcels.	Increase.	Gross Postage.	Railroads' Share, 55 per cent.	Postoffice Share.
1884-5-----	22,910,040	-----	\$2,475,162	\$1,249,505	\$1,225,657
1885-6-----	26,417,397	15.3 %	2,882,772	1,455,876	1,426,895
1886-7-----	32,860,154	24.3 %	3,502,075	1,757,378	1,744,696
1898-9-----	71,915,000	119.0 %	7,295,742	3,818,827	3,436,914

Now 10,500,000 parcels are delivered by motor, or horse, vans.

Parcels Post in Other Countries.

Country.	11 lbs. by Parcels Post.			Exp. S. S. from Wash- ington.	Parcels Post, United States.
	England.	Germany.	Mexico.		
Aden	\$1 20	\$0 83	\$0 90	\$4 00	-----
Algeria	62	30	40	3 50	-----
Angola, West Africa	-----	88	70	5 00	-----
Argentina	1 16	73	58	4 50	-----
Bahamas	2 00	1 36	58	3 80	\$1 32
Belgium	53	20	35	2 00	-----
Bosnia	74	13	30	4 00	-----
Bulgaria	1 14	73	45	4 00	-----
Constantinople	66	44	43	4 00	-----
Egypt	78	44	45	3 50	-----
Foochow	99	65	58	3 90	-----
Greece	1 20	36	45	4 00	-----
Japan	1 24	93	97	3 24	-----
Jerusalem	74	39	45	4 00	-----
Madeira	68	44	45	5 00	-----

234 places. United States parcels post with 31 only.

In Alabama there are 334 express offices and 2,445 postoffices. Now, an 11-pound package from New York—of course, these are simply averages for the State, the charge depends on the distance—on 11 pounds from Alabama to New York, or vice versa, the charge by express is \$1.33. At the postal rate in Germany it would be simply 12 cents—saving to the person receiving, you might say, as he usually foots the bill, \$1.21. When I compiled the figures shown on this chart the German could send from Germany to Alabama, or to New York, 11 pounds for 58 cents. That is not true to-day, as on July 1st last our postoffice authorities reduced the maximum weight of a package carried to $4\frac{2}{3}$ pounds, and that is the most you can send now to or from Germany through the post. The Mexican could send the same package for 66 cents, or 67 cents less than the native American can send for. You see you are paying for not acting up to your privilege as American citizens when you do not direct your own postal service, letting the other fellow direct it for you. In Alaska there are 3 express offices and 53 postoffices. The express rate from New York is \$3.89. The German rate would be 12 cents—the German could send it for that before July 1st last, and his saving, the difference between the German rate and the express rate from New York, being \$3.77. Arizona has 41 express offices and 202 postoffices; 11 pounds from New York, \$3.89. The German post rate would be 12 cents; saving, at the German rate, \$3.77. The German could send for 58 cents, and would save \$3.31, and so on. I will not bother you with the chart any more. A word is enough to the wise, and I trust you are all wise.

Now you know there are two kinds of postal service, under different Acts of Congress and subject to different regulations. There is a domestic postal service and a foreign postal service. The domestic

postal service can only be altered by action of Congress, by your own action through your congressmen. The foreign postal service is arranged for in this way: Our Postmaster-General, by and with the consent of the President, has power to conclude conventions with any foreign country he sees fit. In a British postal guide I saw a list of names of 234 countries with which Great Britain had foreign parcels post conventions. Out of the 234 countries we had postal conventions with 31, not even having a postal convention with Great Britain. They had no convention with this country as to sending parcels to and fro, and, realizing that "postal service" means just what it says—that they were there to serve the public and to serve them to the utmost of their ability—they arranged with the American express companies that the British postoffice would bring the parcels to New York and deliver them to the express companies and have those express companies carry them all over the United States. You can send 11 pounds from London to New York, Hoboken, Brooklyn, or Jersey City for 75 cents, but to Pacific Grove you must pay \$1, or to any point in the Union except the four places named you must pay \$1. Now this means, gentlemen, that the express company, after paying the railroad company for transporting the packages, and after paying their shareholders a handsome dividend, can carry 11-pound packages all over the Union at a postage stamp rate of 25 cents, and if they can do that and make a profit, is there any reason why we should not tell our Government to go and do likewise? I went to the Pacific Grove Wells-Fargo's office and said: How much is the charge on an 11-pound package from here to New York? And what do you suppose he said? "Two dollars and thirty-five cents!" They carry it for the Britisher for 25 cents, and they charge you and they charge me \$2.35 for the same service. Now that may not strike you in the light of a tax, but it strikes me as such. King George's tea tax, against which your forefathers rebelled, was not a circumstance compared to the tax you are paying Wells-Fargo for carrying your packages, and it is because you will not direct your own postal service.

I want to tell you what Mexico has done regarding the postoffice. You will find in article 145, section 7 of their law, certain provisions governing franchises to railroads. They make those franchises for ninety-nine years, with the understanding and stipulation that at the end of ninety-nine years the roadbed, the depots, wharves, and all accessories, besides the rolling-stock, shall revert to the government free of any cost, the rolling-stock to be appraised and the government to have the first opportunity to buy at the appraised value. They also have required that the railroads shall carry all postal matter and all postal employés on government business free of charge, and have reserved the right to keep the last five years' earnings of the roads to

maintain the roadbeds and the accessories in good condition. But these are the rates I was going to give you: From England to Aden, or from Aden to England, an 11-pound package costs \$1.20; from Germany, 83 cents; from Mexico, 90 cents. The American pays \$4—quite a handicap against Americans. To Algeria, in northern Africa, from England, 62 cents; from Germany, 30 cents; from Mexico, 40 cents. We pay \$3.50. You see, gentlemen, the handicap on our foreign trade. One consul estimates that we are losing \$2,000,000 annually in the West Indies alone for lack of an adequate parcels post. To Argentina, South America, from England, \$1.16; from Germany, 73 cents; from Mexico, 58 cents. We pay \$4.50.

I was telling you that we had parcels post conventions with thirty-one countries. They are chiefly small countries, except Germany, Mexico, and Chile. With the Bahamas we have a convention, and we can send 11 pounds there for \$1.32, England for \$2, Germany \$1.36, Mexico 58 cents; by express from Washington, \$3.80, but our post-office carries it for \$1.32. Now if you were in Egypt and wanted to send home 11 pounds of curios, to England the rate is 78 cents, to Germany 44 cents, to Mexico 45 cents; the American pays \$3.50. If you went to Japan and wished to send home any lacquered boxes, or vases, or anything of that kind, to England it is \$1.24, to Germany 93 cents, to Mexico 97 cents; the American pays \$3.24.

Now so much for the foreign parcels post. The modern parcels post began in British India in 1865, and Great Britain itself undertook it about 1883, and 1884-5 was the first fiscal year of any prominence in the matter. They handled that year nearly 23,000,000 parcels. They agreed to give 55 per cent of the gross receipts to the railroads for carrying the parcels. The gross postage was nearly \$2,500,000; the railways received a million and a quarter, and the post-office something less. The second year there was an increase of 15.3 per cent—quite a large increase; in 1886-7 it was still larger, the increase being 24.3 per cent. Last year they handled 90,300,000 packages, and the postoffice made more money than the railways. They found that the 55 per cent they were giving the railroads was far too much compensation, and they hauled their own parcels—ten and one-half millions of them—by horse-van or by motor-van as far as from London to Liverpool or from London to Birmingham. The Great Eastern Railway Company there, with thousands of miles of lines, has found it possible to maintain what they call an agricultural parcels post. They take parcels up to 60 pounds weight at a rate of 8 cents for 20 pounds, or 24 cents for 60 pounds, and carry them anywhere on their lines, and deliver them by vehicle anywhere within three miles of a depot, free of charge. Now this is not only possible in Europe, but with the express companies in our own country for the foreigner. Is this thing worth urging here?

I will say that there is a New York league formed for this same purpose, and the National Grange has approved of our plan and passed resolutions instructing a committee to work for the parcels post. I have received a letter from the secretary of the New York league, asking what bill we Western men want in this matter, and whether Colonel Pope's bill suits us. Most of you who ride wheels know that Colonel Pope is president of the Columbia Bicycle Company. He is also president of the New York Postal League. His bill provides for the transportation of packages weighing up to 11 pounds, the rate for the latter being 25 cents, and that bill, for my part I thought of favoring, personally. There is another far more radical bill, making 100 pounds go for 25 cents; and I should like to hear an expression of opinion from anybody present in this regard. I have thought of the antagonism of the express companies to any proposed measure relative to a parcels post. John Wanamaker, when he was Postmaster-General, was asked why it was we had no parcels post. He said: "There are four great reasons," and he named the four express companies of the United States. And how they work I will tell you. I have an acquaintance who has been a State official of the State of California, drawing from \$3,000 to \$6,000 a year from the public treasury. I said to him: "Mr. So and So, won't you join our league?" "What is there in that for me?" he said. "In that for you? There is a cheaper letter post." "I don't want a cheaper letter post." "And a cheaper parcels post." "I don't want a cheaper parcels post." The thought flashed through my mind on the instant: "I know why you don't." I didn't say so, but I thought: "You hold a Wells-Fargo's frank." That man was just honest enough to put his hand in his pocket and pull out his wallet, stuffed with his franks, ten or a dozen, and showed me his Wells-Fargo's frank. He was receiving the pay of this State to look after your interests, and he was sold out to Wells-Fargo to attend to their interests.

PRESIDENT COOPER. The next question laid down on the program is the report of the Committee on Transportation, R. D. Stephens chairman.

REPORT OF COMMITTEE ON TRANSPORTATION.

MR. STEPHENS. Mr. Chairman, Ladies and Gentlemen: This report is signed by three members of the Committee on Transportation selected by you at the last State convention. I will state that Mr. Naftzger, before he was willing to go upon the committee as a member thereof one year ago, requested that a copy of the draft be sent to him or submitted to him for consideration about ten days before the meeting of the convention. I complied with that request and sent him a

copy of this report, with the request that if it was not satisfactory, if it did not meet with his approval, if there was anything left unsaid which he thought should be said, or anything said which he thought ought not to be said, it would afford me pleasure to receive such suggestions from him as he saw proper to give. I also mailed to Mr. Alden Anderson, our worthy Lieutenant-Governor, a copy with the same request. I have received no answer from either, consequently I am not able to say whether this report will meet with their approval or not. Silence, however, gives consent, they say; so, viewing it from that standpoint, they having had an opportunity of adversely criticising it, it would seem that it meets with their approval.

To the Honorable Chairman, and the Members of the Fruit-Growers' Convention:

Your Committee on Transportation begs leave to submit the following report:

We, the undersigned members of the Fruit-Growers' Transportation Committee, believe the private ownership and control of refrigerator cars used for shipment of California fruit to be inimical to the interests of the fruit-growers and shippers, as affording an opportunity for discrimination and favoritism.

All cars and other transportation facilities should be owned and controlled in every particular by the railroads, and all shippers should have equal facilities and be upon equal terms.

We, therefore, in this public way, record our earnest protest against the renewal or extension of existing contracts with the refrigerator car lines now engaged in this traffic, or the making of any similar contracts with any parties whatsoever.

We make further objection to the private ownership and control of these refrigerator cars, as having the effect to maintain what we consider excessive refrigeration rates.

The fruit-growers—those who are not engaged in the shipping and marketing business—are irrevocably opposed to the private ownership and control of the cars in which their products are shipped. They believe the time has come when they should be relieved from paying heavy tribute to this, the worst of all monopolies. Its power is so great as to subordinate all other interests, and if combined with the marketing, will be almost absolute. There is no power that can prevent such combination so long as private cars have the monopoly of carrying our fruit, with a tariff that brings in such an enormous profit as does the present tariff for refrigeration, for the reason that the large fruit companies are corporations, and there is no law through which the transfer and control of the stock of such corporations can be prevented.

This fact is mentioned for the reason that the railroad companies claim to be opposed to a combination of such a character, and we desire to show that the only way to prevent it is not to enter into a contract with the Armour Company, or any other car line, for the reason that it would be easy for the car line with which the contract is made, through the coercive power it would then possess, to soon gain control of fruit-marketing companies by having a majority of the stock transferred to it, or have it held in trust by those who would be subject to its will, which would amount to the same thing.

Refrigeration has been the bane of the fruit-growers of California. *It has done more to retard the progress and prosperity of this State than all other things combined, for the reason that it possesses the power to almost wholly, if not quite, control the marketing of its fruit products.*

Time Schedule.—In regard to the time occupied in the transportation and delivery of our fruit at Eastern destinations, we reiterate all that we said in our memorial upon this subject for the season of 1901, and earnestly pray that the time agreed upon in May of that year between the growers and the railroad companies—six days to Chicago and similar points, and nine days to New York and similar points—be put into full force for the coming season 1904.

The time the railroads agreed to make in fruit shipments in carload lots was, by the Southern Pacific, to Ogden 60 hours; by the Union Pacific and its connections, 84 hours to Chicago, of which 24 hours would be consumed from Council Bluffs to Chicago; a total of 144 hours, or six days. East of Chicago the time would be about 60 hours; the trains would leave Chicago in the afternoon of the day of their arrival there, and arrive in New York on or about 4:30 A. M., third morning, thus giving a nine days' service to New York and like destinations. That such time can be made is evidenced by what has been done in the past. Cars of fruit have been sold in New York on the ninth day after their shipment from California, and 11 days was almost the maximum time that cars were out before being sold in that market. And now it frequently happens that cars are out from 14 to 19 days before being sold in New York and like destinations.

California is a wonderful country. It has no equal anywhere. The one thing that makes it distinctively superior is its great and varied horticultural resources.

To thoroughly develop the fruit interests of California, put it upon a paying basis from a grower's standpoint and keep it there, it will be necessary to give its fresh-fruit shipments a reasonably fast regular time schedule, such as can be depended upon to deliver carloads at their respective destinations in the order they were shipped from the State.

Give to the fruit industry of California such a service and eliminate the private car lines, the thing which is paramount to all other things that can be done, and you promote the interests not only of the fruit-growers, but also of the State.

The adoption of a reasonably fast regular time schedule service in the transportation of our fresh-fruit shipments is second only to the elimination of all private car lines from the business.

We hold it to be unjust to the fruit-growers of California to place their property subject to the control of any private car line by giving to that car line a monopoly of carrying their products to market.

Profit for fruit transportation should be all included in the freight charge alone.

R. D. STEPHENS, Chairman,
ALEX. GORDON,
A. N. JUDD,

Members of the Fruit-Growers' Transportation Committee.

SUPPLEMENTAL REPORT.

Statistics showing Result of Shipping and Selling 3,623 Carloads in Eastern Markets in 1903.

The basis from which the estimate of the cost of production is made, is taken from a statement made by the Chamber of Commerce of Sacramento, California, in a pamphlet entitled "Fruit-Growing is California's Greatest Industry. Sacramento County is the very heart of its greatest production; possesses a climate unsurpassed for its equilibrium," issued in 1903, for the purpose of inducing people to come to California and build homes. In this statement the Chamber of Commerce says: "This tract (referring to Tract No. 74—10 acres—at Orangevale, owned by Col. H. Weinstock) is taken as an example simply because Col. Weinstock is a careful and methodical business man, keeps an accurate account of all details connected with the cultivation of his tract, and the figures chance to be available." The season referred to is 1901, since which time the cost of living and everything else has materially advanced.

In cost of production is included the cost of buying the land, improving it, planting it, and properly caring for it until it comes into bearing; then pruning, materials for spraying, compounding same and labor for applying, fertilizer and applying, water for irrigation and applying, plowing, cultivating, hoeing, picking, hauling, packing, crates, baskets, paper, nails, delivery at cars, loading, increase in cost of labor since 1901, and renewals, which means replanting and cost of again bringing to maturity, buying of implements, breakage and repairing of same, etc., not including interest on the capital invested.

MARKET.	No. Cars	Gross Sales	COST TO GROWER, NOT INCLUDING INTEREST ON CAPITAL INVESTED.					Profit	Loss	*Add Interest on Capital Invested at 8 per cent.	Profit	Loss
			Freight	Refrigeration ..	Commission	Cost of Production, etc.....	Total Cost.....					
New York.....	1,219	\$1,380,139	\$438,475	\$136,228	\$97,200	\$392,694	\$1,264,597	\$146,442	\$21,900	\$162,127	\$50,461	\$88,046
Chicago	834	850,576	250,200	76,725	59,511	406,158	792,594	81,031	23,049	110,922	30,735	83,075
Boston	635	712,797	237,705	74,110	49,760	309,245	670,820	60,928	18,951	84,455	20,752	63,230
Philadelphia	284	287,418	95,040	29,975	20,135	128,568	273,718	22,920	9,220	35,112	6,340	27,752
Pittsburg.....	207	212,827	74,520	21,675	14,974	100,809	211,978	10,461	9,614	27,531	1,096	28,376
St. Paul	130	130,625	39,000	12,240	9,157	63,310	123,707	9,056	2,138	17,290	1,901	12,273
Minneapolis.....	103	100,887	30,900	8,560	6,586	49,674	95,720	7,753	2,586	13,699	2,241	10,773
Cleveland	68	71,498	24,480	6,517	4,973	33,116	69,088	4,462	2,048	9,044	1,175	7,809
Baltimore	50	54,030	18,000	5,545	3,750	24,350	51,645	3,814	1,429	6,650	1,313	5,578
St. Louis	75	78,061	22,500	6,595	5,453	36,525	71,073	9,486	1,898	9,975	3,412	5,799
Cincinnati.....	38	39,034	13,680	3,577	2,634	18,506	38,457	2,794	2,217	5,054	1,139	5,716
	3,623	\$3,927,492	\$1,244,500	\$381,747	\$274,193	\$1,762,955	\$3,663,397	\$359,147	\$95,050	\$481,859	\$121,165	\$338,927

* Interest at 8 per cent is added, because in many cases the growers are in debt, and all small holders have to pay that rate at least, and if they are not in debt, they are certainly entitled to interest on their capital.

NOTE.—This table gives a recapitulation of a great mass of statistics, compiled by this committee; and which they have had printed in pamphlet form. Copies may be had on application to the Commissioner of Horticulture at Sacramento.

The following table shows the number of cars shipped from June 23d to October 30th, both dates inclusive, and the number of cars sold from July 6th to November 13th, inclusive. Fourteen days are allowed for time occupied in transit, which is about the average time it took to deliver cars at destination. This shows a discrepancy of 3,110 between the number of cars shipped and the number of cars reported sold:

Cars Shipped.	Cars Reported Sold.	Cars Not Accounted For.	Cars Shipped.	Cars Reported Sold.	Cars Not Accounted For.
June 23..	July 6..		Aug. 15..	Aug. 29..	
" 24..	" 7..		" 16..	" 30..	
" 25..	" 8..		" 17..	" 31..	
" 26..	" 9..		" 18..	Sept. 1..	181
" 27..	" 10..		" 19..	" 2..	
" 28..	" 11..		" 20..	" 3..	202
" 29..	" 13..		" 21..	" 4..	
" 30..	" 14..				
July 1..	" 15..		" 22..	" 5..	
" 2..	" 16..		" 23..	" 6..	
" 3..	" 17..	224	" 24..	" 7..	
" 4..	" 18..			" 25..	" 8..	209
" 5..	" 19..		" 26..	" 9..	162
" 6..	" 20..		" 27..	" 10..	
" 7..	" 21..		" 28..	" 11..	
" 8..	" 22..				
" 9..	" 23..		" 29..	" 12..	
" 10..	" 24..		" 30..	" 13..	
" 11..	" 25..		" 31..	" 14..	
" 12..	" 26..		Sept. 1..	" 15..	189
" 13..	" 27..		" 2..	" 16..	
			" 3..	" 17..	234
" 14..	" 28..				
" 15..	" 29..	39	" 4..	" 18..	
" 16..	" 30..			" 5..	" 19..
" 17..	" 31..		" 6..	" 20..	
			" 7..	" 21..	270
" 18..	Aug. 1..	154	" 8..	" 22..	
" 19..	" 2..			" 9..	" 23..
" 20..	" 3..		" 10..	" 24..	
" 21..	" 4..		" 11..	" 25..	
" 22..	" 5..				
" 23..	" 6..		" 12..	" 26..	
" 24..	" 7..		" 13..	" 27..	
			" 14..	" 28..	
" 25..	" 8..		" 15..	" 29..	145
" 26..	" 9..		" 16..	" 30..	
" 27..	" 10..	336	" 17..	Oct. 1..	230
" 28..	" 11..			" 18..	
" 29..	" 12..		" 19..	" 3..	
" 30..	" 13..				
" 31..	" 14..		" 20..	" 4..	
Aug. 1..	" 15..		" 21..	" 5..	
" 2..	" 16..		" 22..	" 6..	105
			" 23..	" 7..	
" 3..	" 17..	221	" 24..	" 8..	229
" 4..	" 18..			" 25..		" 9..
" 5..	" 19..				
" 6..	" 20..		" 26..	" 10..	
" 7..	" 21..		" 27..	" 11..	
			" 28..	" 12..	
" 8..	" 22..	243	" 29..	" 13..	123
" 9..	" 23..			" 30..		" 14..
" 10..	" 24..		Oct. 1..	" 15..	142
" 11..	" 25..		" 2..	" 16..	
" 12..	" 26..				
" 13..	" 27..				
" 14..	" 28..				

Cars Shipped.	Cars Reported Sold.	Cars Not Accounted For.	Cars Shipped.	Cars Reported Sold.	Cars Not Accounted For.	
Oct. 3..	Oct. 17..	100	Oct. 17..	Oct. 31..	125	
" 4..	" 18..		" 18..	Nov. 1..		
" 5..	" 19..		" 19..	" 2..		
" 6..	" 20..		" 20..	" 3..		
" 7..	" 21..		" 21..	" 4..		
" 8..	" 22..		" 22..	" 5..		
" 9..	" 23..		" 23..	" 6..		
" 10..	" 24..		" 24..	" 7..		
" 11..	" 25..		" 25..	" 8..		
" 12..	" 26..		" 26..	" 9..		
" 13..	" 27..	157	" 27..	" 10..	71	
" 14..	" 28..		" 28..	" 11..		
" 15..	" 29..		" 29..	" 12..		
" 16..	" 30..		" 30..	" 13..		
				Total..		6676	3566	3110

The above statistics are given in order that no one may be misled in regard to the true condition in which the fruit industry of the State is, at least so far as fresh-fruit shipments are concerned.

Fruit-growing is the most hazardous of all farming pursuits, for the reason that it costs so much and is menaced in so many different ways by so many different things; such as early and late frosts, heavy winds, which sometimes blow off from ten to thirty per cent of the fruit; early rains, insect pests, blights of different character, and new and mysterious diseases that no one knows why they appear nor any remedy for them.

By referring to the figures herewith given, it will be seen that the cost of growing and marketing often exceeds the gross sale of the fruit.

From statistics gathered by County Assessors, and in other ways, it is shown that there are many thousands of trees and vines planted that are not yet in bearing. In some counties the increase will amount to nearly, if not quite 33 per cent, and when this new acreage comes into bearing there will have to be a very radical change made for the better in existing methods of transportation and marketing, or a heavy financial loss to the growers will result.

That relief must come to the fruit-growers of California is evidenced by the following figures:

Gross sale on 3,623 cars this season	\$3,927,492
Freight	\$1,244,500
Refrigeration	381,500
Commission	274,193
Cost of production, etc.....	1,762,955
	<u>3,663,148</u>
	\$264,244

The result gives an average profit of about \$72 per car. When interest is added on the capital invested, the result will be over \$100 loss per car to the growers.

A. GORDON.
A. N. JUDD.
R. D. STEPHENS.

REMARKS ON TRANSPORTATION, ETC.

BY R. D. STEPHENS, OF SACRAMENTO.

Transportation and marketing are the important questions to be considered in connection with the fruit-growing interests of the State. Transportation is the most important of all things to be considered in efforts to give stability to the fruit industry of California; in fact, it is the key to the situation. A system of transportation should be arranged and adopted by the railroads that will result in placing upon an equality all parties interested in marketing our fruit products. No man or combination of men should be given an opportunity of controlling markets at will, for, in such an event, there can be no guarantee that prices will be steady; on the contrary, it will be in the power of those in control to give such values as they please, and therefore prices may fluctuate from year to year as will best serve the interests in control. In other words, we would then, in all probability, have a rotation in years, regarding prices—one fairly good year and about two years of low prices, so as to take away all that the growers might have made in the year of good prices in order that they—the growers—might be kept in subjugation by being made dependent upon those who are handling their products for the necessary financial assistance to continue in their vocation of fruit-growing. Such a condition would certainly give to those in control great power, for the growers could not get financial aid from any other source, because their orchards and vineyards would not be considered good security.

No better proof is needed that such would be the case than the fact that most, if not all, of our savings banks and capitalists will not now, even in this prosperous year—so termed by those who have arrogated to themselves the sole right to market the fruit products of California to the utter exclusion of all others—loan money on orchard or vineyard property where it stands alone, unless the land could be made to bring a profit by utilizing it for other purposes.

Some of the best orchard property, so considered, in the State has been mortgaged for years and is yet heavily mortgaged.

This fact raises the question, why should such a condition exist if fruit-growing has been a paying business for the producers?

The future of the fruit-growers of California is anything but assuring, for the reason that there is a vast acreage, principally vineyard, that has not yet come into bearing, which makes things look bad for the growers.

In the last year the price of wine grapes has been all the way from twenty-five to fifty per cent lower, and the growers have to wait six months, and in some instances more, for full payment, when before, it was cash on delivery.

This reduction comes from the profit column of the growers, for it costs more to grow the grapes now, on account of the increase in the cost of labor and living expenses, etc.

The heavy reduction in the value of wine grapes was wholly unexpected, and came as a great surprise to the growers and others who were, through newspaper reports and boom literature, led to believe that no safer or better way of investing their means could be suggested than to plant vineyards, and yet, in less than one year, at one stroke, from fifty to seventy-five per cent of their former profits were taken from them. The slump in wine-grape values will greatly militate against the prosperity of the State in the near future.

The varied conditions that have existed regarding the wine-grape interests in California apply with even greater force to all lines of horticultural interests.

The trouble with all of them is, there is no stability in any of them; no one can tell, except those who are handling the fruit products of the State, what one year will bring forth regarding values, because as things are now the *growers*, at least ninety per cent of them, are *wholly* eliminated from having a voice in the disposition of their products. The growers are compelled to deliver their shipments, at their own expense, at the car door, and there their rights end. They have no right to say where it shall go, or into whose hands it shall be delivered to sell. In fact, at the car door they are compelled to surrender all right of control.

Under such conditions, is it any wonder that some become prosperous and rich, in some instances millionaires, at the expense of the growers?

The question, the one all important to the fruit-growers of California, the upbuilding of the State, and the prosperity of its people, is, What can be done, if anything, and by whom, that will better the existing condition in regard to the transportation and marketing of fruit shipments East?

This is not a difficult question to answer. It is so plain and simple that with a few moments' consideration, anybody with the slightest conception of business affairs should be able to answer it.

At this time, and until other transcontinental roads come into the State, the only source from which relief can come to the fruit-growers of California is the Southern Pacific Company, and if that company can not—for any reason such as lack of facilities for giving a better time service, and a good deal better service, too, than has been given in the past three years, and a lower transportation rate, including refrigeration and the elimination of all private car lines from the service—give relief, then the fact should be made known, so that efforts could be made in other directions to better the condition of the fruit-grower of the State.

In speaking of the Southern Pacific Company, I wish to say that there is no member of the Transportation Committee—and it is to be hoped there is no member of this Convention—who is actuated by any feeling of prejudice or desire to do or say anything for the purpose of annoying the officials of the company. On the contrary, we desire to be on the most cordial and friendly relations with the officials of the company, for our only hope for relief is through them, and in duty to ourselves and to them we realize the necessity for stating facts, plain, simple facts, facts backed by indisputable evidence.

We know that the greatest ignorance has prevailed in the minds of all classes in regard to the cost of growing fruit in California. This is explained in part by the fact that the cost of growing fruit has greatly increased in the past few years. Formerly orchards were not menaced by any insect pests or blights of any kind. Box material and supplies of all kinds have advanced in price from 30 to 40 per cent. For instance, crates that formerly cost $4\frac{1}{2}$ cents now cost the small growers 7 cents, and in carload lots $6\frac{1}{2}$ cents. Labor is higher and the cost of living is more. A good spraying outfit, something unknown in the early history of California, costs from \$380 to \$475. Then the materials for spraying, their mixture and application, are heavy items of expense to the growers, and I might continue enumerating items of expense, such as the thinning of the fruit on the trees, which must be carefully and systematically done to make the work successful.

Home consumption can not dispose of the fruit grown in this State at any price, nor under any circumstances, and for this reason we have to seek other markets for our fruit, and the only ones accessible are those on the Atlantic slope, to be reached only over the lines of the Southern Pacific Company and its connections. Therefore, we look to it for protection.

That the Southern Pacific Company possesses the power to remedy many of the existing evils which are now menacing the fruit industry of California can not be gainsaid, unless it is under the influence of a power greater than itself. We feel that the Southern Pacific Company should do everything that it is possible for it to do, to protect and foster the fruit industry of the State, for the reason that it has done all in its power to induce people to come here and invest their capital in fruit-growing.

The moment that a fruit tree or a table-grape-bearing vine is planted in California it is mortgaged to the Southern Pacific Company, and it also carries with it the land upon which it is planted, to which we are not making any particular objection at this time; but we do, in the most emphatic manner it is possible to conceive, *object to having the mortgages transferred to any other interest*, such as private car lines.

Give to a private car line a monopoly of carrying the fruit products

of the State, and you give to that car line the power to manipulate the markets for the fruit at will, through the fact that at any time it pleases it can go into the fruit-marketing business and charge to all competitors, or to those it wishes, such a tariff for refrigeration as will bring to it a large profit, while it carries its own freight for nothing; therefore, the profit it makes by carrying its competitors' fruit acts the same as a rebate, in other words it is a discrimination made between shippers.

No competition can last long under such circumstances, and when once an interest is under control there is but one result, it is inevitable: the power in control will make everything possible, regardless of consequences resulting to others.

If fruit grown in California is as profitable as it is claimed to be by some, why is it that a large per cent of the orchard property can be bought for a great deal less than it cost? Why is it that mortgages on orchard property that has been in bearing for years remain unsatisfied?

Is it not better for those following any vocation, and for the community in which they live, to be prosperous and contented, and therefore willing to invest a reasonable proportion of their profits in improvements and the comforts of life, than to have them in an impecunious condition and consequently unable to do those things?

The hope for the fruit-growers of California lies in their ability to show to the Southern Pacific Company that the conditions surrounding their interests are not such as they should be to place them in such a position financially as will make them of value to the State and add to its prosperity.

This can be done only by calling the attention of the Southern Pacific Company's officials—those who have it within their power to grant relief, if such a thing is possible—to facts of such a character, that if they will give a little of their time to investigation of the same, they can not fail to be convinced that something must be done to protect the fruit industry of the State.

If, after a thorough investigation, these officials can not see their way clear to grant the relief so much needed, then it will be better, far better, to let all the facts bearing upon the matter be made public, so that those who have not yet invested in fruit-growing may be admonished not to do so and thus prevent them from becoming paupers and pauperizing others.

Let us hope that much good may come from your labors here to-day and that your efforts will materially assist in placing California—the country possessing more varied and richer resources than any other country of equal area in the world—in the position it seems was designed for it by the Creator.

PRESIDENT COOPER. What disposition will you make of the paper you have just heard read?

MR. MARKLEY. I move that it be adopted and filed.

MR. STEPHENS. Mr. Chairman, I beg pardon; there is one thing I forgot to mention and should mention, because it is made a part of the report. Here is a copy of a statement which took the typesetter three weeks to set up and which required a great many more weeks to figure out. It is almost an absolutely correct record of every car of fruit shipped out of the State of California between the 23d day of June and the 30th day of October. It is also a correct report, as given by the California Distributors, of the sale of every car that was shipped between those dates and sold up to November 13th. I desire to call your particular attention to a tabulated statement there, with the double mark in the center, showing the number of cars shipped between those dates, the number of cars reported sold, and the number of cars that were lost in some way. There are unaccounted for 3,110 carloads of fruit that were sent out of this State between those dates. I desire to call your attention particularly to that, because it is significant; it shows more than could be said in a volume of a thousand pages, from the standpoint of the business man. The question is, what became of these 3,110 carloads? Some may be accounted for by shipments made by persons who ship outside of the Distributors, but, comparatively speaking, the number of cars was very small indeed as compared with the whole number of cars shipped. Now, this statement gives the fruit sales in every auction city on the Atlantic side, by weeks, so that by perusing it you can see what period there appeared to be good sales and the period at which there were poor sales. The compilations were made in that manner for the purpose just mentioned, and also to avoid errors in additions, and so forth. You will find that these columns will balance. Another thing regarding this statement is that the freight, the refrigeration, the cost of production, etc., are shown separately, interest not included. The profit or loss, as the case may be, is shown up to that time. Then afterwards the interest upon the investment, and the necessary amount required to bring the orchard or vineyard into bearing, are taken into consideration and added to the loss or subtracted from the profit, whichever it is, and then it gives you the result, showing whether the fruit was marketed at a profit or not, including interest. I make these explanations so that you can understand this better.

MR. BERWICK. Mr. Stephens, were those 3,110 cars unaccounted for sold at private sale?

MR. STEPHENS. You must guess at that. I intend to discuss the question after awhile, and possibly I may throw some light upon it.

PRESIDENT COOPER. Now, there is a motion to accept the report as read, previous to the statistical report. I wish to ask the mover whether he wishes to include the report and also the statistics.

MR. MARKLEY. Yes, sir; the statistics are submitted as a part of the report signed by the members of the committee.

PRESIDENT COOPER. Then the motion is before the Convention for the adoption of the report as previously read, and the statistical report also as a part of the committee's report.

Carried.

REPORT OF COMMITTEE ON LOCAL ASSOCIATIONS.

The following report of the Committee on Local Associations was submitted by its chairman:

To the Honorable Chairman and the Fruit-Growers' Convention:

Your committee to whom was referred the subject of the formation of local co-operative associations, to centralize for the conduct of the Growers' Co-operative Agency in San Francisco market, begs leave to report as follows:

Efforts have been made to secure such organizations at several points most interested in securing fair market conditions there, but up to the present time none have been found with enough local initiative to secure such organizations except upon the Sacramento River. This association has successfully conducted the large business of the Growers' Co-operative Agency during the past season in San Francisco, and urgently invites every locality interested in that market to form a local association to become a branch of the Growers' Co-operative Agency, thus joining them in the conduct of its affairs.

Your committee is convinced that abuses of no kind can be very effectively remedied without the concerted action of those who suffer from these abuses, and such concerted action is best secured by local organization of growers. They therefore recommend the continuance of the effort to secure such organizations.

Respectfully submitted.

A. R. SPRAGUE,
Chairman of Committee.

On motion, the report was adopted and ordered filed.

MR. BERWICK. Mr. Chairman, I have a resolution here which I will be pleased to read to the Convention. It is drawn up by a fruit-grower whom many of you know, Mr. E. F. Adams.

Resolved, That in view of the disclosures of the boycotting methods of the San Francisco fruit commission men, this Convention demands of the Governor and Board of State Harbor Commissioners such rigid enforcement of the Woodward Act as shall insure to every producer of perishable products who desires it, the opportunity to freely sell his produce on the State property in San Francisco, unhampered by any boycott to which others making use of the State property are parties.

Referred to Committee on Resolutions.

MR. SPRAGUE. Mr. Chairman, I should like to discuss the two subjects last before the Convention.

PRESIDENT COOPER. It is in order.

DISCUSSION ON CO-OPERATIVE MARKETING.

MR. SPRAGUE. For years it has been known that it was impossible for the growers of products for the San Francisco market to get satisfactory service in that market; that there were many abuses to which that traffic was subject, and excessive charges for the work, and during the last several sessions of this Convention there has been an effort to secure the organization of the growers to such an extent as would enable them to remedy those evils. As a result of this, the committee appointed by your Convention secured the organization of the growers along the Sacramento River for the purpose of marketing their products in San Francisco. It was late before this action was taken on the Sacramento River, too late for similar action in other localities interested in the San Francisco market. Therefore, the Sacramento River growers were obliged to attempt to conduct that work alone. They met, early in the season, with the determined opposition of the commission merchants' association, and so bitter was this opposition that it virtually forced them out of business for the time, and they were unable to sell their products. They appealed to the other portions of the State interested in that market to join them in this undertaking—parts of the State shipping heavily to San Francisco. It was endeavored to interest individuals engaged largely in shipping to that market, and they endeavored to interest the people of San Francisco who were suffering by reason of excessive charges, but it was all in vain; no efficient interest could be created, either among the growers or among the people of San Francisco, and, as a result, this organization, by the first law of nature, which is self-preservation, was obliged to refrain from continuing the fight on its own behalf and alone in San Francisco. It is now doing a business in San Francisco, and has been during the past season, which has not involved the serious antagonism of the commission merchants. Now then, what can be done in the face of such a situation as this? We are confronted with the fact that the products of our farms are sold to the people of San Francisco at excessive rates to the consumers, thereby greatly checking the consumption of those products, and that is a very serious factor. In former times you know that the commission merchants, unless they could secure a certain, definite price, a somewhat high price, would throw into the bay that which they could not sell, rather than lower the price and sell a very much larger volume. This is common history. Now, that is contrary to the welfare of the grower tributary to that market. There should be a stable, normal market price, which should return a fair compensation to the growers. That is the best condition which they can seek in San Francisco. A large consumption is what we want, not a small consumption with exceptionally high prices occasionally. The people of San Francisco, as we

learn from the metropolitan journals, are crying out in protest at this situation and frantically beating the air for some aid. We are appealed to here, and it is a question to be considered soberly, how can this aid be given? As in other lines of trade or commerce, the farmers or growers, when they propose to do business, must get ready to do business, submit to certain arrangements with each other, and make certain agreements by which business shall be done. Now, in our judgment the fundamental thing in the way of getting ready to do this business, to reform the situation at San Francisco so as to do any business which we deem it essential that we should do, is to get ourselves organized locally in those districts in which it is of the greatest interest to have that business well done. Now it is difficult to find, in the different localities, men who are sufficiently self-sacrificing to devote themselves to the public weal to such an extent as to step forward and attempt to secure such local organization, but that is the point which is absolutely essential. If there can not be found, in the various points tributary to the San Francisco market, men who are willing to give their time and, if necessary, some of their money to effect this work of organization, these abuses will go on, and all our resolutions and all our attempts to regulate them by act of the Legislature will fail. Combinations never have been and never will be controlled by law effectively. It must be by organization to enable us to do the business ourselves which we wish well done. Now, gentlemen, I appeal to you to see that these organizations are formed.

MR. JUDD. Mr. President, it seems to me another horn of the dilemma might be taken hold of. You understand how difficult it is to get an organization in a locality where there is a diversification of markets and of products and vast numbers of people differing on the subject of co-operation. It seems to me that the Sacramento River growers, for instance, should organize themselves, as they have done already, and let them be their own commission merchants. I talked the matter over considerably last year with our people, and it seems that they are anxious for this proposition, but it is difficult of accomplishment. In the strawberry business, for instance, the commission men themselves are in some respects largely interested as owners, and other owners are hampered or tied up to such a degree that it is difficult, as the gentleman who just spoke has said, for them to combine without sacrificing themselves. Now, I am confident that if the Sacramento River growers will organize themselves, as I said before, as a commission organization for one year, just to demonstrate to the growers all over the State the practicability of co-operation, and let us send to them a certain amount every day to sell, on consignment, as we do to commission houses—say they want 50 or 60 crates of strawberries or 100 or 150 boxes of apples, or whatever it may be—it seems to me that

they would be willing to sacrifice in a way where necessary, and if they will accept a situation of that kind I believe every locality in California will keep them flooded with the produce they want and let them sell it on commission. Now I would like Mr. Sprague to consider that proposition and answer it.

MR. SPRAGUE. Mr. Chairman, in reply to that I will say that I am astonished, in the first place, to see how absolutely necessary it is for co-operative organizations to advertise. What Mr. Judd proposes is exactly what the Sacramento River growers have been doing in the past two years. In the past season they have conducted a business, running into hundreds of thousands of dollars, very successfully, in the San Francisco market, realizing, as some of the growers present will testify, better prices than the commission merchants themselves realized for the products sent them. They have a very fine business to-day and a very fine business location, and they are soliciting your consignments, for the purpose of making themselves strong, so that the situation can be properly controlled. They ask all of you, everywhere, to forward such of your consignments as you wish to come to the San Francisco market, to their house, The Growers' Co-operative Agency—that is the name of the firm—and whenever you get ready in your locality to organize a local association and send a representative to help conduct that business, you will be welcomed with open arms. The address of the Agency is 425, 427, and 429 Front street. It is very necessary that they should have consignments throughout the year—potatoes, onions, citrus fruits, if you have any, and strawberries; during the summer the Sacramento Valley, of course, furnishes very large supplies of fruit and produce, but during the rest of the year they have to depend on the products that come to the San Francisco market from other sections of the State. Throw the weight of your influence toward that institution, and, my word for it, gentlemen, the evils of the San Francisco market will be corrected, but they can not be in any other way.

DISCUSSION ON TRANSPORTATION.

PRESIDENT COOPER. If there are any ladies or gentlemen present who wish to discuss the report of the Committee on Transportation, it is now in order for them to do so.

MR. JUDD. Mr. Chairman, we know that this State is the most completely overburdened with high transportation rates and the poorest service of all the United States. In some places where we have succeeded in getting an electric line or something of the kind we have got a little reduction, affording some competition in our own State, but what we want is to compete with other States. A little while ago you read in the papers, relative to the investigation of the affairs of the

Porter Brothers Company, that their rebates from the refrigerator car lines were some \$1,800,000, and that seems to be apropos to this report. If it is possible that a thing of that kind can exist in this country, where an individual that has charge of the business of a fruit company can take a rake-off of over a million and a half on refrigeration alone, there is something remarkably "rotten in Denmark." You can readily see the point raised in that report. If we don't crush this private car-line proposition it is simply going to crush us. But, to take up the proposition of publicity. Let us have reports every month or two. Let us know the freight rates on all fruit products on the Great Northern lines, the Northern Pacific, the Canadian Pacific, and all those lines. Let the public know exactly what they are paying when they ship. It is certain to my mind that the Eastern lines get a great deal less than their pro rata for the distance they haul. Don't be afraid to tell the public whether we are getting the worst of it as compared with Washington and Oregon. Last year they were shipping apples from Oregon by the O. R. & N. down to Denver and by the way of Deming, clear back up to Phoenix, 4,280 miles, for a dollar rate—no, the rate was $97\frac{1}{2}$ cents; and for shipping apples from Watsonville to the same point, 831 miles, the rate was \$1.08 $\frac{1}{2}$. There is the difference. Publicity, if anything, is what talks. Let the public know the exact facts in regard to transportation rates, and it will "shake the dry bones" all over the country.

MR. STEPHENS. Mr. Chairman, and gentlemen of the Convention: I am speaking in advocacy of the adoption of the report of the Committee on Transportation. I wish to say right here, in our locality, and I presume it prevails in all localities, with the exception of this, probably, where you are making raisins out of the products of your vines, that you can't go to a savings bank and borrow one dollar upon your orchard and your vineyard property unless it is backed by other property that would be sufficient to satisfy a deficiency judgment. The savings banks' treasuries are teeming with hundreds of thousands of dollars ready to be loaned, and the directors of the banks are anxious to make loans upon good security, but orchard property and vineyard property are not regarded as good security by them. If the fruit-growing industry of California—particularly the growing of deciduous fruits—were prosperous, would the banks and the capitalists hesitate to loan their money on the property? By no means. There may be some savings banks that will make these loans, but you can not go into the city of Sacramento and borrow from the Sacramento Savings Bank, which is the wealthiest one there, on these properties, unless they are backed up by other property which would be regarded as good security; with this one qualification, that the land upon which your vines or your trees are growing can be utilized in some other

way that will bring profit and consequently give value to the land when it is denuded of the fruit trees or vines.

Now I desire to make a few remarks, brought to mind by statements made on the floor here. With all due deference and respect to those who are in charge and control of the California Fruit Distributors, I wish to say that in this tabulated statement presented in connection with the report of the Committee on Transportation, where there is shown a deficiency of 3,110 cars unexplained, it is possible the car line may be interested in the marketing of fruit. Now if it be true that the Armour Company is in the marketing business—I am not saying that it is, but I believe it to be—if through the power of the Distributors, which in my judgment it dominates, it can select markets and protect those markets, where are those 3,110 cars, less possibly 150 or 250 or even 500 that might be shipped by other institutions? Who sold them, and what prices did they bring? Nobody knows, excepting those who sold them. There is the wrong to you. Agents are sent out to buy f. o. b. from the growers, who are offered, and the magnificent (?) offers in many cases accepted, 30 cents a box for their plums and from 40 to 50 cents a box for their pears, and that is why last year was such a disastrous year to the growers. The fact that Porter Brothers had just been reported as being bankrupt, and there being no possible competition, as they believed, they felt it was discretion on their part to accept those prices, and a very large amount of fruit on the Sacramento River, in Placer County, and other localities, was purchased by the Earl Fruit Company, shipped East and sold in the name of the grower, so that when you read the name of John Smith, from Portland, or any other place, receiving \$4 a box for his pears, you said: "What a magnificent price Mr. John Smith is receiving for his shipments"; and when plums were reported sold at from \$1.75 to \$2: "Why, what a magnificent profit Mr. Edward Berwick is making on those shipments," when Mr. Edward Berwick had previously surrendered all proprietorship to the Earl Fruit Company. These are facts, gentlemen. The little tabulated statement issued last season attracted a great deal of attention in the railroad offices and, no doubt, in those of the Armour Company and of others interested in making their millions out of you gentlemen. They hooted at the statements at first and said they were incorrect. I went to the State Board of Trade and invited investigation. Twice, personally, I visited the California Promotion Committee and solicited those in power there to take the question up, for the reason that if the statements were erroneous it was the duty of those trying to induce people to come here and invest their means to establish the fact that they were wrong. They intimated to me that they would do it. Two or three weeks passed and I heard nothing from them, when I formally addressed a communication to the California Promotion Committee, submitting

to them all documents bearing upon the subject, and two weeks afterwards I received a communication from them stating that they had concluded not to take up the question. One day, as I was passing by the Chamber of Commerce of Sacramento, I looked in at the door and saw a lot of gentlemen there, directors of the Sacramento Chamber of Commerce, and I asked them to take up the question. They didn't understand it, but they said they would. I dropped in two or three times and they were very busy, but they promised to take it up. I said to them: "Gentlemen, I want you to invite any railroad official, or as many as you deem proper. I want you to invite Mr. Robert Graham and Mr. C. B. Dewees and Mr. Buck and Colonel Weinstock—everybody connected with this matter; bring them here and we will discuss the matter and we will see whether the statement will hold water or will not." After a lapse of four months the Sacramento Chamber of Commerce had communicated with these parties, and they would not respond; they said they did not want to meet Mr. Stephens, they didn't care to be insulted! I don't believe I ever insulted a man or woman in my life, and I assured them that no one would be insulted; that all we wanted were the plain, simple facts in the matter. The Chamber of Commerce made a report of this kind: They took all the documents submitted through the Transportation Committee by the fruit-growers of the State and figured on them, all these interested parties, for four months, and they denied to you gentlemen and ladies the right of having an insight or look at their figures and passed judgment upon what was filed with them by the railroad, the Armour Company, and the Distributors, but would not give you an opportunity to see what they were. I knew when the directors of the Chamber of Commerce were going to meet, and I was there and rose to speak, and the President said to me: "Mr. Stephens, you can't talk before this Chamber of Commerce. I ain't going to let you." I said: "That is all right, Mr. Seymour, you will have the nicest time in the world keeping me down. I am going to try to talk." He said: "I'll not let you"; but there was a member of the directorate who moved that I be given a hearing of ten minutes. I occupied that ten minutes. I have here a booklet—a pamphlet issued by the Sacramento Chamber of Commerce. I listened to their report first, and they verified every charge made in the report of the Committee on Transportation. They admitted that refrigeration was less in the territory in Oregon north of Portland and in the whole State of Washington, because the railroads there furnished their own refrigerator cars; but when it came within the territory which the Southern Pacific dominated, then the rates went up. They virtually admitted everything charged in the report, but denied one thing, which I hoped they would, that the estimate of cost to the grower was too high, and they quoted from Colonel Weinstock's statement, for

the reason that he is a very careful business man. According to Colonel Weinstock it cost \$422 and some cents an acre, current expenses alone—not including interest upon the capital requisite to buy the land, to plant it, to build houses, and to get the things necessary to have in order to live comfortably—for the year's expenses. This opened my eyes. I didn't know, and I don't believe a man in the State of California can tell, what it costs to produce each box of peaches, plums, or pears, or anything else shipped, because the cost varies, and I have endeavored to make an average estimate. I have added here the increase of wages since 1901, and we all know that there has been a material increase. I have also taken into consideration the cost of renewals. No doubt Colonel Weinstock's figures are correct. I supposed those figures referred to f. o. b. sales, and I said: "Colonel, I suppose the sales you refer to are f. o. b. sales?" "Oh, no," he said. I then asked: "Where is your account of the cost of transportation, your freight and your refrigeration, your loading charge, your commission, and so forth, where are they?" "Oh," he said, "I just take them as they come to me from the jobber." Now what he paid I don't know, nobody knows. I do know, however, that he was president of the Shippers' Association, and they might pay some regard to his being president of that association, and his commission might not be so high, his loading charge might not be so high, and other things might not be so high.

I don't want to detain you, but there are one or two things to which I want to refer. If we have two railroads, enough money has to be made to support them, and the producers of the country traversed by those roads have to be given an opportunity to do something, to produce something which the roads can haul and charge for, and the more roads you get in the better your condition will be in regard to transportation charges, as is evidenced by the whole country here excepting this territory from Tehachapi to the Siskiyou Mountains. Even in southern California, according to a newspaper account, the orange-growers of southern California boarded the private car of Mr. Harriman when he was down there, and sought an interview with him, regarding time of shipments in transit, etc. They were referred to certain other officials of the road, to whom they refused to be referred, as they had talked with them until they were satisfied that they could get no relief from them, and therefore wanted to discuss the question with Mr. Harriman. He agreed to consider it, and they then asked for a reduction in the transportation rate. His answer was: "Not until the courts compel us to do so." They also said that they would ship all their oranges over the Santa Fé, which was making better time than the Southern Pacific, if they could; but here came in this combination which exists regarding the shipping and marketing of citrus fruits, to divide the

traffic equally between the two roads, and therefore those who were listed upon the Southern Pacific route could get no relief. I wish to say that the Santa Fé is dominated by the Southern Pacific in much of the territory through which it runs, as is evidenced in many ways.

FRUIT PACKAGE LABEL LAW.

MR. JUDD. Mr. Chairman, I have a resolution here on another subject that I would like to introduce. It is as follows:

WHEREAS, The label law of the State of California, passed by the Legislature March 6, 1903, providing for marking on fruit boxes or packages the name of the vicinity where fruit is grown, is insufficient, as it permits too much latitude and does not give the publicity intended by the promoters of said law; therefore, be it

Resolved, That said law be amended so as to read after the words "where grown" the words "the name of the packer and his address and where possible the name of the grower."

MR. JUDD. The reason why I think that this is necessary is from the fact that in our locality, where that law has been enforced, I am an unfortunate inspector, and I find that notwithstanding the fact that the boxes, packages, or sacks are marked with the name "Watsonville, Santa Cruz Co., Cal.," or: "This fruit was grown in Santa Cruz and Monterey Counties," it falls short of the intention of the law. If you put on the grower's name, where practicable or possible, you touch the grower's pride; you place upon him the responsibility of seeing that that fruit shall be in prime condition. You place also upon the packer the responsibility of packing it and putting it on the market in proper condition. That is the reason why I suggest that this amendment to that law be recommended by this body. As you understand, there is considerable opposition to the law, and we have a test case coming on where some of the big exporters are fighting it, ostensibly on the alleged ground of its unconstitutionality. If the present law, with this proposed amendment, should go into effect all over the State, it would increase the markets and increase the number of buyers by the hundreds, simply because they will see on every box, on every package, the name of the packer and perhaps the name of the grower. The purchasers, if they feel so disposed, can deal direct with the packer or grower. When the fruit lands in Liverpool, for instance, and the buyers see that it is a particularly fine brand they will write to the packer or grower for further shipments. It will be an incentive to the packer and to the grower to improve the pack, and it will better the fruit industry all along the line, will make a wider market, induce greater consumption, and increase the number of buyers, which we need most of all. Where any individual or firm virtually has the monopoly of any market, exorbitant rates are charged and only the wealthiest can consume the product. It seems to me that the amendment proposed is essen-

tial for the purposes stated: to increase the markets and also the pride, the patriotism, and the responsibility of the grower and packer, as also to increase the number of buyers.

PRESIDENT COOPER. The amendment is referred to the Committee on Resolutions. We will now take a recess until this evening at 7:30 o'clock.

EVENING SESSION--FIRST DAY.

TUESDAY, December 8, 1903.

The Convention was called to order at 7:30 o'clock. President Cooper in the chair.

PRESIDENT COOPER. Hon. Alden Anderson, having had to go East, could not be present, but he has sent his report, which is in the hands of the Secretary and will be read by him.

Report read by Secretary Isaac.

REPORT OF CALIFORNIA FRUIT DISTRIBUTORS.

Deciduous Fruit Shipments for the Season of 1903 by the California Fruit Distributors, with an Outline of Plan of Operation of the Company.

The first carload of deciduous fruit for the season of 1903 consisted of a fruit express car of cherries, and was shipped from Vacaville, Solano County, May 9th. The last car (apples excepted) consisted of grapes, and was shipped from Concord, Contra Costa County, November 21st.

As will be seen from the accompanying statement, the shipments of this year exceeded those of last year by several hundred carloads, just as the shipments of last year exceeded those of the previous season.

In the figures given below are included 670 cars of apples. This number does not include all the apples shipped from California, but simply those that have come under the cognizance of this organization in the same proportion as formerly. This fruit was distributed to a total number of 131 cities, being a considerable increase over that of any previous year; in fact, fruit was placed this year in no less than 28 cities that never before received California fruit in carload lots. While a few of the cities experimented with last season did not prove satisfactory car-lot distributing points, and some of those experimented with this year are not yet ready for such shipments, the most of them

will develop into regular distributing points. The largest quantity of any one variety of fruit handled outside this organization was grapes, and as the several outside shippers of this variety of fruit generally shipped only to one or two cities, at times there was a relatively greater amount of this fruit in some markets than there should have been. Otherwise there has been a comparative evenness in sales throughout the season in all markets. The following is a statement of shipments for the season beginning May 9th and ending November 21st, in actual cars shipped and not based on tonnage:

Cherries	211 cars
Apricots	231 "
Peaches	1,867 "
Plums and Prunes	1,145 "
Pears	1,719 "
Apples	670 "
Figs, Quinces, Nectarines, etc.	23 "
Grapes	1,802 "
Total	7,668 "

Cherries.—The crop of cherries was lighter than that of last year, but was of good quality and ripened gradually, which made it possible to ship and distribute same in the best possible shape. Sales were very remunerative.

Apricots.—More apricots were shipped than last year, and as the crop in the early shipping districts was heavy, the quality was not as good as usual. The prices, on the whole, were satisfactory.

Peaches.—There was an increase over the shipments of last year. The earlier varieties were somewhat lighter, and other varieties about normal. The best average net returns ever secured were had this year. This was particularly true in regard to the later varieties, especially Salways, which held up at good prices until the end of the season.

Plums and Prunes.—There were some 250 carloads less shipped this year than last year, but during the height of the season daily shipments exceeded those of any single day last season. It required the utmost exertion and care to have the shipments properly distributed, to the end that there would be no glut in any of the markets. Later varieties of plums were very short. Prices were very satisfactory.

Pears.—The total number of cars of pears shipped was slightly less than last year, but the main shortage was in the fall and winter varieties.

Grapes.—The greatest increase in any one variety was in grapes, there being 1,802 cars as against 1,033 cars last season, the largest previous shipment of this product. Prices on the whole were even and remunerative and netted satisfactory figures. This, in view of the fact that the importation of Almeria grapes was greater than ever before known, is particularly gratifying.

The larger portion of the above shipments was handled by the California Fruit Distributors, with headquarters at Sacramento. This organization is composed of most of the principal growers, shippers, and co-operative associations engaged in the fruit-shipping business. It was organized in May, 1902, and immediately assumed all of the functions and duties of the organization known as the California Growers and Shippers' Association, together with greatly enlarged powers, duties, and responsibilities; its business being not only to give the utmost accurate information in regard to all shipments, etc., but also to secure an even distribution thereof to all markets.

Membership in this organization is in no way qualified by the quantity of shipments made. The shipper of one car is given as much consideration as the shipper of a hundred. There are eleven directors, each of whom has a vote in the fixing of policies and in the outlining of general business directions. The representation is thus based not on the volume of business done, but rather on the individuals represented.

Before the organization of the present company, those engaged in the industry labored under many disadvantages that are now eliminated. Competition for business was keen, with no regulation of shipments. Each one endeavored as much as possible to keep his business from his competitor, for that purpose billing all cars to one city, making diversions that were kept secret while the cars were en route, with the result, for instance, that a city like Minneapolis, where three cars of peaches might sell at good figures, was at any time liable to have three times that amount sent in by different firms, which would necessitate the selling price being cut to a minimum, while a city like Pittsburg might at the same time be without any fruit, whereas an equalization of the shipments to the two markets would have meant remunerative and satisfactory prices for all concerned.

Then again, when a market was in good shape and the sale of a car would bring satisfactory figures, the parties representing different interests in that city would immediately wire to their shippers in California, "Market in fine condition; advise diversion and immediate shipment of large quantities." The result was that all shippers were liable to take the same action, and in a few days instead of having a good market with fair returns, there would be a demoralized market and serious loss. This condition of affairs would shift from one point to another, and the general experience was that where a market for perishable fruits once reached a low point, unless there was a great subsequent scarcity of that product, it was extremely difficult to again raise the level of prices to a profitable basis.

The formation of the California Fruit Distributors was not an easy matter. Some firms, because of location or superior packing on their part or better carrying quality of their fruit, enjoyed advantages not

common to others. Some of them believed that if they could keep on with prevailing methods for a short time they could force their competitors out of business and then would have the field entirely to themselves, while all the time they would likely be losing money for all concerned.

The present general plan of operation of the California Fruit Distributors is as follows: They do not purchase or own a pound of fruit themselves, but simply act as a clearing-house or agency for the different growers, shippers, and associations working through them, who make their own carload shipments. When a car is loaded the bill of lading is indorsed over to the California Fruit Distributors and is sent, together with the manifest and all pertinent information regarding contents thereof, to the company's headquarters in Sacramento. The car is then disposed of for the account of the party loading the same. Once the bill of lading and manifest of contents of car are received, the management aims to place the fruit in the best possible market for that fruit, taking into consideration the variety, its degree of ripeness, and general quality, and using their knowledge of the needs, requirements, and local or domestic supplies of the different markets, together with previous shipments as a basis of action.

Not only have they complete and accurate information of all shipments previously forwarded, as they make all sales, diversions, and apportionments, but they also receive daily from all leading centers telegraphic information stating present condition, prospective demands, amount and variety of local supplies, and all other matters pertinent and necessary to the most intelligent distribution of the fruit.

They immediately stopped all private consignments to outside points and determined that all fruits not sent to the East to be sold at auction should be sold on what is known as the "f. o. b. California plan"; *i. e.*, that a minimum price for the product should be fixed in California, and a draft for the value of the car be drawn on the bill of lading and manifest, payable before delivery of the car, and that under no circumstances would the price agreed upon be reduced on any shipments leaving California on the same day, whether sold before going or sold en route; the idea being that shippers when sending their fruit to outside points should know just exactly what they are going to receive for their product, and that dealers, if they bought the fruit, would be interested in maintaining prices rather than cutting them; further, that those who purchased the fruit, as long as they had to purchase, would know that their competitors could not buy at a lower price than that at which they could purchase, as it was believed that if buyers could be guaranteed against a decline the business would be energized and stimulated and a greater distribution of products in the outside markets be had, all of which has proven to be the case.

The distribution of fruit to the auction markets is made with the utmost care, and long experience in the business is called upon to direct what fruit should be sent to the different markets and to apportion to each market the relatively proper amount of fruit to keep them all on a comparative equality, after taking into consideration the difference in the cost of transportation and refrigeration charges to the different points. Were California the only fruit-shipping State the problem of distribution would be much easier, but there are other large fruit-shipping districts, especially in the South, and their fruit comes into competition with California products. While this competition may at times interfere seriously with the California fruit, it at the same time shows the absolute necessity of co-operation on the part of those engaged in the industry in California, if the best results are to be obtained.

The saving in expense of telegraphing, mail, etc., much more than pays the total expense of the organization. The first season an endeavor was made to direct a part of the distribution from the Chicago office, but it did not work satisfactorily. This year all of the distribution was directed from the Sacramento office, and the efficacy and wisdom of the action are so manifest and proper that I apprehend no one will again question the expediency or agree to any other action in the future.

The most serious problem to be solved now is the one of transportation. Little more can be done toward systemizing the selling and distribution or increasing the volume of shipments or taking the very best care of those already shipped until this important matter is worked out satisfactorily. We must have a regular as well as an expedited service, to the end that we can know positively, barring accidents, just where a car of fruit will be at any given time. About sixty per cent of the shipments are distributed through the auction markets. No fruit is sold in these markets on Saturday or Sunday. Shipments are made from California on every day, including Saturday and Sunday. Suppose, for instance, that a certain number of cars were sent to Chicago to arrive on Friday in time for the last auction sale of the week, and the fruit arrived too late to be put on sale. It must remain on the track until Monday, with constant deterioration as regards quality and consequently value, and on Monday other fruit would also be due, making an undue and relatively improper offering. The allotments having all been comparatively made, if the cars that did not arrive there on Friday for sale should be diverted to other markets, it would throw the other markets out of balance and the whole scheme of distribution would be upset. Thus everything depends upon *transportation*, for on perishable products it is a well-known and undeniable fact that a day lost is never regained, to say nothing of deterioration and consequent loss on shipments when too long en route.

The most strenuous efforts will be put forth by the California Fruit Distributors to obtain such a service, and until such a service is had it

will not be felt that the most vital necessity of the business is secured or the next most necessary reform accomplished. Other reforms and changes will have to and will be made, but little more can be accomplished until this stumbling-block is out of the way. It is only because of the splendid carrying qualities of the California fruits and the intelligent packing and preparing of the same that they have been able to maintain their present position in the various markets, and there is no reason why the industry can not and should not be maintained upon a permanent, stable, remunerative basis on average results for all seasons.

The past season, by discounting the promised schedule time and figuring upon the probable arrivals in the several cities based upon the actual time being made, very fair comparative results were attained. There were no gluts or comparative over-supplies in any of the markets, and the net returns were fairly satisfactory. How much better they would have been with better time can only be estimated.

Thus far, out of diverse interests, secrecy, and undue competition has come a measure of order, system, stability, and satisfactory returns, and while to favorable conditions in the East might be attributed a part of the result, it can not be wholly so attributed, because never before in the history of the business have there not been times of glutted markets and red-ink returns from some of the distributing points, and besides, the shipments this year were greater than ever before by several hundred carloads.

With a proper selection and careful grading of the fruit and an expedited scheduled freight service, and with possible reductions in charges in different ways from time to time, I believe that twelve thousand cars of deciduous fruit can be marketed from California with as good or better results in the future as have ever been attained in the past, and the organization and maintenance of the California Fruit Distributors is a long step toward that consummation. It is a long stride in the direction of intelligent and practical co-operation in the handling of one of California's chief products, with consequent benefit to the whole industry and to the whole State.

CO-OPERATION IN THE MARKETING OF CURED FRUITS.

By M. THEO. KEARNEY, of FRESNO.

Co-operation in the marketing of cured fruits is the subject upon which I am invited to say a few words. This broadly covers all cured fruits, whether peaches, apricots, pears, apples, prunes, or raisins.

We are holding our meeting in the town and county of Fresno. Fresno has been my home and the field of my labor for thirty years, and it would be most agreeable to me simply to express the great pleasure which I in common with all the people of this central portion of the State have in welcoming to our midst our brother fruit-growers of California, and in thanking you most cordially for the great honor you have done us in again selecting our town for the holding of your Convention.

While it is always permissible to snatch some pleasures by the way as we fly through life in this supremely strenuous country, now fairly well known as the United States of America, we would not be true to our environment, and to the spirit of our institutions, if we failed to put duty and our material interests before pleasure. I must therefore beg your indulgence and pardon if in the little I have to say on my subject I use arguments and expressions which may not sound entirely pleasant or agreeable. My apology and excuse is that in so doing I may prove much more your real friend than if I adopted a more complimentary line.

We fruit-growers of California have been accustomed for so many years to be praised for our thoroughness in the cultivation and general management of our orchards and vineyards, for the intelligence and skill displayed in the selection of varieties of fruits and in the combating of insect pests, for the broad-minded and masterful enterprise shown in the rapid development of our industry, and for the great success achieved in the quality of our products, that perhaps we may be in a measure pardoned for sitting still and purring gently while our fur is being stroked the right way.

But I want to ask you whether there is not ground for a strong suspicion that we are really the receivers of goods that, strictly speaking, do not belong to us? We are being praised for our enterprise, our business sagacity, and, in a word, for our success in life. Now, I contend that efforts which are only half successful are not entitled to the crown of praise and the laurel wreath. In other words, that although we may produce perfect fruit in large quantities and at a minimum of cost, still if we do not provide for the marketing of that fruit so that it shall yield to us a reasonable profit every year on our investment of capital and labor, we have not reached the goal, we are not victors in the essential thing for which we are struggling, and, therefore, we practically are failures.

It has always been a mystery to me that men who in other respects show so much intelligence as do farmers, and especially fruit-growers, are as a class so utterly lacking in capacity when called upon to deal with commercial affairs. I use the term lacking in capacity in a comparative sense, and to show you how much I am justified in doing so I ask you if you have not had object lessons in the value of co-operation sufficient to convince and convert even the most primitive intelligence? Can you name five per cent of the things you pay out your money for in these days for which you are not forced to pay a greatly increased price through the leverage of co-operation or combination? From the great financial trusts, the great railway corporation combinations, through nearly every manufacturing interest in the world, down through all combinations of mechanics, miners, and other skilled and unskilled labor, even to the thousands of Italians who with pick and shovel are digging subways in New York, who can not speak a word of English, are in a foreign country, and have but quite recently left work in their own country that paid them but 30 to 40 cents a day and yet who here insist upon getting \$2.00 to \$2.50 a day—all, all can combine, and will, when necessary, starve themselves and their families in their determination to succeed, but the intelligent growers of cured fruits find it impossible to make even a half-way creditable effort to do so. Is this not true? And if it is true, is it not cause for the blush of shame to cover the face of every one of us?

Among the cured-fruit producers we have an association of raisin-growers which is only partially successful and has been kept alive from year to year only by a miracle, because so many of them in their blind selfishness seek to gain a little advantage over their more enlightened neighbors by staying on the outside.

We have had weak and half-hearted efforts to organize the producers of cured peaches, apricots, and pears, but with no success.

As to the effort to organize the prune-growers, you all know about that miserable failure. And yet while the prune-growers are this season making a desperate effort in a detached way to force up the price of prunes to a 3 or 3½ cents basis, every man familiar with market conditions, and the absolute fruit famine this year all over the world, knows that if the growers were united in a marketing organization they could get 4 cents easier than they are getting 2½ cents now. In France the prune-growers are getting three times the price the California growers are getting, and for no better fruit, in fact not as good as ours. In Hungary some weeks ago some of the prune-growers not knowing the situation sold at a low figure, others found out about the scarcity and at once raised the price 100 per cent, while those who sold early almost created a riot because the government officials were slow in issuing their crop bulletins. Pray God that we may develop some of that spirit here in California.

Is it possible that we, the cured-fruit producers of California, will go on making a shameful exhibition of our incapacity in the face of the business world, and with such a phenomenal opportunity to win a fortune for each and all of us as we have had this season?

As to methods of organization, resourceful men should be able to devise half a dozen different methods, any one of which would bring success.

If the plan of the raisin association is not adapted to the larger needs of the producers of prunes, peaches, and apricots, or if through the mismanagement of the board of directors of the prune association that plan is discredited, why not take as an eminently successful model the best of the labor organizations? Create local centers of organization all over the State where deliveries are to be made, and let the packing of the fruit be done by those who produce it. These local organizations to create a central board of delegates, which, through inspectors, shall enforce a uniform standard of packing that shall command the confidence of the trade and create a valuable trade-mark. This central board to have the sole control of prices and the distribution of the fruit. The proceeds from sales to be sent in lump sums to the various local organizations, to be by them paid out to the farmers.

This need not interfere in any manner with the sale of the fruit through the present established channels of trade. It simply reserves the packing and—a very important point—retains the possession of the fruit in the hands of the growers until paid for.

Allow me to make one more suggestion, which is this: If the growers are to have a reasonable hope of creating a marketing medium that will be really and entirely successful, it will be absolutely necessary for them to rise above the penny wise and pound foolish practice of employing boys to do men's work, of employing so-called cheap men who invariably prove a costly and unprofitable investment, of skimping in the salary, thereby reaping loss and disaster through incompetent service. I think you will all recognize Mr. Carnegie as a pretty good model of a successful business man. It is well known that he made it a rule of his business career to employ as his assistants the very best and most skillful men in the iron industry, and that he paid them liberally is evidenced in the large fortunes of Mr. Frick, Mr. Schwab, and others. You have heard of the great Krupp Iron Works of Germany, the largest and most successful in Europe. It is evident from the character of the German navy and of the German Atlantic passenger ships that the Krupp Works have skillful workmen. It is known that the German system of education is the most thorough in the world. And yet it is a fact recently noted that this company, by the offer of much larger salaries, enticed away some of Carnegie's best men.

Do you think they would do this if they did not believe that it pays

well to employ brains? If you will pardon me I will dwell a little longer on this point, because the employment of incompetent men is the rock that has shipwrecked many a farmer's organization.

Many of you may have heard of Mr. Pulitzer, the owner of the New York "World." He bought that paper at a comparatively low price when it was very much run down. Being a newspaper man he knew who the best men in the profession were, and by the offer of greatly increased salaries secured their services, built up the reputation of the paper, and made millions of dollars out of the investment. Another example is the New York "Herald," which is the greatest money-making paper in the world, and it has been made so by the Bennetts, father and son, by wise and liberal management. The controller of this paper hesitates at no cost however great to get important news in advance of competitors.

To take an illustration nearer home. We have a raisin association which handles over 40,000 tons of raisins a year. In my judgment a thoroughly skillful manager, if supported by the growers, could so handle that crop any year as to net the growers 5 cents a pound for their raisins. Last year we obtained $3\frac{7}{8}$ cents a pound. This year I fear the net result will not be 3 cents. The difference between 5 cents and 3 cents is \$1,600,000 in one season.

Will any man contend that it would not be a good investment to pay an expert manager \$25,000, \$50,000, even \$100,000 a year, if you could not secure his services for less, to save that enormous sum of money? Apply this to your prune crop, and it will show even larger figures.

Bear in mind that I insist that the man must have undoubted ability and be worth the money. I claim, therefore, that the right man as manager should be sought for all over the country, that you should if possible secure the most successful and skillful man in the trade, even if you have to buy out his business with him, and if he will not consent then you should make every effort to get the next in ability—and when you have got him don't dream of telling him what to do. On the contrary, support him in all his plans until he proves a failure. If, as has heretofore been shown by your votes, you all think yourselves competent to handle this business, then we must have a bonanza of business ability worth more than all our gold mines.

No self-respecting man, or body of men, can say that because of failure once, twice, or a dozen times they need not try again. I hope, therefore, that on this day and by this Convention a movement will be started that will redeem our characters as intelligent and enterprising men, and through its resultant prosperity our fruit-growers will add their quota to the renown of this glorious State—California.

POSSIBLE AND IMPOSSIBLE CO-OPERATION.

BY A. R. SPRAGUE, OF SACRAMENTO.

This day marks a critical period in the development of California. Her progress must be slow unless conditions justify the expansion of her orchard industries. No other form of development will so rapidly draw hither those people of the East who form the most desirable citizens. No other industry permits a subdivision of land which can secure a dense rural population. Cattle ranges were cut up into vast wheat farms, and these in turn must be cut up into small ranches fitted for mixed husbandry, in which the culture of fruit should be an important part, but owing to the disorganized condition of the dried fruit industry the limit of wise expansion in fruit planting is but just ahead. I believe this is so evident to this Convention as to need no discussion. If this is a fact, it is a most important fact to every citizen, whether orchardist, manufacturer, banker, or merchant, and it should command their most serious consideration.

In this brief paper I must regard as fully established such propositions as have been steadily before the people for several years past and have never been publicly controverted. Most prominent among these is that co-operation among California fruit-growers is absolutely necessary to the steady success of the industry. Such co-operation is, as yet, very limited in its scope, and covers but a small part of the whole field.

What, then, can be done to extend its influence? is the all-absorbing question which I shall seek to discuss.

In my judgment the chief obstacle is the prejudice against every form of co-operation, caused by the failure of the great California Cured Fruit Association. This antagonism would be justified were that the only method of co-operating that has been tested in California, but it is not.

A form of organization is but a piece of machinery by which we seek to accomplish a certain work. Most farmers have, at some time in their experience, purchased a machine which would not work well. Did they, therefore, forswear the use of any sort of machine designed for such work? By no means; they were instructed by their mistaken purchase and used greater care before again purchasing; they were careful to find out if any other machine had been thoroughly successful in performing similar work. Exactly such should be their attitude in reference to co-operation.

Examine with me the only two methods of co-operation that have yet been extensively tested in California. The one method is that of the Cured Fruit or Prune Association and also of the Raisin Association. The fundamental principles of this form of organization are two, viz:

First, it is a great democracy; all growers in this great State who

are members must gather in the vast assembly that shall direct its affairs.

Greece fell a prey to the barbarian hordes, because not yet had been developed the idea of representative democracy which would enable her various cities to unite in making laws and provide for their administration.

This developed form of political co-operation reached its highest efficiency in our own city, county, state, and national governments—a truly representative democracy.

The difficulty of securing a quorum with a membership so widely scattered has been a most serious cause of weakness. Add to this the fact that in the various widely separated groups of growers there are no organic influences at work to promote harmony of feeling and of action, and there is no way for such groups to participate in the direction of the work save at the great yearly assembly—the annual meeting. There is, therefore, no feeling of direct responsibility for the conduct of affairs. This is a serious element of weakness. These conditions naturally give rise to the question of the permanence of the organization—a doubt most injurious to the influence of the organization among Eastern buyers, which is emphasized by the struggle necessary to secure the renewal of contracts after their expiration.

The second fundamental characteristic of this form of co-operation is that it early establishes a price for its products, which it pledges itself to maintain throughout the season. It is a negative attitude, "We will not sell except at our price." A fine bluff, which has failed more often than it has succeeded. Unless nearly the whole product is controlled by such a combination its efforts to maintain a minimum price must necessarily fail. Success is chiefly dependent upon the confidence which the organization inspires in the Eastern buyers. This once lost is hard to restore. It is now lost. When, therefore, the grower has lost confidence in this method of organization, and the Eastern trade is also in the same state of mind, it would seem wise to cease to look to this form of organization for future co-operative work in California.

The other method, that of representative democracy, meets our industrial as well as our political needs. It has a record of continuous success. For fifty-nine years Rochdale co-operation has steadily advanced in England until it is by far the most potent commercial force in England. In this country, too, wherever the method has been adopted in full—that is, where the local organizations have centralized in a buying agency—it has succeeded. The same form of organization has an unbroken record of success in the fruit exchanges of California.

The Southern California Fruit Exchange was the first to demonstrate the value of this method of co-operation among citrus fruit-growers. From a small beginning they grew into a business of \$7,000,000 per year, and then to secure more complete efficiency they arranged to

co-operate with their rivals, the packers, under agreements completely protecting their constituents and yet dealing so fairly with these rival interests that their second season finds the California Fruit Agency more harmonious and stronger than ever.

Equal success has attended the same method as worked out in the California Fruit Exchange in deciduous fruits at the north during the first three years of its organization. Its steady success in showing its patrons the benefits of co-operation has led to a rapid growth. This winter it is marketing dried fruit from Santa Clara County, and next year it will be operating in southern California as well.

Here, then, is a piece of machinery fully tried, and always successful in proportion to the extent of its use; easily adapted to meet the special needs of any industry and to unite in any reasonable and just manner with any other permanent factors in its field of work. This is possible co-operation.

The formation of local associations, exclusively of fruit-growers, is the first necessity; the function of these being to get fruit ready for shipment in car lots, and to unite in a general agency for marketing the same. When such an organization is sufficiently complete it may unite for the accomplishment of common purposes even with opposing interests, as in the case of the California Fruit Agency and the Southern California Fruit Exchange in the south, and the California Fruit Distributors and the California Fruit Exchange in the north. Doubtless greater efficiency could be had if all fruit-growers would unite in a growers' organization, but they will not, and hence that idea is of impossible co-operation. Many growers will continue, for one reason or another, to remain outside of any such co-operative work. Why not recognize this and make the best of it? Something must be conceded by each before men can co-operate. Since a large fraction of the growers will not co-operate, their business necessarily goes to the commercial packers and shippers. These, then, are a necessary part of any fully effective co-operative plan. They must, therefore, be conceded a profit large enough to hold them loyal to the general plan.

Since these packers and shippers are buyers, their interest in the selling market is the same as that of the grower; that is, they desire to get as much as possible for their product. Since such an alliance is purely to secure a steady and profitable market, it is entirely homogeneous; but these packers and shippers as buyers naturally wish to buy as cheaply as possible and the grower desires to sell for the highest obtainable price. Co-operative selling tends to sustain prices, and is therefore opposed to the interests of shippers and packers who wish to speculate. At this point the latter must give way in return for a reasonable basis of profit conceded by the allied growers; but their speculative profit is uncertain and they could well afford to forego this to

some extent, if they could be assured of a regular but moderate commercial profit. Thus a basis of agreement between these previously antagonistic elements could be arranged in each branch of our California fruit industries. Already the California Fruit Agency, operating in citrus fruits, is demonstrating the general method to be pursued.

First must be secured a growers' co-operative organization based upon local associations, centralized, which might include local packers who ask only a packer's profit. This might be strong enough to operate as an independent organization. Then this organization and the chief commercial packers and shippers can find a basis of agreement by which all may profit in securing the efficient marketing of their products. Their methods will, of course, be such as the California Fruit Agency now uses and which every other thoroughly successful commercial combination adopts, viz: their own paid agents, properly supervised. Though naturally antagonistic, the factors of such co-operative organization will keep their mutual agreements, because it is bad business not to do so.

The California Fruit Distributors as yet comes far short of the high efficiency desired, not because of antagonism, but because its members have not yet been willing to make such concessions as will enable it to efficiently organize its marketing agencies. Undoubtedly, however, it will develop in these lines as the need becomes more imperative.

The dried fruit interest is almost entirely without organization. The need is here most urgent, and no citizen can afford to be indifferent to it.

The Raisin Association needs re-organizing, to give it greater permanence and efficiency.

The olive and honey interests also may well adopt the same plans.

The several fruit interests may thus be co-operatively organized, and then act together in sustaining, in the consuming centers of this country and Europe, the most efficient and complete agencies for distribution and sale of their various products that ever were established.

These interests will thus be able to bring to bear a vast influence wherever necessary, either in securing more favorable conditions in transportation, or in increasing the consumption of coast products by means of advertising or in any other manner. Because they would make fruit-growing permanently profitable, they would outclass all promotion committees for bringing to our beloved State the thrifty and intelligent people of the East, who are delaying their coming only for the assurance which such co-operation would supply.

This kind of co-operation is practicable, it will pay its way, will imperil no one's living or property, may be begun at any time and almost anywhere. How long will the people of California continue indifferent to so great an opportunity?

CO-OPERATION.

BY C. D. HARVEY, OF LOOMIS.

Co-operation has been so thoroughly discussed in all its phases, not only on this present occasion, but also at former meetings, that I hesitate to accept an invitation to take part in its further consideration. When, however, I observe the different opinions and diverse conclusions of those most familiar with the subject, I am impressed with the fact that we are still reaching for conclusions which experience has not fully settled. The past history of co-operative efforts in this State has discouraged rather than encouraged us, until the very term "co-operation" repels the average grower. Defeats have outnumbered the successes in the direction of co-operative efforts, and instances of ill-advised and badly-executed plans bringing disaster into so many homes are still fresh in the memory of all our growers. In the light of past experiences, co-operation is a many-sided subject, and to different individuals and classes has varied meanings. To the five poor English weavers in the old country who laid the foundation for that colossal co-operative institution which has extended its operations over the commercial world, doing a business of hundreds of millions of dollars annually, it is a tremendous power. When, however, it is used as a false signal to entice the unsuspecting into the power of designing or selfish men, its mission is changed and its strength is measured only by the money it controls.

Co-operation is a principle, not a policy, and any co-operative movement which is not based upon principle will in the end prove a failure. Its power can not be measured by the amount of money invested, but by the spirit of the men comprising the membership and by the sound principle upon which it is based, and this will, I believe, account for much of the failure of the past and especially where success was based upon the numbers and volume of business it controlled, forgetting that great organizations were as subject to natural laws which govern trade, as the lesser ones.

The mighty Mississippi is as subject to the law of gravitation as the most insignificant creek, and when she bursts her levees and rushes over a productive and fertile country, carrying desolation and destruction in her pathway, she is only following the natural laws of her being, just as some of the gigantic co-operative organizations of the past, getting beyond the control of the growers, have devastated homes and destroyed confidence in this State. It carries within itself the seeds of its success or its destruction.

It is therefore by the failures as well as by the successes of the past that we must take our bearings for the future, and our best thought and keenest discrimination to-day should be given to this subject of co-operation.

The old highway over which co-operation has traveled in the past is strewn with the wrecks of co-operative organizations, so when I was sent into Santa Clara County a year ago to work in the organizing field for the Patrons of Husbandry, it became necessary to give thought to these matters, and I found organizations built upon sandy foundations, with a superstructure of insecurity and selfishness on the part of both officers and members. Organizations without one distinctive co-operative feature, except the name "co-operation," were used as a bait to beguile the unsuspecting growers under their baneful influence, where interest on the stockholders' capital swallowed all co-operation dividends, until the mere mention of the word "co-operation" was to the average grower what the shaking of a red flag is to an angry bull—and this was the field to which I had been assigned.

It is not my purpose, however, to criticise the failures of the past. Neither do I expect to furnish suggestions not already familiar to you, but rather to rehearse the individual experiences and personal observations gathered in the work as organizer during this period, which may furnish some material which our co-operative builders may utilize hereafter in the co-operative structure.

A play-loving boy first gave the suggestion which led to the automatic cut-off of the steam engine, so it might happen that from one outside the beaten path of co-operation and less familiar with its work, will come a suggestion which your master mechanics could put to some good use.

The field assigned me was a difficult one, owing to the distrust and lack of confidence of which I have spoken, but after a few weeks of earnest effort several organizations were effected in the thickly-settled fruit-growing districts along the west side of the Santa Clara Valley. The bringing together of those growers into neighborhood organizations, to discuss the topics of the day, markets, farm and household questions, developed a disposition for action to secure relief from outside agencies working against the growers.

Organization without co-operative action resulting therefrom is like a tree without fruit—nothing but leaves. Co-operation is the natural result of organization, so that all through these organized districts co-operative organization began to blossom.

At Mountain View an extensive brick warehouse was transformed by its magic touch into an up-to-date packing-house, supplied with all modern appliances for grading, processing, packing, and shipping. Heretofore this community had hauled its fruit a distance of twelve miles to a neighboring town for packing and shipping, and now not only the expense of the hauling is saved to this community, but the cost of grading, storing, processing, and packing, as well as the increment on something like four hundred tons of dried fruit, is disbursed

in the community where the fruit is grown, a saving amounting to over half the cost of the plant the first year.

Sunnyvale, a little burg of less than a dozen houses, surprised itself and the neighboring towns to find itself the possessor of a new up-to-date packing-house, built upon the co-operative membership plan, grading, storing, processing, packing, and shipping about three hundred tons and distributing these expenses in its own community, with a saving corresponding to that of its near neighbor, Mountain View. Cupertino also followed suit, and the seeds of co-operation are germinating all through the district—evidencing the secret power of earnest and honest work. And better than all else, confidence is being restored—that foundation of all permanent and successful co-operation.

The construction work of the organizer having been accomplished, new conditions are created which must also be provided for.

The speculating shippers, foreseeing the far-reaching effect of this movement in liberating the growers from the contracts, by a unity of action attempted to crush the movement at the very beginning. Controlling the packing-houses, the transportation companies, and the selling agents in the Eastern markets, the future of these young associations was not assuring, and when the older associations of the growers began to furnish supplies to the speculating shippers to break down prices and to close the markets, it was evident that the new associations must represent the future co-operative movement in this contest. This combination of speculating shippers with local agencies and Eastern sellers to depress prices and dominate markets, drew the dividing line between the co-operative and non-coöperative interests sharper than ever before, so that both individuals and associations were compelled to decide between co-operation and non-coöperation, regardless of the name they might assume; and by the conspiracy to establish an inadequate price for the growers' products, and to force an acceptance of that price by controlling markets and marketing agencies, these young associations were confronted with a problem which older and more experienced associations shrunk from, but with a courage born of desperation they accepted the situation and stood by their organization.

Three things were now necessary: First, a selling and distributing agency so as to reach the Eastern market; second, storage, processing, and packing facilities for such districts as were not included in these organized associations; third, money, not only to do business, but for the growers to live upon while the fruit was being marketed.

The co-operation atmosphere was so tainted with the dead and decaying bodies of the old associations that it was difficult to reorganize a selling agency in so limited a period without becoming entangled in local jealousies and local business interests or disturbing social or family ties, all of which must be duly considered at so critical a moment—

in short, all the agencies employed must be absolutely free from everything which might hamper or hinder its effectiveness.

At this time an appeal was made to the California Fruit Exchange to take charge of their shipping interests. And the helping hand extended to the call was the first co-operative assistance they received outside themselves.

Storage and packing facilities were next demanded, and the warehouse of the old California Fruit Association opened its doors to receive the growers' produce before the winter storms should force a sale to the waiting speculators. It was like the parting of the waters of the Red Sea when these growers thus escaped the speculating task masters of California.

Thus, another point was gained, and the question of finance next confronted the needy growers. This was a cold business proposition, with no sentiment to recommend its favor, but prices were depressed and the markets practically closed by the market manipulators.

A speculators' siege was begun, and storage, packing, and shipping facilities availed little to appease the immediate demands of a hungry stomach or the pressing needs of the family. No one understood this better than the besieging speculators, but they had not reckoned on the tenacious power of loyal, self-denying, co-operative associations like these.

The co-operators' appeal unlocked the iron doors of the money vaults, and the needed supplies (an advancement of one half the market value of the products as represented by the warehouse receipts) were at the command of every member.

It was a new order of things when every grower could do business in a business fashion with a business institution.

Thus, step by step, these growers with a returning confidence are throwing off the shackles and crop mortgages which have bound them to servitude, and out of the ashes of the past failures is being builded a house of refuge, into which every needy grower can come—a place of safety for him and his products.

I have thus detailed the practical workings of local organization as I have observed it. It is a system of education which lifts a community out of helplessness, and makes every individual in that community an integral part of the community, which is of tenfold more value to him and the public than the increased money value of his products.

Two things are an absolute necessity, namely: confidence and integrity on the part of growers. Given these two conditions, and no mercenary compact can stay the irresistible force of co-operation among the growers in California or elsewhere.

PRESIDENT COOPER. "The Pact," a protective organization. The Secretary has the paper and will read it. (Paper read by Secretary Isaac.)

THE PACT.

By MARTIN JONGENEEL, OF COURTLAND.

The desirability and necessity of organization among farmers and fruit-growers have been repeatedly brought before the public, and nobody now denies that this offers the only solution the farmers have to better their condition. In view of the fact that all other classes of men have formed organizations and have succeeded in deriving immense benefits therefrom, it may well cause wonder that the farmers are about the only people who have not organized. It is very true that attempts at farmers' organizations have been made in the past, but with indifferent success. As a general rule, the farmers themselves are blamed for these failures, and are accused of the lack of sticking qualities.

In several instances the intense competition between the producers has prevented them from realizing that the men opposed to them are not their neighbors who sell the same product, but the middleman, the canner, the shipper, and the commission man, who buy their products and sell them to the consumer. Every one who has lately read the San Francisco "Chronicle" is acquainted with the way the commission men have been conducting business. The people of San Francisco have been compelled to pay enormous prices for vegetables and fruit, while the farmer gets very small returns, the commission men making most of the profit.

The main trouble, as we believe, has been the difficulty of forming an organization on principles broad enough to keep the farmers together and at the same time run it in such an economical way that nobody will think that he is paying out a good deal of money and not receiving very many, if any, benefits for the same.

We take this opportunity of bringing to the notice of all farmers and fruit-growers of the State of California the existence of a farmers' organization, which was formed in May, 1903, at Courtland, Sacramento County, California, and which is known in that locality as "The Pact." We believe that "The Pact" is based on principles which may lead it to become a general pact all over the State.

At the present time "The Pact" is simply an organization for farmers on the Sacramento River to come together and talk over their conditions, to suggest methods by which they can be improved, and to act as one body whenever a concession has to be asked for from outsiders. At the present time "The Pact" has followed the policy of not engaging in any commission or buying business whatever. So far, our organization has been a small one, still we have accomplished some good results; enough to more than pay its members for the small dues, and to make us hopeful that "The Pact" is going to be a success and is going to stay with us. As an example, we will state that in former years the farmers on

the Sacramento River suffered a great loss in empty boxes, which were either not returned by the commission men or lost by the transportation companies. This year "The Pact" took up the matter with the above-named parties in San Francisco; a new system of handling the empty boxes and baskets was inaugurated, and as a result very few boxes were lost, and one grower reports that this season he is gainer by one hundred boxes. In explanation of this it may be said that these one hundred boxes were some which he had lost the year before and which had been in the hands of the commission men and jobbers for nearly a year.

Another grievance which the farmers on the Sacramento River had, was that the Southern Pacific mail boats did not leave San Francisco on schedule time; some of the subordinate officials being anxious to wait a little overtime, to take on more freight; then the United States mail, which is carried by the Southern Pacific boats, was not distributed in a manner expeditious and convenient to the farmers. "The Pact" sent a committee, which had a conference with the general manager of the Southern Pacific Company, and stated their grievances. As a result the boats now leave exactly on schedule time. At our suggestion the Southern Pacific Company took up the matter of the mail with the postal authorities, and as a result, after December 1st we are to have mail agents on the boats, who will distribute the mail from station to station. Other examples could be brought forward, but we think that these are enough to show that by standing together something can be done. As individuals the farmers would not have been able to accomplish any of the above-named results.

There are a great many questions which are of importance to all the farmers of the State; others are of a local nature. The plan which we have in mind would be to have small local sub-organizations of "The Pact" distributed throughout the State. Whenever a local question came up, it would be attended to by the local organization; questions which affected the whole State would be taken up by the head organization, which naturally would be situated in San Francisco. These local organizations would be in a position to get exact estimates of the crop reports in their different localities, and by sending these estimates to the head organization, they could be computed and the head office would then be in a position to know almost exactly how much of any particular product would be put on the market and what price should be received for the same. Thus the expense of getting this information would be nominal. This item alone would be of incalculable value to the farmers, and it is something that they have never had before.

There are now no end of abuses which are not corrected, simply because the farmers are not organized and do not enter an organized protest. Most every one knows that in the business of shipping fruit to

Eastern markets a great many things ought to be changed. Last season, and every season before it, many carloads of fruit were too long in transit, thereby spoiling the fruit by the time it reached the Eastern market. By the investigations which are now being made in the business of Porter Brothers Company is shown what is made by the shippers in the nature of rebates, and we may be sure that a very small part of the transactions will ever be known. Many of the farmers who have been shipping fruit East have known this for a long time, but have simply allowed the thing to go on, and the few individuals who have made a protest have been laughed at and ignored.

As a rule, the local organizations could do most of the business, because any reasonable demand they would make of any other organization, be it transportation companies, canners, or commission men, would be readily granted, if these organizations knew that the local organization of "The Pact" was backed by nearly all the farmers of the State of California.

Farmers and fruit-growers of the State of California, we appeal to you to give this matter your earnest thought. We are not conceited enough to think that we on the Sacramento River are the ones who have discovered a way of organizing the farmers that can not be improved upon, but we feel the dire necessity that the farmers must wake up and stand together. This accomplished, the time will have passed when the farmer will ask the buyer and consumer what it pleases them to offer him for his products; instead, he will tell them what they can buy his products for.

DISCUSSION ON CO-OPERATION.

MR. SPRAGUE. Mr. Chairman, as no one seems willing to speak I will crave your indulgence while I say a few words relative to some of the points brought up, first reviewing somewhat the last paper. I have been studying, so far as one on the outside can, the labor organizations' record for the last year, and I find that there exists a very common feeling of uneasiness among these organizations lest they are going too far, and they are looking after some other method among themselves for securing that justice which they deem they are not always getting. It is well enough to fix a price, if your price is reasonable and if you are prepared to sustain it and prepared to retain your product if the buyer refuses to take it. It is always unwise to make a "bluff" of that kind and fail, because it creates loss of confidence. Now, I believe in organizations taking on such functions as are thoroughly practicable and which can be carried through in spite of all opposition. In other words, I believe in a positive method of doing business instead of a negative method. As to the principle of fixing a

price which buyers must pay, suppose they don't choose to pay that price, what are you going to do about it? You have got to wait until they will or until some one else does. That is as far as we can now go in the progress of co-operation in California. I grant that it would be possible, with complete control of an industry, to secure a high price for a product, if the product is a necessary article of consumption and one which could not be supplied by any other section; but those conditions are almost impossible of attainment. The same results can be attained by the other method, co-operation, that resting on the local association, providing you obtain the same support. Many markets will pay a little more than some other markets and it is possible to adjust prices to the situation, for instance, to the competing foreign crop; as the season advances that condition is more clearly developed and it is possible to fix prices to meet that sort of competition. In the dried-fruit business it is absolutely essential that your system of marketing must be elastic enough to meet the competition of other fruits—the Eastern dried apple and the Eastern fresh apple in the Eastern markets. The varying crop which prevails in the Eastern fruit markets is a great factor in determining how extensive will be the consumption of California dried fruits. We are practically of one mind to know whether or not this is a workable plan, whether we can go right at it this coming season and gain a measure of success, which will be from the start far better than no organization, then advance further, step by step, steadily moving forward, until we have a fair prospect of obtaining complete success in co-operative organization. Now, my friends, that really is the system which controls all the great business organizations of this country. It is, practically, the system which my friend, Mr. Kearney, has alluded to. It is the local association centralized, the functions of the local association joined to the centralized association, formed by general representatives of the whole.

MR. KEARNEY. Mr. Chairman, I would like to say one or two words, which may help us along in this discussion. I gather from Mr. Sprague's arguments that he deems it necessary to have one form of organization for all our products. I believe, if he stops to consider the matter carefully, that he will find that it may be better to deal with the products as they are. It would be absurd, for instance, for the orange-growers or the fresh-fruit growers to organize on the same lines as the raisin-growers, for the reason that the product is totally different. Fresh fruits, oranges, and such products must be sold when they are picked, whatever the market is. Dried fruits and raisins can be carried. Consequently our organizations do not call for exactly the same principles in their management. In dealing with the different classes of fruit we may apply different principles under the general form of co-operation. In organizing the raisin-growers I was, perhaps, instrumental in getting

them to adopt a certain plan, which was to get control of the whole of the crop, to fix a reasonable price upon that crop, to assure the trade that when those prices were fixed they would not be lowered, and to carry the crop through to the next season, if possible, any portion of it that was not sold. We thought that if we could convince the trade that we would hold to whatever price we fixed, that we had control of the crop and would not allow it to go upon the market at a lower price than we named, they would buy freely, and that if they bought freely they would urge their agents and salesmen to sell, and it was the policy to name our lowest price at the beginning and to announce to the trade that we would raise the price. This was a temptation to the trade to load up largely and early in the season, and in that way we secured the services of the trade in distributing our goods. We did name the lowest prices at the beginning of our operations, we did keep our promises to maintain prices, we did raise prices the first year, and we did capture their good will, and the next year, when we raised prices nearly 100 per cent, they rushed their orders in at once and we sold our crop freely. Now, you may deal with a product like raisins in that way. As to the prune crop, I advised growers to adopt the same plan, for the same reason: to tempt the trade to buy largely at the beginning of the season. Now, when you come to deal with dried fruits, peaches, apricots, and other like products, which are produced outside of California as well as inside, where you can not get a sufficient control of the crop, where you come in competition with unknown quantities, then I agree with Mr. Sprague that you must have a more elastic plan. I therefore suggest that it is quite within our province to act on the co-operative plan and deal with the different products as the conditions require.

MR. ALLISON. The board of directors chosen by the raisin-growers of this State distributed last year in the neighborhood of \$4,000,000 to the growers of this State, and it was the largest price for the largest crop and the money was paid to the growers in the shortest time in the history of the Raisin-Growers' Association. The great trouble in co-operation is that there seems to be two or three cliques, that the "outs" will not support the "ins" for the benefit of all, and to say that the Raisin-Growers' Association has been a failure in the last years I think is not stating the fact. Last year it handled 42,000 tons out of 48,000 tons produced in the State, and it paid the growers prior to the annual election.

MR. SPRAGUE. Mr. Chairman, I believe my friend Kearney did not get quite down to a rigid analysis of the representative democracy method of co-operating. Let us see what we could accomplish and whether there are any objects which he seeks to accomplish with the other plan that could not be accomplished with this, and I affirm there are none. In the first place, there would be several local associations

dependent upon a convenient place for processing their raisins and loading them in car lots. That would determine where the local associations should be. There would be an immense association here in Fresno, unquestionably; there would be several associations in contiguous districts, in Visalia, in Hanford, in Fowler—well, you know better than I do where there would be local associations. There would be one or more great seeding institutions, to which the raisins could be sent to be processed for seeding. The central association or exchange would perform all those functions which are now performed by the Raisin Association; that is, it would have control of all those things which concern the whole field. As to selling, it would have, either alone or in conjunction with other interests, its agents in every town of importance in the United States and abroad, if raisins were sold abroad. Those agents would be men largely on salaries—some brokers, perhaps, but those brokers would be under the rigid supervision of our own paid men, paid officials, in touch with the Eastern trade all the time. The central organization would decide, after conferring with the representatives of the local associations, at what prices raisins could be put out safely, making no promises to the trade, but being judicious in the matter of prices, so far as possible taking into consideration the foreign competition, etc. Now then, if it were found that the foreign fruit could compete favorably with our fruit at the price established, so as to cause the importation of an undue amount of foreign goods, that price would have to be lowered somewhat. If it is necessary, it can be lowered under that system. By beginning with a price giving reasonable assurance that you will move the raisins, and then keeping close tab on all the markets, you will be in a position to crowd up the price a quarter of a cent, or half a cent, and the stiffening of the price will strengthen the courage of all the Eastern dealers. They will take on larger quantities of raisins. This thing can be analyzed closely enough to tell whether this plan would be successful or not. I feel very sure, indeed, that it would; that the end which you seek to attain could be accomplished with this more highly organized form, which the whole commercial world is practically working under at the present time.

At this time a recess was taken until Wednesday morning at 9:30 o'clock.

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, December 9, 1903.

The Convention was called to order at 9:30 o'clock A. M. President Cooper in the chair.

MR. MARKLEY. Mr. President, if I am in order I would like to make a report.

PRESIDENT COOPER. The program has been completed as far as we have gone excepting the paper of M. V. Hartranft and the one of Mr. Filcher. I presume that they will be here and that we will hear them this afternoon. The Governor is in Fresno, and will be here some time this morning. After his arrival we will suspend the program for a few minutes to hear anything he may wish to communicate. We will hear the report of Mr. Markley first.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The Committee on President's Address submitted the following report:

To the State Fruit-Growers' Convention:

We, your committee, to whom was referred the President's address, respectfully submit the following report:

We urge all persons interested in fruit-growing and irrigation to carefully consider and digest this able document. We consider it important that the standing Committee on Legislation place in the hands of each member of the next Legislature, just after the election, a copy of the same, urging the Legislature to take proper action upon the recommendations therein contained.

We extend the thanks of the fruit-growers of the State to our President for these annual addresses, and for his constant efforts in their behalf.

JOHN MARKLEY,
W. R. McINTOSH,
A. N. JUDD,
GEORGE L. HUNT,
EDWARD BERWICK,

Committee on Address of the President of the State Fruit
Growers' Convention, Fresno, December 9, 1903.

THE CALIFORNIA VINE DISEASE.

By PROF. NEWTON B. PIERCE, OF SANTA ANA.

The disease about which I have written has been pretty thoroughly worked out in some respects, as to its general characteristics, so I will make only a brief review of the present conditions in the State.

Since the first appearance of the California vine disease in the vineyards at Anaheim, California, in 1884-85, it has never entirely ceased its ravages in the affected districts. Its spread through southern California was very rapid, so that within five years from its first appear-

ance it had ruined at least twenty-five thousand acres of vines in what are now the counties of Orange, Los Angeles, San Bernardino, Riverside, and San Diego. This involved a direct and indirect loss of not less than \$30,000,000.

About five years later, in 1889-90, the same disease broke out in the upper end of the Sacramento Valley, and old Mission vineyards both east and west of the Sacramento River, in Tehama County, died in a single season. Since that date extensive vineyards have been killed in Tehama, Butte, Colusa, Yuba, and Sutter counties, and many others have been practically ruined. Probably five thousand acres of vines have been destroyed in that section of the State since the date named.

A third extensive viticultural center has more recently become affected by the same disease. About 1898-99 the great vineyards of the Santa Clara Valley began to fail in a manner similar to those of southern California and those of Tehama County. The death of vines in the Santa Clara Valley has been rapid over large areas, while toward the east side of the valley and among the Santa Cruz Mountains at the west the destruction has been slower and is still progressing. The affected district includes portions of the counties of San Mateo, Santa Clara, Santa Cruz, and Alameda. It is probable that the loss will amount to ten thousand acres of vines in this district, as nearly or quite that acreage is already affected.

We have then, in general summary, a destruction of forty thousand acres of vines by this disease in the course of the past twenty years—1884 to 1904—and a direct and indirect financial loss to the State and country from this cause of probably not less than \$40,000,000.

In both southern California and the upper end of the Sacramento Valley the California vine disease has destroyed the vineyards wholly independent of the action of phylloxera, which pest, so far as known at present, does not exist in either district. In the Santa Clara Valley, however, phylloxera has been present for some years, so that both diseases must be taken into account in considering the effects in that locality.

A broad study of the appearance and development of the California vine disease in the three great viticultural districts now affected, reveals certain prominent facts that should be noted by those interested in vine growing:

(1) The disease is more apt to develop in a region where the vines have been weakened by some cause—such as the injury of the root system by drought or excessive moisture, or by sudden changes from one to the other.

(2) The disease when once established in an epidemic form remains in the affected region in an active state, destroying new vineyards set

from healthy cuttings and showing all of the characteristics of a generally distributed parasitic malady.

(3) There are striking differences, in the susceptibility to this disease, of different varieties and species of grapes, although in the heat of a first epidemic many varieties will die more rapidly or more generally than after the height of the epidemic has passed.

We gather from these general observations certain guiding facts: (a) Vineyards in unaffected districts should be carefully guarded against all weakening influences, as a radical change of moisture conditions, for the prevention of disease is always better than cure; (b) When the disease obtains a foothold its presence should not be ignored, but its effects should be carefully studied with a view of determining the comparative resistance of the varieties and species of grapes already growing in the district; (c) In replanting, only the hardier types should be selected, and in case these vines are unsatisfactory in fruiting qualities the hardiest known root should be planted and top-grafted with the most resistant variety producing the type of fruit required.

At present the vine most resistant to the California vine disease and which is believed by most growers to be of *Vitis vinifera* origin, although this is still an open question, is the Lenoir. Upon its own roots this vine is almost completely resistant, and this is especially true of vines set after the heat of the first epidemic has passed. The raisin grape showing the greatest hardiness is the Malaga. One of the hardest table grapes is the Tokay. Some of the more resistant wine grapes are the Feher Zagos, Black Malvoisie, Grenache, and Herbemont.

The Lenoir vine has shown such great resistance to the disease that experiments were inaugurated by the United States Department of Agriculture to ascertain its value as a root upon which to graft the more susceptible varieties. Nearly four hundred acres of Lenoir vines have been planted and grafted to other varieties during the past seven or eight years, the work being done by leading viticulturists. The evidence to date is that the Lenoir root greatly aids a more susceptible top variety in resisting the disease, and in case the top graft is of a somewhat hardy variety the combined resistance has thus far proven satisfactory from the commercial standpoint. This work is still in progress, but it is believed that the results already obtained warrant the presentation of these facts to the growers.

A concluding word relative to the nature of resistance may not be inappropriate. Vines which are resistant to phylloxera are not of necessity those which are free from that insect, but they are vines sufficiently hardy to withstand its attacks and still permit of successful viticulture. This is equally true respecting resistance of root and top in the presence of the California vine disease. The disease affects even

the hardiest varieties, although they show various degrees of resistance to its action. Hence, as already stated, the most resistant top should be placed upon the hardiest known root in grafting against the malady.

PROF. PIERCE. I would like to call attention to one thing which I have not mentioned in my paper, and as this is, to some extent, a meeting of Fresno growers, it ought to be spoken of. Something has weakened many of the vineyards about Fresno. Many vines lost their leaves last fall much earlier than they should have lost them. It is apparently not a local cause, but quite general. I looked over this field some weeks ago, and the only thing that I can fix upon as general enough to be responsible for the appearances noted is the lowering of the water-table. Colonel Forsyth has called my attention to that condition, and other leading growers agree with him in respect to the lowering of the water-table, and I believe that the vineyards of this region have been materially weakened in the last year or two, probably within the last year largely, through that cause. This section of the valley has been very well filled with water for several years back, and the vines have established a surface habit of growth, and now that the water-table has been lowered they have suffered, in my opinion at least. This seems to me to be the only plausible explanation. This may not result in widespread death of vines, but it has a weakening influence which prepares your vineyards for an attack of a very serious disease, the one about which we have been reading. The vines here at Fresno are now in a condition where, if the cause of that disease should be introduced, you might lose your vineyards generally, so that I would caution the growers to try and bring back the old conditions, to a reasonable extent, as carefully as possible; do not overdo it, do not bring the water up too soon, but bring it back somewhere near the original level, if possible, and in the future be as careful as may be that this condition is not repeated, because in southern California, in the Sacramento Valley, and in the Santa Clara Valley the weakening of the vineyards preceded this epidemic disease which has stripped those regions of vines. This is simply a caution. I don't believe that you have the disease here at present, and I will give you one of my reasons for so believing. The Lenoir vines growing out east of town are affected as much as other vines with the trouble, and I know, from my extended observations throughout the State where this California vine disease prevails, that that variety is almost absolutely resistant, so that you have something else troubling your vines. If it is not the lowering of the water-table I can not explain it. Just how low the ground water should be I think depends on the habits of your vines.

MR. KNOX. You speak of the lowering of the water-table here. I know that in the majority of places around here it has been thirty

inches from the surface of the ground. Now, I would like to know if that is too high or too low ?

PROF. PIERCE. Well, you can establish a habit of growth to suit yourself. If you keep your ground dry you will have a deep-rooted vine; but if the vine has a root system well established close to the surface, to lower the water-table so that you have a space of dry ground beneath the roots is injurious, and you are liable to lose the leaves, and in some cases the vine, from that cause.

MR. KNOX. About the first of March the water was up to within about thirty inches of the surface of the ground, then it began to lower, and in the first part of August it was down four feet; the first part of September it was down six feet, and at present it is nearly twelve feet.

PROF. PIERCE. Yes, sir; and I think that is what injured your vineyards.

MR. KNOX. Wouldn't it be much better if there could be installed a system of drainage that would keep the water-level down to about five or six feet?

PROF. PIERCE. I think so, decidedly, provided your vines were established that way in the first place; but to make a change you lower the water-table more rapidly than the vine can follow it, and when you do that your vine dries out and it is bound to have a weakening influence. Transpiration will cease and the leaves will fall.

MR. KNOX. Isn't it the trouble right now, that we have the high ground water at a certain time of year and then the ground water drops just when the vines need that moisture?

PROF. PIERCE. Well, you are under a system of irrigation, and that should be controlled in such manner as to keep the water within reach of the vines. You used to maintain the water level very high here, and I thought it would be a better thing for the vines if the ground water could be kept down to about five feet. Whether the roots of your vines would go down to that depth depends on whether you lower the water too fast. If you do, they couldn't follow. If you keep it so as to gradually lead those roots down you will have a different root system in time, but the trouble is to do that.

MR. FIDEL. I should like to ask the Professor if he ever noted an improvement in the condition of vines which have suffered from this disease ?

PROF. PIERCE. Oh, yes. It is a common thing for vines to be stripped of leaves in the fall and to come out again apparently fresh in the spring.

MR. FIDEL. We have had vines affected for a year or two, and some seemed to die rather suddenly and some seemed to keep on growing, in a half-hearted way, but they do not die.

PROF. PIERCE. Where are you from ?

MR. FIDEL. The Santa Cruz Mountains. It does not seem to spread around the originally infected vines. It seems to jump.

PROF. PIERCE. Yes, the California vine disease seems to strike a vineyard in a sporadic manner, without any regularity. It does not spread the way phylloxera does, but the action of that disease has been so thoroughly described in publications that I have omitted describing it in this case. I did not think it necessary. There are a number of fungous diseases which cause vines to die. We have one that is a native of this country, and one that has been introduced from France, but which has not become widely distributed as yet. The native disease is common, but I do not find many vines suffering from it. A great many fruit trees have died from it. It is a parasitic fungus, that is, the kind I am speaking of. Of course vines die from a great many causes, but the parasitic fungus causes the roots to rot. It is liable to spread and is usually found on old oak trees when you dig them out, and if you put in vines it will kill them off. It spreads from one vine to the other just the same as the phylloxera.

MR. McINTOSH. Has any progress been made in southern California in replanting vineyards after they have been killed by the Anaheim disease?

PROF. PIERCE. Very little. In the southern part of the State a few growers have planted Lenoir vines. Those vines are all right, and some of the other more resistant types are in pretty good condition at present, but most of the vines which they have planted have been of weak stock and nearly all of them have succumbed to the disease, in some cases the third and fourth planting.

THE RAISIN OUTLOOK.

By T. C. WHITE, OF FRESNO.

The raisin outlook, as it appears to me, is anything but encouraging to the raisin-growers of California, for two reasons: (1) There are from ten to twenty per cent of the growers who are not members of the California Raisin-Growers' Association; and, (2) There is an apparent overproduction, which seems to be increasing from year to year, as newly planted vineyards come into bearing.

The first reason is, perhaps, the most serious, for if the growers were all members of the Association the second reason would to a large extent be obviated. If all of the growers were in the Association, so that we could present a solid front to the trade, set a fair and reasonable price upon our product, supply the consumptive demand with as many goods as it requires, and, should there be a surplus, dispose of it to the distilleries and for other purposes at highest obtainable prices, the loss prorated among all of the growers would be a mere bagatelle and the net

result would be satisfactory. But, alas! the "outside" growers are among us, and they seem to be here to stay. The "outside" grower is practically the only drawback to the successful operation of the Association, and, from my observations, it is the outsider who is the menace to the successful operation of co-operative organizations wherever these associations have been attempted. To attempt to run an organization of producers with from ten to twenty per cent on the outside, is like a man trying to swim with a millstone around his neck.

There has been an overproduction of raisins at different times during the history of that industry, but at no time has the supply and the demand been so far apart as they seem to be at the present time. In 1881 to 1883, there was an overproduction for the reason that our market did not extend east of the Sierra Nevada Mountains; but by persistent advertising and by forwarding samples, etc., the trade in the East was made to realize that the California product was fully equal to the Spanish article, our market was extended, and the overproduction vanished like chaff before the wind-storm. As prices were improved by the opening of the Eastern market, planting again revived and raisin-growers prospered until 1893-94, when again the supply was more than equal to the demand. This condition of things, in conjunction with the financial panic which swept over the entire face of the globe, was the means of depressing prices to the extent that growers were compelled to sell their crops for less than the cost of production. This state of affairs continued until the California Raisin-Growers' Association was organized, which was in 1898. From that time to date (with the exception of one year) growers have prospered; but during this period, planting has been more extensive than ever, and to-day we are confronted with an overproduction which is more serious than ever, and the only solution of the problem, as I see it, is either to seek foreign markets for the surplus or to induce every grower in California to join the Association.

To attempt to compete with the foreign article in foreign markets, with the enormous difference in the cost of labor against us and with freights and import duties to pay, would be like attempting to make water run up hill; yet it would be possible to dispose of our surplus in this way if there were no outside growers to contend with; but the outsiders (being from ten to twenty per cent of the whole) as the crop increases in quantity will soon have enough raisins to supply the early market, and if the Association would hold the umbrella for them until they have sold out, this condition of things would have a tendency to increase the number of outsiders, and the result would be that we would have no association, and consequently no price.

The Raisin-Growers' Association has done a great work in extending our markets, and by advertising in different ways has made some progress

in increasing consumption. The seeding of raisins has also done much to stimulate the use of raisins as a food product. We have supplied small sample boxes of seeded raisins to numerous expositions, conventions, and the like, for free distribution. In addition to this, the Association has distributed broadcast, in packages of seeded raisins and otherwise, recipes for the use of seeded raisins as an article of food; yet, while the consumption is increasing to some extent, it does not seem to keep pace with the production.

Assuming that the old adage, "The supply and the demand will regulate the price," is correct, and admitting that the supply is fully equal to the demand, were it not for the Raisin-Growers' Association sustaining prices the growers would be in competition with one another, and it is safe to predict that prices would be not much above the cost of production.

Let us then discourage further planting until such time as we can see our way clear to dispose of the present output, or at least until such time as the Association shall represent the entire acreage of California under its control.

As I have said, at different times during the history of this industry we have had serious overproduction, for different reasons, but this time it would seem as though we had gotten pretty near to the end of our rope. I have suggested a remedy, and if that remedy is adopted I believe it to be a solution, and the only solution, of this problem, and that is to induce practically every grower in the State of California to join either the Fresno Raisin-Growers' Association or a similar association, or some sort of association as suggested by my friend Mr. Sprague last evening. We should adopt the best plan, whatever it may be, in order that the entire industry should be under the control of some association with power and influence. Whenever the supply more than equals the demand, as I have said, then the price is bound to be reduced to the minimum. Now we all know, I presume, that the orange-growers, the growers of deciduous fruits, and all the fruit-growers of California are experiencing this very thing, are facing overproduction. Now, what are you going to do about it? My judgment is that the right thing to do is to encourage co-operation among the growers, to promote the organization of small co-operative associations, wherever they can be organized. Let the members induce all their neighbors to join, and then go into a central organization; have all the fruit industries of California go into some organization of co-operative companies, and then have, as the workingmen do, a federation of all those co-operative companies, and all unite in building up these industries in different ways and in sustaining prices. For four years prior to the organization of the California Raisin-Growers' Association the raisin-growers of this country were selling raisins for less than the cost of production.

There is no question about that. The average price received did not exceed $1\frac{1}{2}$ cents per pound in the sweat-box, and any raisin-grower within the sound of my voice will testify that raisins can not be produced for less than $1\frac{1}{2}$ cents per pound. The Raisin-Growers' Association was organized in 1898. The first year was an experiment. Some attempts had been made before, all of which were failures. Co-operative companies were organized all over the country, fifteen or twenty of them, and a central organization was formed for the purpose of marketing; but the commercial packer was on the ground, and the commission man was with us, offering cash in the sweat-box. Cash for raisins in the sweat-box is a very forcible argument, and the commercial packer got the best of it. Up to the time the Raisin-Growers' Association was organized, these little co-operative companies had gradually decreased in power and in number and they commenced to go out of existence, and finally when the Raisin-Growers' Association was formed they were taken in as a part of that Association, and in 1898 the first result of the Association was that the grower received 3 cents per pound in the sweat-box for his product, which was double the amount he had received during each of the preceding four years. We regarded that as a pretty good start, so it was decided to continue the next year. The result was that the grower received 4 cents per pound, and he has received 4 cents per pound ever since the Association has been organized, excepting the first year, as I have stated, and one other year, which was 1901, when he received a little less than 3 cents a pound. The present year there has been something said as to whether or not the Association will succeed as it has in former years. We have gone only two or three months into the season's business, and I will say that up to date the demand for raisins has been almost as great as in any other season up to a corresponding date during the history of the Association. We have already paid to the growers from the actual sales of raisins—not from any money borrowed or anything of the kind—\$2,000,000. We have on hand about \$2,500,000 worth of raisins which are equal in quality to any the State has ever produced, and in all probability we will distribute among the growers over \$2,000,000 more by the time that product has been disposed of. Sales have not been, perhaps, as extensive up to this time as they were last year, but conditions are different. The financial condition in the East is such that buyers are not purchasing for speculation, nor are the jobbers loading with stocks of goods, and I presume that the prune-growers, the orange-growers, the growers of deciduous fruits, the salmon canners, and the canned-fruit dealers are all experiencing the same condition of things. There is no speculative demand. It is simply a demand for immediate consumption. In my judgment the Raisin-Growers' Association was never in better condition than it is now. We

have the largest crop of raisins the State has ever produced, by more than 5,000,000 pounds. Last year we produced the next largest crop, 106,000,000 pounds, and this year it is estimated—and we can make a very close estimate at this time—that we will have 110,000,000 pounds of raisins to dispose of before the end of the season. The beginning of the raisin business in California was in 1873, and that year only 120,000 pounds of raisins were produced. The consumption of raisins in the United States is practically the same as it has always been in proportion to population, but when the production was small the balance of the requirements for consumption was met by importations from Spain. We have imported from 30,000,000 to 40,000,000 or 50,000,000 pounds per annum. The average consumption of raisins by the American people is not much more than one pound per capita. Now that we have eighty millions of people in the United States, the demand for consumption is about 80,000,000 pounds of raisins per annum, whether we produce them or whether they are imported. Now, if we are already producing 110,000,000 pounds, isn't it safe to predict that we are producing raisins enough to supply the demand, and isn't it right and proper to discourage further planting until we can see our way clear to dispose of the present production?

PRESIDENT COOPER. I have been told that the Governor is present. If so, will he please come forward?

The coming spring will mark a period of twenty-four years since the horticultural law was created. In the first year we shipped one carload of fruit across the continent. Last year we shipped about 50,000 cars. The bulk of the increase does not extend back more than twenty years, showing that the increased exportation from California across the continent is about 2,500 cars per year. Calculating, therefore, the continuance of such increase for twenty years more, we will, at the end of that time, probably ship 100,000 cars of fruit. I saw it stated in the "Fruit World" that, including the vegetables exported, there will be 77,500 cars shipped this year, so that we can fairly calculate that in twenty years more we will ship across the continent more than 150,000 cars of fruit and vegetables. Last year the transportation companies were paid a little over \$19,000,000 for the transportation of fruit, so that when, in the near future, we ship 150,000 cars of fruit and vegetables, we will have to pay about \$50,000,000 to the transportation companies annually, and one would suppose that those companies would be very keen to get that money. During this period of increase we have overcome many difficulties, but we have still greater difficulties to overcome. There has been no time in the history of fruit-growing in California when advice and wise counsel were more needed than at present. Three times during these years—this is the Twenty-ninth Fruit-Growers'

Convention since I became President of the first Board of Horticulture—we have been honored by the presence of the Chief Executive of the State. It does me great pleasure to introduce to you this morning Dr. George C. Pardee, Governor of California.

ADDRESS BY GOVERNOR GEORGE C. PARDEE.

The chairman of this meeting, who is also Horticultural Commissioner of this State, has been good enough at various times to come into my office at the State Capitol and endeavor to discuss with me matters which are of the greatest importance to you and therefore to this State. I say "endeavor to discuss," for the reason that the discussion is altogether one-sided, I knowing very little or nothing of the matter, and he being, as it were, a past master in the art; but I find that there are various matters and various problems which should receive, and will receive, that due attention from the people of this State and from the government of this State which their magnitude deserves. The question of transportation seems to me, as far as one can judge who is so far outside the pale as I, to be of the utmost importance to you. We have now traversing the State two great railroad systems, both clogged, each utterly unable to take care of the business which California now offers them. Instead of taking your products and the products of your brethren in this horticultural business quickly to the markets where you desire them to go, a length of time for that purpose is required that practically takes from them the value that should be yours. The question of pests upon your vines and fruit trees I assure you is one which is receiving the full attention of this State. We feel that anything which will militate in any way against the success of your endeavors and your business is doing an injury to this State, which the State itself should do everything to work against. Therefore, gentlemen of the Convention, I wish to assure you that the government of this State is alive to the difficulties of the situation that you are facing and is willing, aye, is glad, welcomes the opportunity, to do whatever lies in its power to forward your business and to make your ventures more profitable. (Applause.)

Time was, almost within the memory of him who now stands before you, when California's wealth was confined entirely to the products of her mines; when her soil was considered incapable of supplying even the wants of those who toiled to bring forth to the light of day the golden treasures that nature, working in the slow revolving lapse of countless centuries, had laid safely down in California's apparently sterile soil. Our rainless summers and our snowless winters were not regarded as favoring the art of the husbandman by those who early came to California's far-off land, lured by the tales of our El Dorado just discovered. Even Webster, one of the greatest men this nation

ever had, looked upon California as not worth the having. And it is a curious thing to read in his great speech on "The Objects of the Mexican War," delivered in the Senate of the United States, when the Sixteen Million Loan Bill was under discussion, on March 23, 1848, these words in reference to what is now the great State we love so well: "And how is it with California? We propose to take California, from the forty-second degree of north latitude down to the thirty-second. We propose to take ten degrees along the coast of the Pacific. Scattered along the coast for that great distance are settlements and villages and ports; and in the rear all is wilderness and barrenness and Indian country. But if, just about San Francisco, and perhaps Monterey, emigrants enough should settle to make up one State, then the people five hundred miles off would have another State." And again, in the course of the same great speech: "I can not conceive of anything more ridiculous in itself, more absurd, and more effrontive to all sober judgment, than the cry that we are getting indemnity" (for the Mexican War) "by the acquisition of New Mexico and California. I hold they are not worth a dollar; and we pay for them vast sums of money."

And, on June 27, 1850, again addressing the Senate on the proposed admission of California as a State, Mr. Webster said: "The Senator says that the territory of California is three times greater than the average extent of the new States of the Union. * * * We all know that it has more than three times as many mountains, inaccessible and rocky hills, and sandy wastes, as are possessed by any State of the Union. But how much is there of useful land? How much that may be made to contribute to the support of man and of society? * * * I am sure that everybody has become satisfied that, although California may have a great sea-board, and a large city or two, yet that the agricultural products of the whole surface now are not, and never will be, equal to one-half part of those of the State of Illinois; no, nor yet a fourth, or perhaps a tenth part. * * * There is undoubtedly a long valley on the Sacramento and San Joaquin of tolerably good land, and there may be some good land between the coast mountains and the sea; but, on the whole, nobody will say that, in quantity of good land, or of tolerably good land, there is any excess; on the contrary, there is far less than belongs to most of the new States. * * * So small are the streams, when you depart from these two rivers, the Sacramento and the San Joaquin, that they do not supply water for the cultivation of the very small portion of the land that otherwise might be made tillable. What, then, will be the value of this territory? * * * Where is there any value in it? * * * Can it be of any use whatever?"

Is it any wonder, then, when they listened to the words of America's foremost man, prophesying the failure of any attempt to populate the land we now possess, is it any wonder, then, that those who came to

California, as did the Pioneers, to gather up the gold that called them hither, intended only to spend a few months here amid the wastes and deserts of an inhospitable territory, and then, enriched by what they found, go back to live in peace and luxury amid the torrid summers' heat and killing winters' cold that beat upon the States from whence they came? To them the summer's drought, the brown hills, the parched valleys, the dry creeks, the long months of rainless sunshine, preached eloquent sermons and corroborated the pessimistic views of him whose giant intellect o'ershadowed all who sat with him within the Nation's Senate chamber. No wonder, then, that he who sought to set the plow to California's fallow acres and scatter seed upon its barren fields was looked upon by the hardy sons of other climes as worthy of the jibes and jests so freely showered on him. No wonder that your earliest predecessors were scoffed at and held up to ridicule by those whose only notion of California was that of El Dorado, to be quickly robbed of all its treasures and then abandoned to the desolation that had been and must forever after be its only heritage. And yet they persevered, those stubborn men who loved the soil and were not dashed by prophecies of certain failure. They looked upon the small attempts at agriculture, horticulture, and viticulture that the ascetic padres of the Missions had unconsciously set them for their lessons; they found that all the cereals, planted in our virgin soil, sprung forth to greet the winter's fructifying showers, and warmed and hastened by our genial springtime sun, returned an hundred and a thousand fold to him who trusted nature wholly; they put the vine and the fruit tree in the goodly soil, and saw such growth as made their doubting comrades open wide their eyes in wonder; they found that, where so many failed in finding gold enough to satisfy their greed and need, no failure came to him who, with a reasoning care, trusted all his future fortune to Pomona, Ceres, and Bacchus; they found, in short, that of California's 100,000,000 acres there were over 30,000,000 as productive and as fat as any others that could be boasted of by any other land or people. Where, then, are all the prophets of evil who were so free to class California with desert and with wastes? Where, then, are those who would have had this nation refuse to accept from Mexico this land, greater in extent than all New England, with forests such as compel the wonder of all who are fortunate enough to behold them, with a mineral wealth that, in the nation's hour of greatest need, supplied the wherewithal that kept her credit good and preserved us all a nation one and indissoluble, and with a soil that, hardly yet one-tenth occupied, supports in comfort and luxury a million and three-quarters of happy and contented people?

Of southern California, Webster said: "Gentlemen will please to remember that, in that part of California, eight months of every year

roll on without a drop of rain falling, and there is not within the whole of it any land whatever that can be cultivated without irrigation. * * * Can it be of any use whatever?"

And yet within that very territory, from which, in 1850, it was proposed to make the "Territory of Colorado," our brother and our sister Californians have fairly wrought a miracle. No longer depending upon the fitful and uncertain favors of the god of showers, those people of the south have wedded to the desert the water which, before their advent, went to total waste. And from that happy mating of flood and field springs every year a fruitage that has drawn the eyes of all the world toward California. Where, but a short quarter of a century ago, the wild things ruled a desert land, where only clouds of dust obscured the sun, but where now his brightness is o'ershadowed by the smoke that rises heavenward from thousands of domestic altars, where then the widely scattered villages, clustering about the decaying walls of mission and of monastery, now have sprung into being, like unto the magic of Aladdin's tale, great cities, proud and wealthy as the metropolis of ancient Greece; cities that, like Rome and Carthage, command the willing tribute of a kingdom; cities that one who saw the land on which they stand given over to baser uses, fairly scans in open-eyed amazement and wonders lest he may be dreaming. And, tributary to these cities, the golden globes of orange and of lemon dot the soft and restful green of many townships and furnish widespread comfort and luxurious wealth to thousands who have made them theirs.

The wealth that made our pristine name and fame came first from out the bowels of the earth. Our common mother, kind to all who live beneath the California sun, gave up her treasures with a willing hand and made our land the Mecca of the treasure-seeker. Not yet exhausted, even only partly conquered, the wealth that California gave, in sounding metal, to the treasuries of nations, is only part of what she still is giving and will always give to him who asks her for her favors. You, gentlemen of the Fruit-Growers' Convention, have given California equal fame with him who, in our early days, came westward with the tide that brought us men of mighty deeds. On you, your predecessors and your successors, California looks with jealous and with loving eyes. The miner, typical of California's early name and fame, sits safely in the temples of our enduring love. But on a throne of equal height and equal splendor, toward which we all with glad eyes turn and pay our homage and our gratitude, sit serene and safe, within our heart of hearts, the men and women who till the patient California soil and at whose command the complaining locomotive takes, to other and less favored lands, the wealth which you have made another synonym for California.

It will not, then, be very long before, following your lead, our valleys,

at which our erstwhile great men so cavalierly scoffed, will support a population such as only California can. Where now there are but tens of thousands, millions will enjoy the blessings so freely showered on us by an all-obliging Nature. To you, who have so nobly done your part toward California's greatness, we owe our thanks and grateful recollections. And to you, who represent so large a part of those we hail as "friends and Californians," we freely and gladly offer them. (Applause.)

MR. STEPHENS. Mr. Chairman, I move that a vote of thanks of the fruit-growers of California be given to our honorable Chief Executive for the assurances which he has just given us that, so far as in his power lies, everything will be done that can be done to promote the interests of horticulture in the State of California. I believe that it is our duty, and it should be our pleasure, to do this, because it is the first time in my memory or my knowledge that the Chief Executive has come to the rescue of the fruit-growers of the State.

Carried unanimously by a standing vote.

PRESIDENT COOPER. I take pleasure in introducing to you Dr. Chester Rowell.

THE PRODUCTION OF WINE AND RAISIN GRAPES.

ADDRESS BY DR. CHESTER ROWELL, OF FRESNO.

The production of grapes is almost coextensive with the civilized world. Grapes are almost as universally produced as is either wheat or potatoes. Some kind of grapes is grown from the tropics to the arctic circle. Wine is made from grapes produced almost anywhere in the world, but the production of raisin grapes is confined to very limited localities. There are but few vineyards in Italy where the raisin grape is produced. Wine grapes may be produced, as I have said, as far north even as Lake Superior. The extreme northern parts of France will produce them, but will not produce raisin grapes; while the whole of the interior of Spain will produce wine grapes, there are comparatively few spots even in that country which will produce the raisin grape, as it requires different climatic conditions and different soils, and is produced in a different way to wine grapes. Raisin grapes differ from wine grapes in their cultivation, in their management, and in their life. Our consul at Genoa informed me, in conversation, that the most valuable lands in Italy are those which will produce the raisin grape, but the life of the vine is short, and its history is the same since we have any knowledge of it. Its productive life is about twenty-five years, as I have been told by those best informed on the subject in Spain; its profitable, productive life, cut back as the vine is annually nearly to the ground and its life thereby shortened, is about twenty-

five years, after which the grapes begin to deteriorate in quantity and in quality, and eventually it is necessary to remove the vines in order to plant the ground with something else for two, three, or four years, when the raisin grape may be again planted and will have another twenty-five years of life. Not so with the wine grape. Some vineyards in the south of France are a hundred years old and produce well; many individual vines are several hundreds of years old and still produce fruit. We find, even in our own State, that the raisin grape is nearly always planted as an industry; the vineyards are planted and cultivated intensely for the production of raisins. Our own older vineyards are growing less and less productive. The production of wine grapes generally in nearly all parts of the world where they are produced is not a distinctive industry, but simply an adjunct to something else. On every little farm in Italy and on almost every farm in France and Spain you will find a little vineyard that produces wine, but it is only an adjunct to something else. Nearly every man sits under his own vine and fig-tree, every man makes his own barrel of wine, but the land is also made to produce something to live upon as well as something to drink.

It has been said that in this great country, where almost every acre of land will produce raisins and wine, we will soon overdo the production of wines and raisins. I believe that the California Wine-Growers' Association is insisting that there is already an overproduction of wine, that there should be an effort made to stop the planting of grapes. It is also said that there is now an overproduction of raisins. These matters, in my judgment, will adjust themselves. We haven't begun to produce wine grapes. The whole State of California will produce wine grapes, of an excellence and in an abundance that no other part of the earth can equal. The American people have not become wine-drinkers, but the great bulk of the people of the Old World are wine-consumers, and the world will be our market. With our American market alone there may be a temporary overproduction, but the market will adjust itself, just as the production adjusts itself. Eventually we will have the world for a market, and every hillside and valley in California will be made to produce the wine grape as well as almost all the other fruits produced in semi-tropical regions. The same as to the production of raisins. There will be a time when our American market will not take them, but there is comparatively a small part of the world that will produce raisins. Right here in this great, broad, hot San Joaquin Valley is the one ideal spot in which to produce raisins. Algeria produces a few, Brazil may possibly produce a few, and there are other parts of this western coast where you may produce a few raisins, but there is no part of the world that will produce them in the perfection that we do here, and there is no very great part of California outside of this valley

that will produce the raisin grape successfully. Long after this generation has ceased to live the raisin will be produced here in its excellence, just as it has been on the Mediterranean hills and in Spain for a thousand years. Consumption will increase and the markets will adjust themselves. In time that part of California adapted to the cultivation of wine grapes will be producing ten times, yes, a hundredfold, more wine than we produce now, and this part of California which is particularly adapted to the production of raisins will continue to produce raisins, and the most valuable land in the world will be that land which is best adapted to the production of first-class citrus fruits and first-class raisins. The most valuable land that I found anywhere in the world was that producing the very choicest of oranges, sometimes with a value even of \$1500 to \$2500 an acre, except a little land on the island of Jersey, where they produce vegetables, some of that land bringing enormous prices; but of vine lands the most valuable and most productive and most salable were those producing the choicest of raisins. I can only add this one word of encouragement: Those of you who have vines and who produce grapes need only to stay steadfastly with the production of grapes as an industry, and it certainly will never disappoint you, because it is bound to become one of the most important industries.

RESOLUTIONS RELATIVE TO A PARCELS POST.

MR. BERWICK. Mr. Chairman, I have some resolutions I would like to read now. May I read them before handing them to the committee?

PRESIDENT COOPER. Yes.

MR. BERWICK. The resolutions are as follows:

WHEREAS, Our postal service is at present lamentably deficient in the matter of an up-to-date foreign and domestic parcels post; and,

WHEREAS, The American express companies have found it possible to inaugurate for the British postoffice a postal stamp rate, on British parcels, of 25 cents for 11 pounds, to any postoffice in the United States, thus proving the practicability of profitably doing the business at such a rate;

Resolved, That this Convention of the fruit-growers of California, assembled in Fresno city, this 9th day of December, 1903, hereby requests its Senators and Representatives in Congress at Washington, D. C., to introduce and support such measures as shall secure for the American citizen, through the United States postoffice, a parcels post at least as cheap and effective as that now afforded by the American express companies to the Briton.

Resolved, That this Convention also requests the President, in conjunction with the Postmaster-General, to conclude postal conventions for the handling of parcels up to 11 pounds weight, with all the nations who are at present members of the International Parcels Post Union; this on as favorable terms as those enjoyed by the citizens of Mexico and European lands.

THE WINE INDUSTRY AND ITS FUTURE PROSPECTS.

By PERCY T. MORGAN, OF SAN FRANCISCO,
President of the California Wine Association.

After fifty years of hard and intelligent effort on the part of handlers of California wines the industry has been established on a firm basis. The quality and general excellence of the product are no longer in question.

Wine-drinkers in this country, unfortunately, form but a small minority, but a great proportion of the wine they consume is of domestic production. California alone grows and markets over ten times the total quantity that is imported from abroad, while Eastern vineyards, also, produce a great quantity that finds a domestic market.

The per capita consumption of wines in the United States, however, does not equal one-fiftieth of that of wine-drinking countries like France and Italy. Consequently the field is not as wide as might be desired or at all in consonance with the great possibilities of California as a region in which wines of the highest excellence can be produced. If the per capita consumption of the United States equaled that of France, there would be a domestic market for over two thousand million gallons of wine, and almost every rolling hill and fertile valley of California could be profitably covered with vines.

In France, a country with a population of but little over one-half that of the United States, there are 4,250,000 acres of bearing vines; from which it will be seen how comparatively insignificant the United States is as a wine-producing and wine-consuming nation.

The future of the California wine industry is principally, if not entirely, dependent upon an expanding market. Whenever the demand, be it domestic or foreign, shall exist, a vast acreage in California suitable for the growing of wine grapes can very soon be brought into bearing.

For two or three years past a brisk demand for wines from first hands, caused by a succession of short crops, has given a great stimulus to grape planting, and a considerable area—estimated by some as high as 70,000 acres—has been planted to vines, principally in the sweet-wine districts, extending from Yolo County in the north to San Bernardino County in the south. The greater part of this new acreage was planted to wine grapes, though some portion was table grapes, which in late years have given such phenomenal returns.

In 1902 the vineyards then bearing gave an enormous yield, and, at the beginning of the 1903 vintage, cellars were crowded with previous years' wines. The prediction freely expressed, that the grape yield would equal that of the previous year, filled wine-makers with feelings akin to dismay, for another such vintage as that of 1902 could only be

housed with a great increase in holding capacity, and inquiry developed that there was not sufficient seasoned cooperage stock obtainable to make any very considerable increase in tankage. The financial outlook, also, was not favorable; and rumors that a repetition of the previous heavy production might cause a drop in prices did not tend to make bankers as anxious to open their coffers to provide funds as generously as they did last year, when in a few weeks they advanced several millions to take care of the heavy vintage.

Among sweet-wine districts this year the wine crop of southern California was quite heavy, and that of the extreme northern grape-growing section was also large; but in the Fresno district, the alternative presented by a favorable drying season and the prospect for high raisin prices caused a great many growers who were dissatisfied with winery conditions to put on trays grapes which have gone formerly to wineries, so that the total sweet-wine yield will, most fortunately, be considerably less than in 1902, and it is hoped that a fair equilibrium in prices may be maintained.

In the dry-wine districts, crop predictions have been fairly well realized, and while the yield was not so great as in the phenomenal vintage of 1902, it was far above an average, and when the vines approach maturity within the next two years concerted action will be necessary to keep up the favorable market conditions which have prevailed for several years past.

Interest, taxes, insurance, and evaporation cut so large a figure in the expense of carrying on the wine business that the initial cost of grapes from which is made wine that has to be carried for a long time, becomes a matter of considerable moment to the wine-maker.

The unexpected and almost unprecedented occurrence of two heavy vintages in succession tended this year to make wine-makers whose cellars were filled with wines from previous vintages, very cautious in buying grapes.

The price for dry-wine grapes dropped considerably below that of the previous year, and while the price for the last two years, taken together and averaged, was quite remunerative, grape-growers who had anticipated a continuance of the higher range of prices shared the disappointment of wine-makers who, judging from previous experience, believed that a short crop would succeed such an abnormal yield as that of 1902, and had held their wines in anticipation of more remunerative prices, in place of which they stand to face a considerable loss.

The wine industry in the last few years has suffered a disappointment in its expectation of an increase in consumption. The Philippine Islands, from which great things were expected, have taken practically nothing from us. Porto Rico, instead of a large market, has proved to be such a small consumer as to be an entirely insignificant factor.

Cuba, in which the consumption of wine is very large, is and apparently must remain practically a closed door to California wines, because we can not compete in price with the wines which are shipped there from Spain. Within the United States the consumption of California wines has shown but little increase in the last four years, if we are to take as competent evidence the only records at our command, namely, the statistics of railroad and sea shipments.

Whether this condition of affairs is due to the raise, made about three years ago, in the price of wines, or whether the production from the heavy acreage of Eastern vineyards planted in late years has filled the increase in consumption which should naturally follow the known increase in population in this country, it is difficult to determine, but the fact remains and must be recognized that unless a change occurs it will be extremely difficult within the next two or three years to profitably take care, through wine channels, of the yield of the new sweet-wine grape acreage which will come into bearing. Should a surplus of grapes be produced every grower will have to face the problem of how to find profitable uses for his product.

This year's experience seems to point to the conclusion that although the raisin-growers are banded together in a closer combination than ever before, managed by competent men of their own choosing, it is quite possible, even with the existing bearing acreage, to produce a greater tonnage than the market will readily absorb at reasonably remunerative prices.

Growers of table grapes, however, have, I understand, experienced another profitable year, and some of the increased acreage may here find a remunerative field.

The wine men discovered last year that vineyards now in bearing can produce a very large quantity of wine, and nothing but the great financial strength of their organization, with its consequent ability to hold the product without being forced to sacrifice it, has prevented the arising of conditions which, in their reflex action, could not fail to seriously affect the grape-grower.

The question, therefore, which may arise is: How shall we take care of the product of the new acreage when it comes into bearing?

Can wine be made at a price low enough to compete in foreign fields or limit the consumption of the Eastern product?

To what extent can grapes be dried so as not to overstock and depress the raisin market?

To what extent can grapes be shipped green to Eastern markets without making the present profitable conditions for table grapes disastrously the reverse?

Does it not appear that all these contingencies must be considered when the 70,000 new acres bring their additional yield of grapes into the market?

It is true that disease may decrease the yield of the old vineyards, and may even destroy some of the new ones, but still there will ere long be a heavy additional tonnage to be taken care of. This should not come upon us unawares. We should prepare for it thoughtfully and scientifically; not by blaming the raisin directors because they can not accomplish impossibilities, nor by execrating the wine men because they are obliged to be conservative with the capital intrusted to them, for were they not so the alternative would soon present itself of no capital being offered them to carry on their business; not, in a word, by all the time hunting up some other fellow upon whom to lay the blame for conditions for which nature alone is responsible, in generously making the vines to grow and the soil to produce, but by all getting together and talking, planning, thinking, and dreaming over a business-like solution of the problem.

It is not difficult for the ordinary man to be prosperous in times when consumption takes care of production, but it takes a cool and wise head not to get lost in times when the yield exceeds the demand. We may hope that such an eventuality will not arise, that something may happen within the next two or three years, either by increased consumption or by some new conditions which at the present moment we do not foresee, to prevent it. But if it does occur we must be prepared for it by alternatives which will enable us, by some concerted action, to get rid of the surplus and retain the value of what the market will take at remunerative prices.

Many propositions have been advanced; some impractical, others, perhaps, more practical, of which the following are examples:

Shall a portion of the grapes be contributed in equitable proportions to be made into concentrated must for shipment abroad and to be sold for what it will bring?

Shall a portion be made into wines for export to foreign countries for joint account, and sold at the best obtainable figure?

Shall new fields be exploited in unfermented grape juice, for which quite a considerable demand has been created by Eastern growers, or, as has been suggested, in the manufacture of fruit syrup to take the place of maple and glucose syrups at present used for table purposes?

Shall an attempt be made to educate the temperance people that the truest solution of their problem is to promote the use of light California wines as a means of checking drunkenness, and through the correct interpretation of their chosen name, namely, "temperance," to use the gifts which God has bestowed upon us?

Drunkenness is never prevalent, in fact is almost unknown, in countries where light wines alone form the staple beverage; it is only where the drinking of the stronger forms of liquor is practiced, that the abuses abound which these honest and well-intentioned people so vigorously deprecate and endeavor to allay.

All these questions should be agitated, and agitated earnestly. Some good work in this direction is being done by a concern styling itself the American Grape Acid Association, which, in its endeavor to find a means of producing here, instead of importing from abroad, the cream of tartar that is consumed in great quantities in the United States, has offered a prize of \$25,000 for the discovery of a process which will make tartaric acid in paying quantities as a direct product from grapes. That its efforts may be crowned with success is a consummation devoutly to be desired, and every grape-grower should assist the aforesaid concern in its laudable work, for if it accomplishes nothing else it will, by its extensive distribution of pamphlets, have advertised California in a splendid manner all over the world.

The foregoing remarks on a possible overproduction of grapes apply particularly to sweet-wine districts, and are dwelt upon in this address because this Convention is being held in the great sweet-wine center.

In dry-wine districts, while it is unlikely that the price of grapes can be sustained at anything near the high prices of the 1902 vintage, there is little reason to fear that the growing of dry-wine grapes may become unprofitable, for the difficulty, expense, and time required to bring a resistant vineyard into bearing are considerable, and no such heavy increase, therefore, in new acreage within a limited time can be anticipated as in the sweet-wine districts. Diseases prevalent in dry-wine counties are more likely, also, to keep the average production within reasonable bounds.

Two years, and even one year, ago I earnestly believed that a large production of dry wine from existing vineyards was an impossibility, and I still believe that the present full supply can, by concerted and sensible handling of the situation, be profitably absorbed through future smaller vintages.

But vines have proved themselves to possess such wonderful recuperative powers that guessing on their prospective yield has become an unsatisfactory business; so that beyond expressing the firm opinion that the planting of grapes in dry-wine counties will prove fully as remunerative for many years to come as the raising of almost any other agricultural product, I feel very chary of making prophecies.

In conclusion, I desire to say a word on arrangements for so-called reciprocity with other nations. If you do not keep a watchful eye on your own interests it is not likely that the present or any future national administration will remember that, while preëminent as the "land of sunshine, fruit, and flowers," the State of California is of sufficient importance politically to be seriously considered when making arrangements with foreign countries. Votes in politics count like dollars in business, and if through disregarding your interests a reciprocity agreement can gain *three* votes where you can furnish only *one*

or *two*, you must not think that, in politics any more than in business, sentimental questions will be allowed to interfere. Reciprocity is not dead; it is only sleeping. Do not sleep, also, but by being watchful and combining the whole Pacific Coast, and any other section or State on such questions, get the votes and the influence which California alone can not muster. Your own Senators naturally prefer to be on the winning side, and if you do not keep up a clamor and vociferously assert your claims and rights they are more likely to see their interests through administration eyes than through those of their constituents.

Cuban reciprocity, which your last Legislature refused to instruct your Senators to vigorously oppose, and which has been allowed to pass Congress practically without a protest, will cause you to rub your eyes and wonder how it all came about when, in five years from now, agricultural products, citrus and other fruits are pouring into your own country's great consuming markets and elbowing out the products of California. And it will, unless you take more interest in such matters, be followed by other treaties or legislation favoring some other section of the country or some other interest at your expense.

A late inquiry, referred to the proper department in Washington, which, being unable to answer it, suggested referring it to the Consul-General of Cuba in New York, developed the fact that the small preference which we imagined we had under the Cuban reciprocity treaty is rendered, by a trick of words, inapplicable to dry red wines, and therefore California is practically excluded from all benefits of that treaty, while yielding on citrus and other fruits extraordinary benefits to Cuba.

Few of you probably understand that while the French, German, Portuguese, Italian, and other tentative reciprocity treaties have never been ratified by Congress, wines from these countries are being admitted into the United States, through presidential proclamation, at from 12½ to 30 per cent less than the full duties prescribed by the Dingley tariff law.

In other words, it will be California, always California, that will get the shells while other sections get the kernels of administration favors.

By such methods, unless you are much more wide-awake than you have been in the past, you may one day find that, instead of invading foreign markets with California wines, you will have to fight to keep your home consumption from being ruinously invaded by some foreign product.

Therefore, I say, do not peacefully slumber, depending entirely on nature's bounteous favors for your prosperity, but demand of your Senators and Representatives—who should be *your* watchmen, and not *you* theirs—that they investigate and keep you fully posted on all matters affecting your interests, instead of waiting for you to respect-

fully inquire of them about this or that matter, as they now appear to believe is the proper procedure.

MR. KEARNEY. Mr. Chairman, I move that the Chair appoint a committee of fifteen, whose duty it will be to devise a plan or plans, and to put those plans into effect, to promote co-operation among the prune-growers, the raisin-growers, and the growers of all other classes of cured fruits throughout the Pacific Coast, this committee to report to the next Horticultural Convention.

PRESIDENT COOPER. The resolution will be passed over to the Committee on Resolutions, of which Mr. Markley is chairman, to report later.

MR. McINTOSH. Mr. Chairman, in view of the immense importance of the address of T. C. White, the treasurer of the California Raisin-Growers' Association, to this Convention this forenoon, which, by the way, was cut short by the visit of our beloved Governor, I desire at this time to ask for an order that upon convening at 2 o'clock this afternoon a discussion of that paper or that address by Mr. White take precedence over everything else. I ask, Mr. President, for an order to that effect.

PRESIDENT COOPER. There being no opposition, it will be in order to take that discussion up at 2 o'clock this afternoon.

Here a recess was taken until 2 o'clock this afternoon.

AFTERNOON SESSION—SECOND DAY.

WEDNESDAY, December 9, 1903.

The Convention was called to order at 2 o'clock. President Cooper in the chair.

PRESIDENT COOPER. If the Committee on Resolutions desires to report on any resolutions referred to it, it will be in order to hear them.

REPORT OF COMMITTEE ON RESOLUTIONS.

MR. MARKLEY. Mr. Chairman, the committee has passed on some resolutions. It reports favorably on the resolution on the parcels post, submitted by Mr. Berwick.

Resolution adopted unanimously as read.

MR. MARKLEY. The committee also reports the following resolution:

Resolved, That the Chairman of this Convention appoint a committee of fifteen, with Mr. A. R. Sprague as chairman, whose duty it will be to devise a plan or plans, and to

put these plans into effect, to promote co-operation among the prune-growers, the raisin-growers, and the growers of all classes of cured fruit and nuts, throughout the Pacific Coast, and that five members of said committee constitute a quorum thereof; this committee to report in writing to the next State Fruit-Growers' Convention.

Adopted.

MR. MARKLEY. Mr. Judd has submitted a resolution. Mr. Judd says he was one of the unfortunate inspectors under the label law, and found some trouble in enforcing it, and that he finds it necessary to amend the law. On his statement, the committee indorses the following resolution:

WHEREAS, The Act of March 20, 1903, relative to the marking or branding of fruit packages, does not give the grower the protection desired; therefore, be it

Resolved, That said Act be so amended as to read after the word "grown," in line 9, Section 1, of said Act: "Also the name of the grower and his postoffice address"; and be it further amended, making it a misdemeanor for any person or persons, firm or corporation, to erase, or substitute, or in any way mutilate or deface any mark or brand on fruit packages, previously placed thereon for the purpose of information, by whom and where said fruit was raised.

Resolution referred to Committee on Legislation.

MR. McINTOSH. Mr. Chairman, while on the report of the Committee on Resolutions, I move you, sir, that a committee of three be appointed by the Chair to inspect the exhibits made in this hall by various persons who have gone to some expense in making a display, and to report subsequently upon this exhibit.

Carried.

DISCUSSION ON THE RAISIN INDUSTRY.

MR. McINTOSH. Mr. Chairman and Members of the Convention—ladies and gentlemen: Referring to the matters before the Convention this morning, it is not necessary for me to tell you who live in the San Joaquin Valley, that this, of all other questions pertaining to soil production, is the most important one. It is not necessary to tell you that the city of Fresno has established a name for itself, not only in California, not only throughout the United States, but also in Europe and in the civilized world, that name being, "The Raisin Center." This name, fellow citizens, has come down through many trials, through many ordeals, through many strifes, through many contentions, with much toil, much labor, and much talk, and to-day, thanks to that spirit which unites individuals under difficulties, which unites the soil-tiller under labor and under loss, we are now in possession of that organization which has given to these people, of the past and of the present, that which under individual effort none were able to accomplish. I refer, of course, to the California Raisin-Growers' Association, now in its fifth year. Its record and its history have been written in

language that can never be erased and never effaced from the memory of this people who have been behind it in times past; and now, after these years of toil, after these years of discouragement, after the years of infancy in this industry, we have, as I said before, arrived at that proud position where, through the instrumentality of co-operation, we have results which are most gratifying and which have contributed more than all other results, from the standpoint of the soil producer, to build up this "Raisin Center" of California. But, in the address to which we listened with so much interest and pleasure this forenoon, we were told that a new and a more distressing, if possible, condition confronts the raisin-grower of California than during the period of its infancy, during the period of the trials and troubles to which I have referred, the unfortunate period of the 1½-cent per pound for raisins, and this declaration comes, gentlemen, from a man who has been connected with this Association, intermittently, it may be, almost from its infancy, from a gentleman to whom, to my certain knowledge, this community owes more than to any one single individual for the organization and original and early success of that Association, a man of ability, a man of talent, a man of courage, but, to my mind, fellow citizens, he has sounded an unusual and a plaintive note to our ears this forenoon. What was that note? It was the note we have heard for years in the past, not from the side of the grower, friends, but from the side of the packer, from the side of the commission man, from the side of the shipper, namely, overproduction. (Applause.) I say, friends, that not until the present moment have we heard from the standpoint of the grower this doleful, this unpleasant, this stand-still—if not to say retrograding—assertion, and I am here, friends, to disprove the proposition; I take no stock in the allegation. I do not believe that there is a single iota of truth, based in logic, for such an assertion. I believe that, through an enlightened understanding, through better methods of marketing our raisins, through better means of distribution, through a better organization, if possible including the entire area of raisin production, we shall be enabled not only to take care of the crop, enormous as it has been during the past two years, but also to double it, triple it—aye, quadruple it, and yet find a market for it all. (Continued applause.) I make this assertion for the reason, first of all, that consumption is in exact ratio to the price of the product. That, fellow citizens, is the underlying principle in all transactions, in all traffic, and if we lose sight of that one principle we are sure to get into deep water, into the strands and shallows of disappointment and distress such as seem to confront the raisin-growers of California to-day. But I say that this is not the only trouble for our consideration. This is the main one. Now, I mean to take up the views of three individuals of this Convention and if possible point out the bearing of their discussion on the

solution of this all-important question, and I shall first take my logical and level-headed friend, Mr. Sprague. He told us, last night, in discussing this question of co-operation, that there was one underlying feature that would never and should never be overlooked, namely, an elastic manner of handling our productions. That means, fellow citizens, that an arbitrary rule or an arbitrary price fixed upon any production is calculated to get the producers of that production into deep water. Now, the argument was simply this, from Mr. Sprague's standpoint, that we must have a better plan, a better form of taking care of our product, through distributing agencies, through local agencies in all the markets, not only of the United States, but of the civilized world, and through these agencies keep our fingers upon the pulse of the people; we must gradually make for ourselves agencies in the different cities and through them establish an elastic price, an elastic market, by which we can accommodate prices to the conditions that exist, in the interests of traffic, of trade. I submit that that is one of the chief principles in everything, and it must be arrived at. No arbitrary rate can ever be maintained against a people who can, if they will, get along without the production of raisins. You know and I know that the best people, those enjoying the most of the luxuries which the soil can, under its most favorable conditions, produce, live a long, a happy life, without ever tasting a raisin, and for that reason, as well as for the general principle of elasticity in dealing in all commodities of commerce, we must recognize this principle and place the Raisin-Growers' Association in a position to deal with it, and to deal with it intelligently and constantly.

So much for Mr. Sprague. Now, as for Mr. Kearney, the gentleman who spoke this morning anent a proposition that had been presented by a young man—you gentlemen here remember it well—who related the circumstance of his stepping into one of our local stores in the "Raisin City," in the center of that wonderful production which has given us so much wealth and so much fame, and he found, to his amazement, that in the local store, in the center of this enormous production, with millions of pounds of raisins on the hands of the Association unsold, and apparently unsalable at the price established, he found to his amazement that a small carton of raisins, weighing a pound, I think it is, Mr. White, is it not?

MR. WHITE. Two pounds.

MR. McINTOSH. Weighing a couple of pounds, the price was 35 cents, or $17\frac{1}{2}$ cents a pound for raisins in the raisin center of California. Is that, friends, the kind of business through which we may expect to reach the consumer and place our products upon the market? The answer is evident. I submit that all of you know that the suggestion should be carried to the limit that Mr. Kearney made; that is, that

every carton should have the price conspicuously printed upon it, and that the trade should be given to understand that they must handle the raisins for that price or not at all. (Applause.) Through that agency alone an enormous consumption in California would be assured, and right in the city of Fresno the consumption might be increased, I would say, ten, twenty, or one hundred fold. We all know what it means. I am satisfied that in the city of London—and not a raisin can be raised nearer that city than hundreds of miles—raisins can be bought in the open market to-day for less money than they can be purchased for at retail in the city of Fresno. Do I need to tell an intelligent audience in California that those conditions should be corrected? Need I tell you that the proper exercise of our intelligence and of the privileges which we enjoy as a free and enlightened people will correct this most remarkable, this most amazing situation?

Next, I want to come to my old friend Berwick. If ever there was a man eminently fitted, in my judgment, to carry forward the project, in behalf of the common people, of getting the products of the soil to the consumer in remote parts of the country, to the individual who needs the goods, to those families of the East, of the North, and of the South who would be glad to take this product with which we are overloaded and use it not only—as Dr. Rowell told us this afternoon—as a luxury, but as a delightful food, a most wholesome food—he is the man. Through the agency of the parcels post, friends, I look for great things—if we ever get it. I believe that if we had a parcels post, on the same basis that Great Britain has and enjoys, that Germany enjoys, that France enjoys, and that many countries of the earth enjoy, there would be no trouble, Mr. White, about the quantity of raisins in California. (Applause.)

The problem now which, to my mind, confronts us is this—let all thought, in the San Joaquin Valley at least, be directed to this one proposition: to cheapening the means of transportation from the producer to the consumer, upon the avenues of trade—by cheaper communication, by the parcels post, if you please, and by other means of communication; and then let us recognize, also, that we must have some elasticity to our markets and our prices, so that we may be ready, without sacrificing ourselves, to at all times accommodate the prices of our goods to the conditions of the consumer. When these things have been accomplished, we shall hear no more of the doleful cry of overproduction; but, on the contrary, we will find the American citizen, at least, standing side by side in the consumption of raisins with his distant brother of the British Isles, who, though producing no raisins at all, consumes four times the quantity which we consume. When these things are accomplished, we will have placed the grower of raisins, we will have placed the soil-tiller and the soil-owner of central Cali-

fornia, in a position in which he will declare: "The more raisin grapes and the more raisins I have, the better off I am." I thank you for your attention. (Applause.)

PRESIDENT COOPER. I will now be glad to hear from any one else on this subject.

MR. WHITE. Mr. Chairman, I consumed considerable of the time of this Convention this morning in going over this matter, and I hesitate to consume much more of it, because I have not changed my mind from what it was in the forenoon on account of what Mr. McIntosh has said. I am still of the opinion that the production of raisins in California is in excess of the demand. He speaks of the parcels post. I admit that that would perhaps be a good thing, but we haven't got it yet. There are many things which perhaps can be done to do away with the over-production and to extend our markets, but those are things which must be studied out, they must be worked out carefully and by business men, by men of commercial intelligence. At the time Mr. Kearney adopted the "sticker," as he calls it, on the side of the package: "10 cents and no more for this package of raisins," the market didn't take to it, and no more raisins were sold under those conditions than were sold before. That was the information we got at headquarters from all along the line. Now, that may be a good thing when the trade becomes accustomed to it, but when you tell the retailer that he can not sell a certain article above a certain price, he doesn't like it. You have got to educate him up to it. Now, when I say that it is better to sell one hundred million pounds of raisins at four cents a pound than to sell two hundred million pounds at two cents a pound, it is because there is more money in it, more profit in it to the grower. I believe in co-operation. I believe it is a safeguard to the grower. I believe the growers should come together and organize these little co-operative companies and attempt in all ways, by post and by increased facilities for transportation, to get our raisins closely before the consuming classes of people. I admit that one argument which Mr. McIntosh has made is good, and that is that there is too much difference between the price which the grower gets and the price which the consumer has to pay. But, what are you going to do about it? Now, he spoke about paying 17½ cents a pound in Fresno. Why, does not Mr. McIntosh know that every pound of our best grade of raisins that the Raisin-Growers' Association sells we sell at 15 cents a pound, by carload lots? Perhaps he does not know that.

MR. McINTOSH. It is a small proportion of them.

MR. WHITE. It makes no difference. We can sell all we produce, and you can't go to a packing-house in this city to-day and buy a pound of raisins of such grade at less than that price.

MR. SPRAGUE. Who is it gets that price, the 15 cents a pound?

MR. WHITE. The producer gets it all except a $6\frac{1}{2}$ per cent commission.

MR. SPRAGUE. And who is it rules the prices?

MR. WHITE. The Association rules the price. The packer sells at the price that is established by the Association, and the price of our best grade of raisins is \$3 a box for twenty pounds, and if that is not 15 cents a pound, then my arithmetic is "off." The next grade of raisins below that is \$2.50 a box, which is $12\frac{1}{2}$ cents a pound.

MR. McINTOSH. What is the average price?

MR. WHITE. The average price the grower has received for his product since the Raisin-Growers' Association was organized, with the exception of the first year and with the exception of the third year—which was an off year—has been 4 cents per pound. The first of last April, when the growers met in this hall, at the annual meeting of raisin-growers, they passed resolutions of thanks to the board of directors, and were more than satisfied with the prices they had received as a result of last year's business, and we had the largest crop the State has ever produced until this year. But there were at least five hundred to a thousand cars of last year's crop carried over into this year. Now then, we have produced five or six hundred cars more this year than last year. We have 110,000,000 pounds this year. It is possible that all of those raisins may be marketed. I am in favor of some sort of scheme that will get our raisins closer to the consumer and cut out very many of the expenses that are incurred in handling the raisins by the middleman. But how are you going to do it? It might be a good scheme to educate the dealers in these goods, and whenever we can educate the dealer or the retailer to set a certain price which would be a fair and reasonable price at retail for our products, and put a sticker on the side of the box and say that "These raisins are 10 cents per pound and no more," then, if he sells our raisins and the market is cleaned out every year, it is time enough for us to say, "Go on and plant some more vineyards; we can dispose of another hundred million pounds." Now, so far as I am concerned personally, I have a very small interest in the vineyards of this county. I have a little interest in some other property. I have land that is adapted to raisin-grape vines that I am willing to sell, but the only interest which I have in any vineyard is my interest in a bank which owns a few vineyards, or owns an interest in the vineyards. I don't own a vineyard myself. I own land, plenty of it, in half a dozen different places in this county and in other counties, that is adapted to the culture of raisin grapes, so that I hope Mr. McIntosh does not impugn my motives when I say that I am afraid, if we keep up the same pace of production which we have in the last twenty years, that we will have more raisins than we can sell at any price.

MR. JACOBS. Mr. Chairman, it seems to me that this discussion on the raisin situation is very much in line with the discussion that has been held in previous years in previous Fruit-Growers' Conventions, with the exception that for a number of years the Raisin-Growers' Association occupied a unique position. They were progressing favorably and were prosperous. The fruit men, who had a co-operative organization, did not stand together, and it resulted in disaster to the growers, from which they have suffered for a long time. Now, I, personally—although not handling raisins—am one of those who handled raisins when the industry was in its infancy, at the time Mr. White has mentioned. In fact, I believe we handled part of Mr. White's raisins at one time.

MR. WHITE. That is right.

MR. JACOBS. I am not an alarmist, as I don't believe that any of California's products are over-produced. I contend that the result is not caused by overproduction, but that it is the result of the methods of handling the business. In the past few months I made a trip through the East and studied conditions existing not only in my own line of business, but also in the raisin business and in that of other California products. Mr. White has stated here that in 1893 there were 103,000,000 pounds of raisins produced, and subsequent to that time the industry met with disaster, until the Raisin-Growers' Association was formed. That association was a necessity to the growers. It was absolutely necessary for their self-preservation to form a co-operative organization, and after it was formed, with the exception of one or two years, they were very successful. In 1898 there were only 80,000,000 pounds produced, but in 1903, this year, I believe Mr. White said 110,000,000 pounds?

MR. WHITE. This year, 110,000,000 pounds.

MR. JACOBS. There is nothing allowed for the increase of population in this country in ten years, and yet there is only an increase, up to the present time, of 7,000,000 pounds of raisins since 1893, when the country was in the throes of a financial panic, and you all know what the word "panic" means. Now, the raisin men of Fresno, just because they have not sold in three months more than fifty per cent of their product, are willing to spread the report abroad that there is already an overproduction; but if they will stop to consider a moment, they will realize that perhaps they are wrong. From conversations with many leading houses in the East, I have come to the conclusion that perhaps there was a mistake made in the methods of marketing the product, and if they have made a mistake in the methods, it behooves the growers of this county to let those same directors work out their own salvation, and they will do it, because they have still nine months to go on. But the conditions existing now are these—and they exist in

the canned-fruit line in which I am interested—the great buyers of this country have been affected by the thought which is going the rounds through the country that we are going to be faced by a financial panic, and buyers have pursued an extremely conservative course in making their purchases. In my own line, people who ordinarily buy from 25,000 to 30,000 cases of goods have satisfied themselves by buying from 500 to 1,000 cases, and some of them 2,000 cases, and then they supply their needs as they require the goods. Now, that means that when they need the goods they will have to buy them, and there is only one thing that can deal with that condition of affairs, when it relates to California raisins or California prunes, and that is the kind of an organization that Mr. Sprague is at the head of. Now, in the East, the buyers of raisins have been met by this condition of affairs, from what I was told, that at the beginning of the season a price was fixed by the California Raisin-Growers' Association; the Association found that all the raisins were not in their hands, and after fixing this price they decided, after some buying had been effected, to drop the price to make the people who had raisins outside of the Association lose money. That was practically the object—to force them into the Association in time. Now, this may be all very well from the standpoint of manipulation, but the question is whether this was judicious. In the first place, it discouraged the big buyers in the East right away, because the basis of the prosperity of the business of handling California products, particularly cured fruits, is a solid organization. Then the buyer, in making purchases, knows that he will be protected in his purchases; but if in the start, after making his purchases, the price drops and he loses money thereon, it discourages him, not only discourages but it disgusts him, and he says: Now I am just going to leave that market alone; and instead of buying ten, fifteen, or twenty-five carloads of raisins he will buy one car, and when he sells that he will buy another, because he doesn't know how conditions are going to rule. So that it is a mistake, in my judgment, to talk about overproduction in raisins. When the proper methods are adopted, the real commercial methods, with the right men to handle the business, you will find that the products will go into consumption and that they will be successfully handled, and they can only be handled through the means of a solid, co-operative organization.

MR. WHITE. Mr. Chairman, I desire to correct a statement made by Mr. Jacobs through error—I am satisfied that it is an error, and I would not like to have it go before this Convention in that way—that at first we had set a high price upon our product and afterwards reduced the price, and thus discouraged the trade. Our information early in the season was that the crop was going to be a short one, shorter than that of the year before, but we realized that the wine men

were going to buy less grapes for the wineries, and we said to the growers that if they would all join the Association and we had a percentage large enough to justify it we would fix the price as high as it had ever been fixed in the history of the Association, and that was exactly the price which the Association fixed. Having the fixing of the price of seeded raisins as well as of loose, we fixed a lower price upon seeded by a cent a pound. We found then that the crop was going to be a large one, and we were satisfied, from the importations of the foreign article, that the market would not justify any such price, and we immediately, and before hardly any raisins were sold at all—before we had any raisins to sell—reduced the price upon the loose to where it is now, and raised it a notch on the seeded. Now, on the goods that had been sold at that time, at the first prices, we rebated the difference in the prices, to every man or house that had purchased a pound of raisins from us; so Mr. Jacobs is entirely mistaken when he says that the trade is dissatisfied because we reduced the price and they had to sustain a loss. We rebated the difference between the first and the second price to every purchaser who had bought a pound of raisins from us, we rebated to him that difference. Now, I just wanted this Convention to understand that.

MR. SPRAGUE. Mr. Chairman, just a few words on some of the points that have been brought out. In the first place, I want to say that I was connected with the second year's operations of the Raisin-Growers' Association. The experience of that year was that, under the system of marketing then in vogue, it was possible for the commercial packers, through their brokers, to make a cut in the brokerage, which was virtually a cut in price, and that was done secretly and fraudulently, for they had promised to do no such thing. The co-operative packers of course could not be partners in the fraud, and we were left with a very considerable portion of the raisins of our constituents upon our hands and subject to serious loss in our profits as co-operative packers. Now, that is a bad feature which is necessarily connected with that form of organization. I want to say this, also, that through all of our connections at the East at this time comes the same testimony, that the Eastern jobbers have lost confidence in the Raisin Association. Now, confidence is the most precious thing in business. Let me say, further, that the very failure to sustain the confidence of the trade during the first year of the operations of the Raisin-Growers' Association led, in my judgment, to the breaking down of prune prices. Now, I speak advisedly concerning that, for you all know that there was a cutting-under, the loss of half a cent a pound in some cases to buyers who had already purchased at regular trade prices, by these subsequent cuts, and the trade then lost confidence. I remember Mr. Kearney testified at our last convention at San Fran-

cisco that when there were some twenty or thirty per cent of the growers outside of the Raisin Association, still these men, with no contracts, and while they were offered more money for their raisins than the Raisin Association would guarantee them, were bringing their raisins forward and depositing them subject to the authority and disposition of the Raisin-Growers' Association. Let us look at the encouraging features of the situation. Look at the progress the Prune Association made in getting together an organization. To be sure, it was an organization more difficult to perfect. No set of men could have made it wholly succeed. There was an honorable set of men in control, but the Association itself was faulty in its plan. The same thing is true of the Raisin Association. The fault is not to be found in the men, gentlemen; and you will find that when you just relinquish this as an era passed and stop discussing it, looking toward the future and standing for the support of this wider influence, this wider movement, with the enthusiasm and power and ability that have been behind these other movements, you will have a success for which we shall never have to apologize. (Applause.)

MR. HARTRANFT. I think that if any one looks the future straight in the face, he will ordinarily become a pessimist, and I think that is the reason why, in times and under circumstances like Mr. White speaks of with regard to raisins this year, we find even well-balanced men occasionally giving up hope. I know that is the case as regards oranges. When there were only 50 carloads produced in the State I heard the discussion among railroad men that there was great concern at Riverside that they might have three or four carloads and not know where they were going to put them. When they had 1,000 carloads they were very much worried. When they got 3,000 carloads, when they got up to 5,000 carloads, and to 7,000 carloads the market broke in terrible shape, but recovered on a shipment of about 11,000 carloads. It broke again on a shipment of about 17,000 carloads, because the machinery for distribution was not organized in advance of the increased production, but they went out again on a 24,000 to 26,000 carload crop, and we wound up rather uncomfortably last spring and summer with a crop of about 22,000 or 23,000 cars.

Now, my friend Stephens from Sacramento has argued for two or three years that they have planted too much to deciduous fruits. I have not been in the Sacramento territory this summer as usual, but it is my impression that up there the producers are in very good shape financially, that they have come out from past losses and discharged many of their old obligations, that they have had a very good season. And in looking over the report of Mr. Anderson I see that his prediction is that they can handle successfully a crop nearly twice the size of that which they are now handling. Now, Mr. Stephens has argued, and I under-

stand he makes the same argument again here, that we can not afford to encourage home-seekers to come in and help to build up the State. I think it is mainly because he merely keeps his eyes on the future, across which is nothing but a black curtain, because he fails to look around and observe and study the progress in the past. I do not believe that Mr. White agrees entirely—at least I hope he does not—with the position that has been taken frequently by Mr. Stephens in this Convention, that we should discourage entirely any further upbuilding of the State through the means of home-seekers. My own opinion of the raisin business is, that we can not flinch from the duty before us until all the school children of the whole land and of many foreign countries have stopped eating poisonous candies on their way to school and have discontinued buying these little nicknacks that are filthy and poisonous to them, until the raisin industry has been organized and systemized to a point where every dealer in candies will have for sale little packages, in oiled paper, of seeded raisins at a penny a package, until raisins and other healthful fruit products of California have been so produced and so marketed that they have, by their cheapness and their deliciousness and their value, driven from all the channels of our trade such unhealthful commodities as are now consumed.

MR. STEPHENS. I occupied a good deal of your time yesterday and I have no desire or disposition to occupy more, and certainly would not if it had not been for my worthy friend, Mr. Hartranft. I don't know that I owe any thanks to him for referring to me, as it necessitates my getting up and saying something. Now, I will preface my remarks by saying that I had the pleasure, a few hours ago, of taking a ride through the suburbs of Fresno and of observing the great prosperity which exists in this city and its vicinity. It is an exception to any other territory of equal size in the State of California. You gentlemen, you residents and property owners of Fresno city and vicinity, are favored more than those of any other locality in the State, and I attribute it to your organization, which brought forth prosperity from the ruin that existed before. I say to you, stand together upon the principles which you have already adopted, and if you can add to them anything that will be beneficial, add to them; but do not abandon that which has brought you prosperity. I say again, there is no city or town in the State that evidences the prosperity which your city of Fresno does. And why? Because you have brought millions of dollars into Fresno county and vicinity which has been distributed among the producers instead of having been gathered together in the coffers of those who have handled the products of others. That is the reason why, gentlemen, you are prosperous here: because the money that your raisins have brought has returned to Fresno and vicinity and has been distributed among the producers. Don't abandon your organization. If it is

defective, remedy the defects. It is suggested, if this is done, if that is done, or if something else is done, that when those things are done there will be a broader market. See that those things are done, Mr. Chairman and growers, before you plant and produce more than you can sell at a profit. (Applause.)

My friend Mr. Hartranft speaks of the great prosperity existing among the deciduous fruit-growers of the Sacramento Valley. No such prosperity, Mr. Hartranft, exists there as does here. Will Mr. Hartranft explain to us, as I did to you yesterday, why orchard property there has been mortgaged for fifteen or twenty years and is still mortgaged, some of the best in the State of California? Why is it that such a condition should exist, if the growers of deciduous fruits have been prosperous? Now, find the way, Mr. Hartranft, find the way through which prosperity will come to an increased acreage, either in raisins or in deciduous fruits, and then you have a right to suggest that the acreage be increased. I am willing to join hands with my friend Mr. Hartranft or with anybody else who will contribute his time and energy and money to develop the resources of this, God's greatest country upon earth. Nothing equals it, and all I object to is that it should be controlled almost wholly by half a dozen men.

MR. JOHNSTON. Mr. President, I also am from Sacramento, and I can not sit here and hear what my friend Stephens says without speaking in reply. We are not on the verge of ruin in the Sacramento Valley. Mr. Stephens says, why are the people from Fresno so much better off than we are in the Sacramento Valley? When we get ninety per cent of our growers in the Sacramento Valley to co-operate we will be in as good a position as you are down here.

MR. SPRAGUE. Mr. Chairman, I want to say one thing. I have been inviting the people of the East to come to California, and I am going to keep it up. I have not been inviting them here to plant raisin grapes or to plant Tokay grapes, but I have said to them: Gentlemen, it is the finest country under the sun to live in; it is the finest country under the sun to make a living in. I don't know of any place under the sun where a man can be so independent if he has got from twenty to forty acres of land, and water to put on it, and knows what to do with it. I said: Make a mixed farm, go into the production of several things, have cows, and chickens, and turkeys, and grow some fruit; don't put all your eggs into one basket, and you will make a living in California and you will be glad that you came. (Applause.)

MR. JOHNSTON. As I said, Mr. President, I am one of those men from the Sacramento Valley, and I want to tell a little joke on my friend Stephens. I was up on the American River last winter passing along by a very pretty place, an elegant farm. I saw some men digging some holes in a field, and I drove up and said: "What are you

digging those holes for?" "To plant grapevines." "Whose land is this?" "Russ Stephens's." "I thought Stephens was discouraging planting vineyards and fruit trees?" "Oh, that is convention talk!" (Laughter and applause.)

Now, I don't advise my neighbors to plant trees or vines, but I will plant them whenever I get time. I am very well satisfied with my work in planting trees. I have not had much to do with railroads, because I usually sell my fruit at home and make a living by it. I have enough now to live on, and I have been at it for a good many years, but I am still trying to get a little more land and I am planting a few more vines and a few more trees, just the same as Mr. Stephens is. I am perhaps assisting in the alleged overproduction, but I have not yet found the overproduction. I have always found sale for every pound of good fruit I could raise.

MR. STEPHENS. Mr. President, I want to reply to the gentleman, because what he has said places me in a rather awkward position, if not met with an explanation. You will remember that three years ago we made an effort, on the lines of the report and recommendation of the transportation committee, which was adopted by the Convention, that we appeal to the Southern Pacific Company not to enter into any new contract with any refrigerator car line. Up to the last minute everything indicated that the Southern Pacific Company was going to put its own car line on and eliminate the private car line. I had an opportunity to buy a piece of land for about thirty per cent of what was asked for it a few years before. That shows great prosperity there. It is good land, as good land as there is in that locality. If the car line was going to be eliminated from the service I felt safe in making that investment, and I purchased the land and planted the grapevines, before it was announced by the Southern Pacific Company that it had entered into a contract with the Armour Company. I tell you, fellow delegates, that had I known that that contract was to be renewed I would not have invested one dollar in the purchase of that land and I would not have planted out one grapevine, although it is in the very center of the best table-grape-growing land in the world. Why? Because I would have regarded it as without value, as subject, in a great degree, to the control of the car line. I only say this in explanation of the reason why I bought the land and set it out to vines. Now, that land had upon it $7\frac{1}{2}$ acres of deciduous fruit trees, of the best varieties. I tried one year to make something out of those trees, and I lost money on every box of fruit. I dug them out, they are out yet and the land is idle. It cost me about \$150 to dig out those trees. I made money by it and the land stands there, and if Mr. Hartranft or any one else wants to plant it he can do it. I didn't even plant it in grapevines. I was afraid of the result.

MR. HUTCHINSON. I have told people to come here, what they could do and what they were doing here. Take it with the farmers in the East, those in the same business we are; they have got to run from one place to another for weeks to get rid of their small crops, while we never have any trouble in selling our crops, and I think nobody in the State has any trouble of that kind. I think those who have kept account of all their shipments know that they have made money, they have found that they have come out ahead. That has been the experience of every man who has kept account of his sales.

MR. STEPHENS. Mr. Chairman, I regret very much to occupy so much time. I say, with this gentleman, that in former years when there were no manipulations by car lines the fruit-growers made money, and I did, I made plenty of money, but I give you my word that in the last two years my expenses have been greater than my income. In regard to selling, you are right, you have no trouble in selling, because a man comes to you and says: I will give you 30 cents a box for your plums, and you have got to take that 30 cents a box or nothing at all. Now, the 30 cents may cover your expenses for the year and you will get your money back. You have one buyer of deciduous fruits in California, and that is the Earl Fruit Company. Some men, like Mr. Anderson, may be permitted to buy some fruit, but the Earl Fruit Company bought the most of it, except what the Porter Brothers bought, and that fruit which they bought was shipped and sold in their name at a big profit, but the grower didn't get the profit, because he had sold his pears at 50 cents a box and his plums for 30 cents. Now, as I explained yesterday, the reasons why he sold were because the preceding year was a disastrous one, because he lost money, because Porter Brothers had this field, and the Earl Fruit Company's agents went around and said that you should not ship with a bankrupt concern and lose money. The year before he did not feel like venturing and was ready to take almost any price, and a large percentage of the fruit grown on the Sacramento River, where Mr. Johnston comes from, was sold and shipped in the name of the grower, but belonged to the buyer.

MR. HUTCHINSON. I want to state right here, gentlemen, that I have shipped a little fruit from this county, under great disadvantages, being three days short of the time from where Mr. Stephens ships his fruit, and I have kept an exact account of every sale and what I could have sold for here, and for ten years I have always come out ahead by shipping East.

MR. SPRAGUE. Right here I wish to make a statement, and that is, that last year several of our growers on the Sacramento River who shipped to the California Fruit Exchange received net fully as much and some of them a little more than the cash price paid by the Earl Fruit Company and the other company. That was in a disastrous year.

In the year before that they received a good deal more than the cash price offered them. This year they again received a great deal more than the cash price fixed, so that I wish to corroborate Mr. Hutchinson's statement, that the shipper who will stand right up on the proposition, even in these difficult times, will get more money for his product by shipping it than by selling it to the cash buyer.

MR. STEPHENS. I agree with you there.

MR. BERWICK. Mr. President, I made some remarks at Los Angeles, at the last session we held there, to the effect that I had been growing fruit for thirty odd years and had not made any money, and because I published those statements I was called a "knocker." I never have cared, and hope I never will care, what I am called in life, so long as I do what Berwick thinks is right. I thought it right to make those statements. Now, we hear a great deal about this fruit business, as though the growers were all making money. For my part, after years of hard work, I have not much to show for it.

MR. JACOBS. I come in contact with a great many fruit-growers of the Sacramento Valley, from Alameda County, and from a section of the State generally around the bay, and I am satisfied that in that valley—take any line of business in the State of California, and you will find that the fruit-growers of the Sacramento Valley are just as prosperous and successful as men engaged in any other business in the State, and if you take the average class of fruit-growers along the Sacramento River and in the Sacramento Valley they constitute just as prosperous a class as any other class in this State or in this country. It is a disgrace, as Mr. Stephens said yesterday, that one great shipping firm has gone into bankruptcy through their past speculations with the money which they have stolen, to use plain language, probably from the growers, for when they got those private rebates it came out of the profits of the growers. That is plain language, but it does not alter the fact that the fruit-grower, under present conditions, is as prosperous as those in any other line of business. Now, Mr. Chairman, I have a resolution to introduce. It is:

Resolved, That this Convention indorse the work being done by the California Promotion Committee.

I submit this resolution.

PRESIDENT COOPER. The resolution will be passed over to the Committee on Resolutions.

MR. HARTRANFT. Mr. Stephens has said that we can go ahead with planting and can go ahead in the regular expansion of our deciduous fruit industry when we shall have proper transportation facilities and the necessary marketing arrangements to justify it. In the first place, I don't believe that there was ever a useful instrument invented

for the use of mankind, I don't believe that there was ever any great work accomplished, except it was done under the stress of necessity. I don't believe that it is possible, in the administration of human affairs, to sit back and wait until you have an open road in any industry. It is a fact, and I am not ashamed to say it—in fact, it is to me a source of intense pride—that the deciduous fruit crop of northern and central California this year was marketed in a manner and with a record that is unparalleled in the history of the perishable fruit trade of the world, and I hope it will be next year so that the record accomplished is such that it will constitute a very happy story for that whole section.

MR. STEPHENS. Inasmuch as I have been accused of something which is disgraceful, I feel that a moment or two of your time might be properly occupied by me. I don't retract one iota of what I have stated. It is a fact, notwithstanding the utterances of my friend, Mr. Jacobs. Mr. Jacobs may come in contact with those growers he speaks of, for what I know, and may be he belongs to the millionaire class, I don't know. Now, take my neighbor and friend, for instance, Mr. Johnston. There is no question about his prosperity. There is no question about the prosperity of many growers on the Sacramento River, because they have been in the business a long time, but I make the statement that Mr. Johnston has other interests besides fruit-growing. I believe he is in the dairy business, at least he was, and he does not depend wholly upon fruit-growing for a living. I do not deny that Mr. Johnston and several other growers on the Sacramento River, and a few in other places, have made money by handling their fruit. But I wish to call the attention of Mr. Jacobs to the digging up of 58,000 fruit trees in one section of the country, in one holding, last year, because they didn't pay, and that is upon the Sacramento River, too. I wish to call his attention to the digging up of many thousands of trees in Butte County, it is alleged because they didn't pay.

MR. STILES. Mr. President, I am very sorry Mr. Stephens has not the facts and statistics to present in this argument. As a resident of Butte County, I would like to have him state the facts as to why those trees were dug up in Butte County. It was for no such reason as he tried to impress on this Convention.

MR. STEPHENS. Then what is it?

MR. STILES. Well, you tell.

MR. STEPHENS. I will tell you. As given out to the people of the State of California by the press, it was because they didn't pay, because the orchards, some of them, had been neglected, because the trees were old and unproductive. That is the very point I make here. I have been trying to call your attention, and the attention of Mr. Jacobs, and the attention of all advocates of increased population, to the fact that one of the most important factors, and expensive factors

in fruit-growing in the State of California, is replanting and renewals. You have got to dig up your trees at some time, and replant. Any man who knows anything about horticultural growth or vegetable life knows that you can not grow the second tree as rapidly and as well as you can the first, because you have taken from the soil the properties which go to make up its strength and fertility. You have to resort to fertilization—another expense. In addition, you have to wait from six to fourteen years from the time you dig up your first tree before you can pluck one profitable piece of fruit from your new tree. Frequently your second tree dies also, for the reason that the ground has been impoverished, or something, and you have to plant again. I am going through that experience now, gentlemen. I dug up trees seven years ago and put new ones out. Last year I dug out the new ones and they never had returned one cent to me. I planted others, and I don't know whether they will grow or not.

MR. MARSHALL. I just want to speak in regard to Fresno County, the county in which I live. I think that, as Mr. Stephens has made a failure up north, he should come down to Fresno County among people who are making money. Five years ago the mortgage indebtedness of the farms throughout this county was over \$42,000,000. To-day it is less than \$5,000,000. Now, we have got a fruit county that is all right.

MR. STEPHENS. Mr. Marshall, I said you had the best county in the State; that you were the most prosperous people in the State.

MR. STILES. Now, Mr. Stephens adds insult to injury as to various parts of the State, and I want to tell him why in my county the trees were dug up. The orchard was planted on alfalfa land, land that was not fitted for trees; they were the wrong variety, and in some cases they were planted on land worth more to take gold out of. We have taken \$25,000 in gold out of some of that land. Mr. Stephens does not state these things, but seeks to injure our State by the statements which he makes.

MR. McINTOSH. Mr. Chairman, in view of the fact that I opened this discussion this afternoon, I may claim, I presume, a few moments to close it. We began the discussion as to raisins in the San Joaquin Valley. This began over the paper of Mr. White, in something of a disputatious nature, but it has been enlivened by our friends of our neighboring county of Sacramento. I now desire to return for a few minutes to the general question which was considered in the beginning of this discussion, viz: raisins, in the San Joaquin Valley. We learned from Mr. White this forenoon that $1\frac{1}{2}$ cents a pound for raisins was just about equal to the cost of production, and that the price fixed at the present time is 4 cents a pound, the average price, and it has placed the raisin industry in the position of holding a large proportion of the present crop unsold and with only a bare possibility of realizing in the

ordinary time the prices that have been arbitrarily fixed by the directors of the Raisin-Growers' Association. Now, the proposition which I wish to impress upon you is this, that between the extremes of 1½ cents a pound which guarantees production, and the arbitrary rate of 4 cents, on the average, which has been fixed by the Association, there is a mean, a happy medium, between the two, and I stand for that happy medium, and in taking this position, friends, I do it in the face of all the vineyardists in Fresno and adjoining counties who have raisins to sell. Naturally enough, they want to realize the best prices obtainable for their product, and when I controvert the advisability of the extreme rate, I am talking in the face of one of the strongest passions—that of selfishness. It is a passion the opposite of sympathy. The sympathy side of our nature tells us we should not limit production in this valley, but should keep our prices in the reach of the consumer. It is guaranteeing a livelihood to the people who live in those climes, in those localities where life is something of a burden, where the inclemency of winter and the disadvantages of summer make a large part, at least, of the inhabitants of the United States in favor of a home in California. I believe in immigration. I stand for that proposition, and in standing for it I want to say to my friends and my relatives, and I have many of them in the East: Come to the blessed and bountiful State of California, come to that prince of all of the localities in California, namely, the Raisin Center of the State. While we want no Cræsus and expect no Cræsus in this valley, we offer those who come here the glad hand and guarantee to them a comfortable living on the basis of a fair income for their labors in behalf of soil production, and above all in behalf of raisins. (Applause.)

PRESIDENT COOPER. Mr. McIntosh has said that he would close the subject. He opened it, and he has announced that he will close it. Of course, it is not exactly proper for the chairman of a convention to enter into discussions, but I would like to ask Mr. McIntosh two or three questions. What is the value of the land on which you grow raisins here in Fresno?

MR. McINTOSH. Mr. Chairman, there are very many conditions that enter into the value of land.

PRESIDENT COOPER. Well, good land?

MR. McINTOSH. I presume the average, Mr. President, for raisin land, under fair conditions, here, that is, what we call wild land, unoccupied land, can be purchased all the way from \$75 to \$175 per acre.

PRESIDENT COOPER. We will put the value, then, at \$100 an acre. How many pounds of raisin grapes can you raise on an acre; how many are grown on an acre, on an average?

MR. McINTOSH. Well, any raisin-grower here might give the average; I don't know that I could, Mr. Chairman. It varies very

greatly, according to the soil, according to the vines, according to the care, irrigation, and so forth, and a number of other things that go into it. Now, for full-bearing vines, that is, the Muscat and Malaga grapes, what would it be, Mr. Hutchinson? Probably you can help me there.

MR. HUTCHINSON. Well, the average for the county would be about one ton to the acre on all land where the vines are over three years old.

MR. McINTOSH. One ton to the acre, and the average price, as we have learned, is 4 cents per pound.

PRESIDENT COOPER. Then we have the proposition that they pay \$100 an acre for the land, and by the time the vines begin to produce, assuming a reasonable cost for planting and caring for those vines, you have an outlay of \$200 an acre. Mr. White stated that at 4 cents a pound the grower possibly had $2\frac{1}{2}$ cents a pound profit, and that, on two thousand pounds is \$50 an acre. In twenty-five years you have to dig up these vines and replant, or may be before then, even if the mysterious vine disease doesn't take them, so that in twenty-five years you have at least the cost of \$400 an acre for that land. Therefore, the profit of $2\frac{1}{2}$ cents a pound is too little, and whenever you talk about decreasing the value of raisins to such a point that a man can't live he had better leave his place and quit. Two and a half cents a pound is as little profit as ought to be expected by anybody who would buy raisin land and plant raisin grapes.

MR. F. W. CRANDALL, OF SAN JOSÉ. I move the adoption of the following resolution:

Resolved, That the thanks of this Convention be tendered to Mr. C. A. Jenkins, Manager of Fresno City Railroad, for the very pleasant ride over his lines, affording an opportunity of seeing Fresno under most favorable conditions.

Motion duly seconded and carried.

PRESIDENT COOPER. I am very sorry to make a statement. I received a telegram last night informing me of the death of my brother-in-law, and the widow has telegraphed me to come home, so I will not see you any more at this Convention.

MR. STEPHENS. I wish to move that the heartfelt sympathy of the members of this Convention be extended to our beloved President in this hour of bereavement, and also that the thanks of the members of the Convention of Fruit-Growers of the State of California be tendered to him for the very able and impartial manner in which he has presided over the deliberations of this Convention.

VICE-PRESIDENT McINTOSH. Gentlemen of the Convention, you have heard the motion of Mr. Stephens respecting our very worthy President, to whom it is desired, in this motion, to extend, in this hour of his bereavement, the condolence of the members of this Convention;

and, further than that, to express to him our hearty and cordial thanks for the impartial and worthy manner in which he has presided over the deliberations of this Convention up to this moment. I bespeak, I believe, the sympathy of every member present, ladies and gentlemen, to this liberal man in this hour of his heart's bereavement. All who favor this motion signify it by rising to your feet. Mr. President, it is so ordered.

Here an adjournment was taken until 7:30 o'clock P. M.

EVENING SESSION—SECOND DAY.

WEDNESDAY, December 9, 1903.

Convention met at 8 o'clock P. M. Vice-President McIntosh in the chair.

MR. McINTOSH. Mr. M. V. Hartranft, of Los Angeles, is on the program for a paper this afternoon: "Fruit Markets and Marketing." I take pleasure in introducing to you, ladies and gentlemen, Mr. M. V. Hartranft, editor of the "Fruit World," of Los Angeles.

FRUIT MARKETS AND MARKETING.

BY M. V. HARTRANFT, OF LOS ANGELES.

The market price of any given product at any given time is that point in the commercial scale of dollars and cents where the man who wants will surrender the coin of the realm to the man who has produced; and the ascertainment of the exact price point at which the great bulk of any commodity can be successfully moved is worthy of the occult powers of a seer, a prophet. Upon this rock some of our strongest marketing organizations have gone to pieces. Who is the man who can run his finger up and down the gamut of prices and stop, with exact precision, on the price point at which an entire crop of any one line may be successfully moved into the stomachs of the people?

The directors of the Prune Association could not do this thing—in fact, they fixed prices just a quarter of a cent too high, and their great craft wrecked ere it was started upon the first voyage. The directors of the Raisin Association have not been able to do it with continuous success, although they have approached nearer to success than any similar undertaking that has come under my observation. The citrus fruit exchanges have not even attempted to fix a price basis, high or low, but have worked to capture the best results in the consuming

markets from day to day. Between the man who has produced and the man with an appetite is an army of middlemen, helping, by one method and another, to bring the two people together, and likewise an army of middle factors, of the speculative mood and method, whose principal operations tend to keep these two factors apart, for the purposes of profit, or extortion, if you wish; and so hopelessly interwoven is the present-day fabric of commerce that it oftentimes requires microscopic vision to distinguish the evil from the good. We have the men who do tell us what price we ought to hold our product for, but they offer us no guarantee that we will not lose by their advice, or that their friends will not sell out at ruling figures while we hold the bag.

In the solution of this problem of marketing come the questions of organization and method of operation. In organization records we have some bright successes and some ugly wrecks. Our Walnut-Growers' Association stands with a seven years' record of continuous success, and gradually ascending markets all the while. Next comes the Citrus Fruit Exchange, which, with modified plans to embrace large commercial packing concerns, represents a large body of small factors compactly welded into one massive operating office. Then the Raisin-Growers' Association, the history of which is too well known to need repetition. And the Fresh Fruit Distributors, controlling ninety-seven per cent of the fresh-fruit shipments, and so administered that for the first time in the history of the State the whole crop was marketed without a glut at any point at any time within the season. And then the Vegetable Union of the south, which has made a record equal to that of the Distributors for two successful seasons. And last of all the Prune Association, which hath been but which is not now.

Of these six great organizations of producers, the Raisin and Prune Associations may be defined as liberally democratic in their government; the others are operated on lines of representation bordering on autocracy.

The problem of organizing, in all its details, is insignificant as compared to the marketing problem. In the consideration of this problem there are three distinct classes of our products which must be considered separately, for the methods that apply to one can not possibly be used with another. We have: 1st, Immediately perishable fresh fruit and vegetables; 2d, Semi-perishable citrus fruit and apples; 3d, Staple cured fruits, raisins and prunes.

President Berwick, of the Postal Progress League, has told you what the Postal Department might do for fruit-growers. I will only emphasize. The establishment of a parcels post service in the United States, such as already prevails in every civilized nation worthy of the name, will bring producers and consumers so close together that, by one fell stroke, all unnecessary middlemen will be eliminated. Mark the words: "unnecessary middlemen."

In the three classes of products which we have to market I mentioned the immediately perishable fruits, such as cherries, apricots, peaches, plums, pears, etc. The path of progress which this branch of the industry has trod these many years is full of pathos and some glory. Out of the wrecking influences of great competition has come a welding of antagonistic interests which has eliminated unnecessary losses and brought us through an entire season of marketing perishable fresh fruit without the evidence of the usual glut at any point. It is true that there have been many contributing causes to the successful results on this year's deciduous fruit crop. The main contributing cause, however, was the unanimous action of over ninety per cent of the shippers in distributing their product properly.

A fundamental point in the success attained in the marketing of fresh deciduous fruit is the open auction-rooms of the important Eastern cities. The auction houses of the East, when conducted in large and important markets, are the bulwark of safety and protection to the producers of our fruits. They give absolute publicity to prices, with the added advantage of concentrating all competition behind the price-making.

Are auction reports reliable? is a question I often have put to me. Those of you who have attended a fruit auction sale in any of the large Eastern cities could not entertain any doubt. There is an open room, open to all the trade from the humblest peddler to the richest wholesale jobber. Is an auctioneer offering the fruit to the highest bidder? The auctioneers are licensed under State laws, and the records of the auction sales are always subject to the inspection of State officials or the public on demand, with enormous penalties for false reports. A printed catalogue is offered before the sale, and with this in hand the buyers go and inspect the separate lots and then mark down their condition upon the catalogue. Every one of the several hundred buyers has one of these catalogues. The sale is called to order and the fruit offered to the highest bidder. Every one of these buyers keeps a memorandum of the prices for the lines of fruit as sold. In the motley throng of people who attend the sale are men of every nationality, from every part of the globe, and of diverse social condition. A combination among such buyers would be miraculous. If a combination were made, there is nothing to prevent an outsider from slipping in and breaking it. The auctioneer is always able to take a fictitious bid. He stands facing an assemblage of four hundred buyers. When the bidding is slow, I assume that he frequently raises the figures as he goes along. I assume this because he frequently comes to a limit in the bidding and knocks it down to a man who says he made no such bid. The auctioneer scolds the man for waving his catalogue, and reoffers the line. On such a happening as this, you can depend that the auctioneer has been

faking the buyer a little, and when it comes to a showdown, the one auctioneer has more opportunity of conspiring than all the buyers if combined together.

On the sale of semi-perishable fruits, such as oranges, lemons, and apples, I do not believe in the ultimate practicability of any system except the home auction system: the sale of these fruits, of good carrying quality, at the depot of shipment, or at some central point in California, to the speculator of the East or of our own State, giving the owner of that fruit the opportunity, if he is not satisfied with the bid that is offered, to speculate himself, to buy it himself if he likes. You can go in any open auction-room and buy in your own fruit. To sell oranges and lemons under the home auction plan, I would recommend for northern California that it be started at Oroville and at Porterville. For southern California I would recommend that it be started at Colton, and the sales held daily; Colton being the central point to which all the shipments could be brought over night. I would consider the success more certain if the bidding were not spirited at the beginning. I would like to see them get such bargains that would make them all feel like having a representative in California, or one member of the firm coming out to spend the season, not necessarily to buy, but to pick up "snaps" if he sees them. Every "snap" that was picked up would only insure the certainty of the operation of the plan. This battle was fought and the same system was established in New York and in other Eastern cities, and was established against the same odds. Why that system could not be transferred to Porterville, to Watsonville, to Oroville, and to Colton, I don't know. The expense of selling at auction is very light. The Eastern representatives could advise their principals about what figure they thought certain brands and lines should bring in the sale the following morning, and, banking on the judgment of their own men, the managers here could buy this fruit in, in fact, re-invest the growers' money, and against them is the price record, which they will either exceed or fail to exceed. It has been argued that the Eastern fruit buyer would not care to come out here and bid for fruit against the man who owns it. He does it all through the East, in all the Eastern auction-rooms. When a few "snaps" occur in the sales, he soon gets over his disinclination. The enticement of a bargain will result in his wiring his broker: "Well, if you can get them for so and so, take them in," and will probably result in the personal attendance of one member of the firm at each sale.

In conclusion on that topic, I believe that all the oranges, all the lemons, and all the apples of the State could be successfully sold in California by the home auction method, and not the least of its benefits would be that we would operate our picking forces in the orchards as the demand expressed itself.

LOUISIANA PURCHASE EXPOSITION.

By J. A. FILCHER, OF SAN FRANCISCO.

Mr. Chairman, and Ladies and Gentlemen of the Convention: The Merchants' Association of San Francisco is a very strong and representative body. It is moving energetically in the effort to have the metropolis of this State properly represented at St. Louis. It has been working zealously in that regard, and Mr. Wiggins of Los Angeles and myself have been working as energetically as we know how to try and interest the people of the metropolis to do what you in Fresno County are doing. You are trying to do something distinctively for the benefit of this county, in co-operation with the commissioners, and inasmuch as the counties generally of the interior are doing that, we can not consistently take State money to do special things for the several localities that are neglecting this work. We will take Fresno County, for illustration, because the people here propose to put up Fresno money for the purpose of specially emphasizing some of the strong features of Fresno—it is not fair to take State money to advertise the strong features of San Francisco. Los Angeles wants to get in with the stereopticon, and San Francisco should be there also. We will have in our State building a splendid hall, where we propose to hold free lectures illustrated with stereopticon and kinoscope views, and we propose to advertise them in the World's Fair Bulletin. From past experience, we know that there are thousands and tens of thousands of people at all expositions looking for something for nothing; they are looking for the free things and they are looking for a rest. The exposition grounds at St. Louis are very large, and by the time the visitors have wandered about until noon or two or three o'clock in the afternoon they will want to come to the California building and sit down in a comfortable chair and listen to a lecture illustrated with slides and moving pictures, explained as they will be by the lecturer. The scope of these pictures is calculated to take the visitor from the time he enters the State, by one route or another, through all the leading sections of the State, showing by illustration not only her industrial features, but her scenic beauties and her hotelries and resorts and all that in this State is interesting. Now, it is probable that this locality would like to have a few slides and probably a moving picture in that lecture, and no doubt will have them, and if it does it will pay for them, because we have given the concession to certain gentlemen who are going to conduct this thing, and they expect to get their money out of the resorts and the institutions that make money out of tourists and home-seekers. If Fresno wants a picture of the vineyards of Fresno, or of the packing-houses of Fresno, it will not have to be paid for, because those are industries material to the State and will be represented as a State feature; but if

there is some spring, or some house, or big hotel, something of that kind, the party who makes money out of that must pay money for the slide.

Before the Merchants' Association last night, however, there were speeches on different subjects. First, why San Francisco should exhibit, and I thought that was almost answered in one sentence by the speaker who replied to the toast. "For the same reason," he says, "that a man answers a girl, when she looks in his eye and says: 'Why do you love me?' 'Because I would be a darn fool if I didn't.'" And when you say: Why should San Francisco exhibit, the reply would be: Because it would be a darn fool if it didn't. The scope of the next speaker's remarks was, what San Francisco could exhibit, and how it ought to do it. My remarks, as accredited to me in the program, were on the general scope of the Exposition and the state of preparation. I remember that I premised what I had to say by referring, first, briefly to the reason for the Exposition. I said, if I remember rightly, that it had been the custom of mankind, since the beginning of time, to celebrate great events affecting their welfare, and I said, and repeat it here to-night, that the purchase of the Louisiana territory was one of the greatest events in the history of the United States. Prior to that time, Spain hampered us on the south. It was not until sixteen years later that we acquired the territory of Florida and the strip of country along the Gulf to the mouth of the Mississippi River. West of the Mississippi River we ran into Louisiana. Therefore, the mouth of the Mississippi River and key to the commerce of the greatest valley in the world was cut off from the United States, as all the western border of that country was owned by France, and I said and now repeat it that it seems as though it was a providential occurrence, designed for the greatness of this country, that Napoleon, hampered at that time by the threats of England, was in a position where he needed money worse than he needed territory in a far-off country, and was willing to relinquish his right to that empire for what seems to-day the paltry sum of \$15,000,000. By that purchase, negotiated by the American minister, Robert R. Livingston, on the one side, and Napoleon's minister on the other, we secured an empire, and we opened then and forever to this country the commerce of the Mississippi River and the great valley adjacent thereto. This empire extended from the Mississippi west to the summit of the Rocky Mountains, and at the suggestion of the French minister, Beaupre, the western boundary was left undetermined. France claimed positively to the summit of the mountains. She had a shadow of a claim to the country lying farther west, and was then disputing the right to the northwest with Spain on the one side and England on the other. Immediately the Lewis and Clark expedition started from St. Louis—and it is an interesting fact that it happened to be St. Louis

that it started from—to explore this northwest territory lying beyond the Rocky Mountains, and to secure it, if possible, for this country by reason of exploration and settlement. Without the purchase of the Louisiana territory, that exploration would not have been made. Without that exploration we could not have extended our domain to the Pacific Ocean, and without those results we would have still been hemmed in by the territory lying over toward the Pacific. But all these things seemed to work together for the glory of this country, and established then and forever the prestige of the United States as the dominant power in the western empire.

Now, is it any wonder that those realizing the importance of this event, the fact that this gave us fourteen states and territories, 100,000,000 square miles of land, and for only \$15,000,000—much of which was sold again by this Government for \$800 a square mile—an event which gave us all this, and which opened up to commerce all the great richness of the Mississippi Valley, which gave to us the inestimable mineral wealth of the Rocky Mountains, which led the way to extending our territory to the Pacific Ocean and spread our empire from sea to sea—is it any wonder that those realizing these facts should have felt it was an event in the history of this country demanding some kind of fitting celebration? It was suggested in the assembly of the Trans-Mississippi Congress that this event ought to be celebrated. It only needed to be stated to be approved, and after being approved by resolution of that congress the Governors of the Louisiana States appointed delegates to meet in convention in the city of St. Louis. They met there on January 10th, in 1899—ninety-three delegates in all. They first discussed the idea of commemorating the event by the erection of some great monument somewhere within the territory; but it was said that no monument ever built by man would be large enough to commemorate so important an event. It was said by another: Let us celebrate it by a World's Congress, a World's Fair, and let us make it the greatest that has ever been held in the world. That idea predominated, and they appointed an executive committee to carry it out. They decided on St. Louis as the place where that fair should be held, because St. Louis, with its 600,000 souls, was and is to-day the great distributing point of the West and the greatest city in the territory purchased. This executive committee made and decided on a plan to finance this great event. They said: We will start in by raising \$15,000,000 for the celebration—the same amount which was paid for the territory. And as to how they should raise it, it was decided that they would ask the people of St. Louis and Missouri to give them \$5,000,000, by personal, private subscription; they would ask the city of St. Louis itself to give them \$5,000,000 more, and they would ask the government of the United States for \$5,000,000. Early in 1901 it was announced proudly

by the enterprising citizens of St. Louis that the \$5,000,000 was secured. Immediately afterwards the city voted \$5,000,000 of bonds for the purpose, and in the following March, 1901, the Senate of the United States passed a House bill appropriating \$5,000,000 more. With this \$15,000,000 the success of the Exposition was assured, and they began energetically to prepare for the same. President McKinley, not a great while before his death, issued his memorial invitation to the countries of the world, setting forth what it was proposed to do, and asking them to participate in the celebration, and through the ministers of the United States this memorial was presented to every civilized court on the globe. They accepted the matter slowly, for the foreigner is rather phlegmatic and slow to wake up to great events, especially when they are events in which he has little interest; but, little by little, the importance of the celebration was pressed upon them, and one after another they have come into line, until to-day it can be said with pride that fifty foreign countries have signified their intention of participating in this splendid exposition. Pressure in the meantime was brought to bear on the States, and to-day thirty-seven out of the forty-five States have made direct appropriations for a participation, and four of them, making forty-one in all, have raised from \$50,000 to \$200,000 by other means for the purpose of representation at St. Louis.

Altogether there are something over one hundred buildings being erected there, and when I say altogether, I mean, first, the fifteen magnificent government buildings erected by the executive authority. Then come in the State buildings, then come in the foreign buildings—and many of the foreign buildings are of splendid proportions. France has reproduced there the Grand Trianon palace of Napoleon at Versailles, fourteen miles from Paris, visited by all tourists to that country. England has reproduced the Kensington palace, and other countries are putting up buildings of historic interest and fame. England is spending in St. Louis \$700,000, Germany is spending \$750,000, France is spending \$700,000, Brazil in South America is spending \$600,000, Japan is spending over \$500,000, and our little neighbor on the south, Mexico, has appropriated half a million for a fitting representation at that Exposition. These are only instances of what foreign countries are doing. I say to you that it promises to be by far the grandest and most magnificent aggregation of the efforts of mankind, intellectual, scientific, and industrial, that was ever gotten together on the globe.

To indicate its proportions, let me say to you that this great fair is being held in what is known as Forest Park, embracing some 2,500 acres; the western portion of it and the least improved is occupied by this fair. An area of 1,200 acres was set aside for the purpose; but subsequent events proved that there was a crowded condition, and they

subsequently rented what is called the university grounds, with the university buildings thrown in, buildings that cost over \$1,000,000, paying \$75,000 rent for them for one year. They have since leased what they call there the Skinker tract, another large body of land; all of which, added to the original domain, makes a body of something over 1,500 acres, and this against 600 and some odd acres in use at the World's Fair in Chicago. The buildings there, the large Exposition buildings, are fifteen in number—the smallest of which covers about 4 acres, and the largest of them about 20 acres—covering in the aggregate 128 acres of floor space, as against 82 acres covered by the buildings in Chicago.

The money required to open the gates of this Exposition, in the aggregate, as estimated, will amount to about \$50,000,000, as against \$28,000,000 expended in Chicago, and yet we who saw the Chicago Exposition, held ten years ago, believed it was the triumph of the efforts of man in this generation. I remember when I went in the gates and looked upon those tremendous structures, so awe-inspiring in their immensity, so grand and magnificent, out-rivaling anything that my eyes or the eyes of ordinary man had ever rested on before, I was overwhelmed, and stood there for the time and looked and looked again to contemplate and wonder that puny man could do things so grand. And yet Chicago's exposition was small compared to what the exposition at St. Louis will be.

All the proportions of this St. Louis celebration are on the most magnificent scale, and I want to say to you that everything is in a splendid state of preparation. Already seven of those fifteen buildings are absolutely finished, and when I say "finished" they are finished. I have seen a great many exposition buildings, but I never before saw one finished until the exhibits were in and sometimes after the exposition opens. When you get in there, you will see that the buildings are clean, their floors are washed, the plastering on, and the floors marked, all in readiness for the exhibitors to go in and put up the structures. Some of them are marked 99 per cent finished and some 98 per cent finished, and the one farthest behind—the Forest, Game, and Fish—is accredited with being 70 per cent finished. In the aggregate, the State buildings, foreign buildings, Midway buildings—or as they call them, "Pike Buildings"—all the buildings of the grounds, including the Stock buildings, including the Filipino buildings—40 acres there—including all road work, the canal work, the façade work, and all the work of installation of machinery, power plants, and all those things, Director of Works Taylor reports the first of this month that, all told, 88 per cent of the entire work was finished at that time; and 88 per cent is just 40 per cent nearer completion than the Chicago World's Fair was five months before it was ready to open its gates; so the indications are that it is going to be ready—all ready.

The wide avenues are beautiful and smoothly paved, and people can walk all over those grounds without miring of a wet day or walking in the dust of a summer afternoon. The indications are that it is going to be pleasing, and the grounds surpassingly beautiful. This hall is about square, but you can imagine a rectangular space a third longer than it is wide; now a line from that corner to that, and the portion over there to be practically level, and this portion rolling or undulating, and you will have some idea of the condition of the surface of the park; and on that level portion of the ground, the buildings, or most of them, are lying in fan shape, starting over here and coming up to a common point on the hill, and starting here and coming to a common point, with avenues 600 feet wide, and a beautiful lake for the gondolas, with branching canals in the center of the avenues. At the center of the forks, the handle of the fan, you have, on the brow of the hill, the peristyle, about 60 feet high—or the façade, I have forgotten exactly what they call it in architecture—but a beautiful structure, a colonnade, with beautiful columns beautifully figured with architectural designs commemorative of the early history of this country, 1,500 feet long, in a semicircle; at either end a magnificent tower arises, and in the center stands a temple, a great structure, and in this temple all the congresses of the world will center. Between the temple and the towers on the end are the cascades, so arranged that the water will fall, step by step, one little fall after another little fall, from the top to the bottom, in a long semicircle, and each of them going over stained glass, to represent a different color. Forty thousand horsepower will be used to generate electricity, and the intention is that the illumination shall outclass anything ever before seen on earth.

These are the conditions, and it is to this greatest of expositions, my friends, it is to this magnificent showing of the world, it is to this point where the people of the world will congregate, where the critics of the world will come, that we as a State are asked to go and participate, and the question that comes right up to us is, shall we be represented, and how shall we be represented? The commissioners say we shall, and that we shall be creditably represented, and to that end they are working with all the zeal and energy and talent they possess, and propose that no effort shall be lacking, that no stone shall be left unturned in the accomplishment of this end, to a degree that shall be satisfactory to you and to them, and, as far as possible, to all the people of the State of California. We understand that we are limited in the matter of finances. In Chicago there was \$327,500 of State money expended, and we have \$130,000, and yet we have grown greater since that time, and we are going to an exposition vastly greater. We have made a reputation in that time for doing things grand and beautiful, and people abroad expect much from us, and you can understand our embarrass-

ment when we undertake with \$130,000 to meet the expectations of our foreign critics; yet we believe that, by the generous co-operation of the counties and the communities of this State, assisted and encouraged by public-spirited men of the State everywhere, and reinforced by the press, which will lend a helping hand—we believe that when the final exhibit is installed, the result will be a triumph of effort on the part of California, one that will reflect credit on you and result in great benefit to the State.

On motion of Mr. Stephens, a vote of thanks was tendered to Mr. Filcher for his attendance and for his very able and eloquent address.

THE RAISIN GRAPE COMMERCIALLY.

BY ROBERT BOOT, OF FRESNO.

The raisin grape, although introduced into this State fifty years ago, has not been of commercial importance more than half that length of time; the total production for the State in 1876 being in the neighborhood of 600,000 pounds of raisins, which increased by leaps and bounds up to 1894, when the production reached 103,000,000 pounds, at which time the industry was suffering great depression in consequence of the unorganized producers' eagerness to force a twelve months' supply of raisins on the market in ninety days. The business of the vineyardist became unprofitable, raisins were sold for less than the cost of production, and many thousands of acres of vineyard were destroyed. This depression existed more or less acutely up to 1898, when the vineyard men organized under the name of the California Raisin-Growers' Association, since which time the business has been carried on on a profitable basis, the production increasing until the high-water mark of 115,000,000 pounds has been reached this season.

The vines from which this large amount of product is derived are among the choicer varieties of *Vinifera*, imported from Spain, and are known as the "Muscat of Alexandria" and the "Gordo Blanco Muscatel"; the latter is distinguished from the Muscat by its lower horizontal growth and its round berries, in contrast with the upright growth and oblong berries of the Muscat of Alexandria. The Malaga grape is also largely cured for raisins, but is destitute of the Muscat flavor, and, being a thicker-skinned, coarser grape, is not so highly prized for this purpose as the Muscat. This reason, and also the difficulty of removing the cap stem, make it objectionable as a seeding raisin, but, on the other hand, make it more valuable as a shipping grape for table purposes, and large quantities are annually shipped to supply this demand. It is said also to make an excellent quality of Valencia raisin for cooking purposes. Our raisin production also

includes the cured product of the Seedless Sultana and the Thompson Seedless, which amounts to several thousands of tons annually.

The area in the State devoted to these varieties of grapes is estimated to be 64,000 acres, but this is probably an underestimate to-day, in consideration of the many new vineyards planted in the last few years, which more than counteract the loss by old vineyards being put out of commission by alkali and other causes. The average yield, covering a series of years, does not exceed three-fourths of a ton per acre for the State, proving that a considerable area is devoted to raisin-grape growing that is unsuitable for its cultivation and unprofitable to the owner, as in most raisin districts there are vineyards which are known to produce double, or more than double, that amount.

The counties of Yolo and Solano have the credit of producing and shipping the first consignment of raisins in merchantable quantities; closely followed by Riverside, San Bernardino, Orange, and San Diego counties, and lastly by the San Joaquin Valley, which, from its favorable climatic conditions as to dryness of atmosphere and high temperature, combined with abundance of water and suitable soil, has come to the front as the banner raisin district of the State, and in which raisins of the best quality, and largest yield, at the minimum cost of production, can be obtained by the vineyardist, with probably one exception in favor of Yolo County, where they turn out an excellent quality of Seedless Sultanas.

The future of the raisin grape and the raisin industry is bright and promising, but success in this industry, as in all others, will come only as a reward for eternal vigilance. The Muscat vine, being one of the choicest and most delicate of the *Vinifera* family, is liable to suffer first from any adverse influence, and there are many adverse influences waiting to prey upon it. The deadly mysterious disease that swept the vines from the rich district of Anaheim and other southern districts and is now preying upon the vineyards of the Sacramento Valley is probably most to be dreaded, as no known specific has yet been discovered for prevention or cure. The minor evils of mildew, oidium, and kindred fungous growths are apt to attack the Muscat in preference to other and hardier varieties. Then, in the insect world, we have, first, the phylloxera, which is already with us; but conditions do not seem favorable for its propagation at a very rapid rate, and it is principally confined to the heavy red loams; it is probable that this evil can be taken care of by being prepared with resistant stocks to replace its ravages, without diminution of our annual crop of raisins. Then, the lesser pests of cutworms, sphinx worms, grasshoppers, and the thrips, which are always more or less with us and can be easily controlled by early cultivation. I have never known injury from this cause where the cultivation destroyed all weed growth in a vineyard

one week before the vines came out in leaf. Prevention is better than cure, and, on general principles, a vineyard that is kept in high condition by careful and thorough cultivation and judicious fertilizing will resist many evils from which a neglected vineyard will suffer. The use of sulphur should not be forgotten; two or three dressings in the spring act as a stimulant to the vine, prevent oidium, and, I believe, assist the early ripening of the crop.

Before leaving the subject of the welfare of the vine, I will say a few words on the subject of pruning, which is a very important part of the necessary work of a vineyard. Some vineyardists boast of the fact that they have let their pruning by contract at so much per acre—say, \$1.50, including burning the brush—and then turn the contractor and his men loose in the vineyard with little, if any, supervision, with the result that when they get through a first-class butchery has been accomplished. In some vineyards, the brush is chopped off at equal length from the stump without regard as to the number of eyes left, no discrimination in thinning, suckers even are pruned and left as desirable bearing spurs. Then again, others prune the stump bare, as though the object was to grow suckers entirely, and after a few years of this treatment they have nothing but suckers, with the crown of the vine rotten and dead. Whatever form of vine is desired, it should be remembered that the best bearing spurs grow from two-year-old wood, and that this two-year-old wood should be growing on or around the crown at regular intervals to give the most space for the hanging bunches, at the same time by a free circulation of sap keeping the whole vine in a healthy growing condition.

Drainage, in some districts, is a question of vital importance to the welfare of the vineyardist. A water-logged vineyard, with only a foot or two of soil available as feeding ground for the roots of a vine, is a poor proposition, requiring an annual artificial supply of ingredients necessary for the support of a vine and the crops; and the evaporation of this water, all of which is heavily charged with alkali, will in a short time make the upper soil incapable of sustaining any vegetable life less hardy than Bermuda-grass.

And, finally, the future of the raisin grape and the prosperity of the raisin industry will be determined by the margin of profit left to the vineyardist, over the cost of production. We all know by experience that even when the supply does not exceed the demand, the competition among the vineyardists themselves, in an effort to be the first to realize on their crop, utterly demoralizes the market, with the result that it is the impecunious grower who fixes the selling price, and that, without organization and co-operation, is always the inevitable result.

We have to-day a strong organization in the California Raisin-Growers' Association. With a very large crop to dispose of, the market

has taken a full average quantity of raisins and its present requirements are supplied; but the market is badly demoralized at the present time by offerings of raisins not controlled by the Association at $1\frac{1}{2}$ cents per pound below Association prices, which is a loss not only to the owner of these raisins of \$30 per ton, but to the whole crop of at least \$10 per ton more. The remedy for this can only be found in unanimous co-operation among the producers, and much better results will be attained if the make-shift, one-year contract could be replaced by one for a term of years, with authority given to the management to raise some capital, enabling them to expend money for efficient advertising and for the erection of packing-houses, if necessary. The subject of co-operation and marketing will, however, be presented to the Convention in a separate paper, and no better field to illustrate it could be found than the raisin grape, in consequence of the limited area in which it can be profitably grown.

HANDLING AND MARKETING THE RAISIN CROP.

BY D. D. ALLISON, OF FRESNO.

The marketing of raisins necessarily depends upon a great many of the details being carried out successfully before the raisins are ready for market. The first duty of the board of directors of the Raisin-Growers' Association has been, in the last two years, to get as solid an Association as possible. About a year ago what was termed a five-year contract was placed before the growers for their consideration, so that they would have ample time before the annual meeting to digest it thoroughly and pass upon it, and so that the work of the Association could proceed speedily and successfully for the coming year. At that annual meeting the contract was passed upon affirmatively and unanimously. To each grower known to the Association was sent a copy of the contract, together with a stamped envelope addressed to the Association, with the request that the grower, after reading the contract thoroughly, sign it and forward the duplicate thereof to the Association. We waited several months, and succeeded in getting about five per cent of the growers to sign; and just about the time the board of directors had decided to go on a barn-storming expedition to interview the individual growers, a meeting was called and by a vote almost unanimous it was decided to request the board of directors to change the five-year contract to a one-year contract. The board of directors called a special meeting and submitted the question to the growers, and they decided to change it to a one-year contract. When the vote was counted, on the assumption that there were in the State of California 64,000 acres planted to Muscat grapes, we found that we had about 93 per cent of the acreage; but in the last two days we succeeded in getting 20 per

cent of that 92 or 93 per cent. Everybody in this community, no matter whether a shoeblick, a banker, a barber, or a butcher, realized that the success of this Association is the success of every individual here. It was only by supreme effort on the part of everybody in this community that we succeeded in holding it together. I do not think you could ever get 100 per cent of growers in any organization of this kind on the face of the earth. Now, we thought we had 93 per cent, and yet out of a total of 118,000,000 pounds the Association has received 96,000,000 pounds, and outside of the Association there are about 22,000,000 pounds. We know that positively, and we know positively that men who signed the contract delivered part of their goods to the Association and then in the "wee sma' hours" of the morning hauled their goods to an outside packer. We know that men will sign with the Association and then go to outside packers to see if they can get a bid on their goods, and if they can get more for their raisins by so doing they will leave the Association in the lurch and sell to the outside packer. We know that men deliver their goods both to the outside packer and to the inside packer, thus working against their own interests. We know that men will go around and solicit every grower in the country to sign these contracts and will preach to them the doctrine of co-operation, and will come into our office and preach it to us, and yet have never signed a contract with the Association. That is one of the problems we are up against.

There has been a great deal of criticism about the board of directors reducing the price of raisins this season. Whenever I vote for a director to represent me in any organization, I do so because I think he has intelligence enough to attend to my business for me. The idea of electing a small body of men to represent a large body is because in that way the business can be done more successfully and more profitably for the whole mass. The board of directors has been censured repeatedly because it does not publish the details of the business. To do so would be to frustrate the very point the Association was trying to reach. We have traced up whence all this squealing has come, and have found that it is from the pen of the outsiders. It is not from the man who has been supporting the Association. It is from the man who has received the benefits of the Association ever since it was formed without paying a dollar or a nickel toward its support. We are running our business to suit ourselves and the gentlemen whom we represent. These outsiders never extend any sympathy to us. They were getting the cream of the market in the opening of the season, because they were cutting under us. They never said a word, they never apologized then for not placing a little money in our hands to help defray the expenses of keeping up the organization, but they now complain because we did not advise them beforehand of what we were going

to do. This is the first time in the history of the Association that there has been a good squeal from the outsider, and I hope it will not be the last. These gentlemen were selling their goods to the outside packers, below the Association price. They had what they called a soft snap, and their faces would beam with the most gracious smile that you could picture in your mind, and we swallowed it; but one fine day they heard that the prices were going to be raised, and there was a gathering of all the goods they could get hands on. The growers thought they were going to get bigger prices, that the directors were going to play right into their hands, and that they were going to have a fat thing this season. We kept our word with the trade; we raised the price, as advertised, but at the same time we thought it advisable to lower the price on the loose article, and consequently there was a wailing and gnashing of teeth for several days afterward. It caught the outside grower and it caught the outside packer, it caught the outside jobber and broker, and everybody else on the outside. We had sold some loose raisins. We guaranteed against a decline. We did not guarantee not to reduce the price, because that would have been too soft a snap for the outsider. He is the fellow who is causing all the trouble. To all purchasers at the higher price we made a rebate. Call it a trick, if you wish, but give it a broad meaning. The moment we reduced prices we notified every broker who had bought a pound of loose raisins from us that he was to make out his bill and we would give him the rebate. Now, that is not robbing anybody, is it? I pledge you my word I have seen a mass of complimentary letters from commercial houses saying that this was the finest stroke that the Association ever made to retain the confidence of the trade back East.

Now, some wonder why the sale of raisins has been chopped off so abruptly. If after supplying the Thanksgiving, Christmas, and New Year's trade there is a surplus of raisins, if it is a short crop, not too much for the Association to carry over, it can be readily sold to the packers to supply the late spring and early summer trade prior to the next crop coming in. But if there is on hand what we call a large "carry-over," then it necessarily has to be carried over until the next crop and there is a chance of bucking up against the crop of next year, which would reduce their chances of getting back the money they might have invested. Last year we had a very large crop, but on account of the expectation and the probability of the five-year contract being signed there was encouragement for the commercial packers of this community to purchase the overstock of the Association, what is commonly called the "carry-over." They came in and bid a good, round price, and we sold out all our stock and paid the growers every nickel coming to them before the annual meeting—something unprecedented in the history of this Association. The annual election went,

I presume, to the satisfaction of the majority of the members of the Association, and everything looked glorious. We were selling lands and vineyards, planting new vineyards, and putting up the price of land—it was a land of milk and honey. The five-year contract went out and we supposed that the people were going to sign it and send it in, but they did not, as I told you before. The longer the signing of the contracts was postponed the more nervous the packers got. They had the goods, and there was a prospect of another crop being harvested equal to the one of last year. It was only about three weeks or a month before the day set for making the final account on the credit of these contracts. This meant the life or death of the Association. We noticed an unusual stir among the packers. They stood to lose about \$200,000 or \$250,000 if the Association was not a go. No wonder they were nervous. They had put their money into it, paid us our price, and if they could make something out of it they were entitled to it. They got together and, with all the energy they were able to exert, they helped save the Association for this year. Now then, we have a one-year contract with no prospect of a five-year contract at this time, consequently we can not get the packers to buy any of the “carry-over.” The object of the five-year contract is to enable the Association to absolutely control the product from year to year; if a grower signs the contract for five years and does not fulfill it, then the Association can start a lawsuit, and if he wants to carry it to the United States Supreme Court the Association can follow him up and within five years it will be settled, but with a one-year contract it can not be done. I believe that every man has a right to live, and if he has invested his capital he should enjoy the privilege of making a living. If commercial packers, or any other packers, will deal squarely, honestly, and faithfully with this Association or any other association to which I belong, I say let them live; but if they do not, I always like to belong to an organization that can say: “All right; if you don’t want to, we are not dependent upon you.” The Association should always have say \$50,000 or \$100,000 as a reserve fund. We paid enough rent to the packers and seeders combined in one year to put up packing-houses and seeders, I presume, sufficient for all eternity, and yet the growers will not recognize the fact. We are ashamed to tell you what we pay them, but they are not ashamed to take it, and if we can make enough money besides we are not ashamed to give it to them. That is the difference between the five-year and the one-year contract.

I have but one thing more to say, gentlemen. It is necessary to make the Association a success, and to be a success it must be a solid association. That is all. Let all stand together, shoulder to shoulder, with one mind, with one intent from the time the contracts are signed until the crop is disposed of, no matter how long it takes, taking the

risk of getting a lower or a higher price in the spring or early summer. If every one will be agreed on that plan, to work one with another in a solid body, there is no organization of agriculturists or fruit producers, as one speaker has said, that can possibly be a failure. All that is necessary is unity, to present a solid front, as one man, and let every one stick up for the Association as against all or any one who attempts to take a whack at it. Until that shall be done, it can never be made a complete success. Let one car go into a market where there are twenty or thirty cars, and a lower price on that one car will demoralize the price on all the others, every time. If a car goes East from an outsider or any other party and is quoted one eighth below, every packer in this vicinity will get a telegram from one of his brokers: "Can get them cheaper, one eighth under the price. If you don't wire quick we will buy from the other fellow." When you elect men to conduct your business you should have confidence in them; if you have not, ask them to step down and out and put in those in whom you do have confidence. It is no use to bicker after the die is cast and the men are chosen. Bury all differences until the next meeting, and then go at it hammer and tongs and get your men in, or lose.

MR. BERWICK. Mr. Chairman, there was one little omission in the proceedings this afternoon. Some resolutions relative to the parcels post passed unanimously. I should like to make a motion that they be transmitted to our Senators and Congressmen of the Pacific Coast by our worthy Secretary.

Adopted.

At this time a recess was taken until Thursday, at 9:30 o'clock A. M.

PROCEEDINGS OF THIRD DAY.

THURSDAY, December 10, 1903.

The Convention was called to order at 10 o'clock A. M. Vice-President McIntosh in the chair.

VICE-PRESIDENT McINTOSH. The first proposition this morning is some announcements, which the Secretary will read to you.

Secretary reads announcements relative to reception by the ladies of the Parlor Lecture Club and excursion over the lines of the Fresno City Railway Company.

MR. SPRAGUE. Mr. Chairman, I wish to offer the following resolution:

WHEREAS, The system of transmitting money by mail through the present money-order system is cumbersome and unfitted to the needs of present-day commerce; and

WHEREAS, H. R. Bill 1976, recently introduced by Mr. Gardner of Michigan, provides for the issuance of a post-check currency in conformance with the recommendations of previous House committees; therefore

Resolved, That this Twenty-ninth State Convention of the fruit-growers of California does heartily indorse the immediate adoption of the post-check form of currency, and that the Secretary be instructed to forward a copy hereof to the Post-Check Currency Bureau, at 825 Vermont Avenue, Washington, D. C.

Referred to Committee on Resolutions.

IMPROVEMENTS IN METHODS OF BENCH-GRAFTING.

BY PROF. E. H. TWIGHT, OF BERKELEY.

As we all know, "Bench-Grafting" is an expression used in opposition to "Field-Grafting," and means making a graft on a cutting before it is planted; as this is done generally in-doors and before a bench, we have the expression "bench-graft."

Let us, in a few words, go over the process of bench-grafting resistant stock. The cuttings or rooted cuttings are brought into the work-room, assorted according to size, and cut to the right length; the scions are also assorted according to size and cut to the right length, which will give us a scion with one or two eyes, according to whether the wood has long or short internodes. The grafter picks a cutting and a scion of the same size and makes the graft, the whip tongue being generally used. The grafts are generally tied with raffia, cotton rags, or waxed string, and are placed in a callusing bed or direct in the nursery. We will not go over the care of these grafts to-day.

This brief account of bench-grafting shows us a method that seems very simple; yet how few people in California can say that they have been successful with it? The reason for this is undoubtedly due to the failure of observing the many little details which really make the method a success or a failure.

I would like to mention a few of those little practical points in the method we have been using, before taking up some improvements along new lines. Starting from the making of the cutting we should give particular care to the following points: The cuttings should be chosen with eyes close to one another; on the stock this will give good rooting qualities, and on the scion it will allow generally two eyes. The time at which the cuttings are made must be considered; the wood must not remain on the vines in the spring until the sap starts to move; the cuttings must be buried completely in dry sand, in a cool room or cellar, so that they will remain in the same condition as they were when first cut. When ready to start grafting, enough cuttings are taken out for a couple of days' work; they are placed in running water or standing in tubs where the water is changed frequently, and are thus allowed to soak for a couple of days before being used. The wood thus prepared absorbs a good deal of water and is much easier to handle, at the same time enabling us to keep a better edge on our grafting knife. The importance of cutting the eyes on the stock before grafting is also too often overlooked, and this means a large expense for suckering.

But possibly the point where we find the most neglect is in the callusing bed. The temperature of this bed must be kept as constant as possible, so that the callus will be formed regularly and evenly, thus giving us a good solid graft. The sand bed must be on a southern exposure, protected by a wall on the north side; it must be well covered at night and the temperature and moisture watched daily; in this way only is the callusing of any advantage. If we simply leave the cuttings in the callusing bed without any attention we might as well save that work and plant direct in the nursery.

But even if all of these points are observed, we feel satisfied if we get fifty per cent good grafts. If we were sure of this percentage and took care to have resistant cuttings at a reasonable figure, as they should be, replanting on resistant stock would cost far less. But—there is a but—we have not been able to figure on that fifty per cent; possibly one of the great factors against us being the unreliability of the help we have to use.

It is in the improvements made in order to guarantee a better return and a saving in the first cost that I want to call your attention to-day.

One of our costly features in bench-grafting is the tying of the graft, and after that its untying. If the material used does not rot quick enough it has to be cut, and this is slow and careful work; if the

material used rots too quickly our grafts are apt to be displaced and therefore lost. If raffia is used and it is dipped in bluestone solution and not carefully washed in running water, the callus is apt to be harmed by the copper. So it is no wonder that the vineyardist has tried to do away with the tying.

If we do not tie, the handling of the graft by our usual method becomes quite delicate; and really the callusing in sand is objectionable, as we are apt to lose many grafts in passing from the callusing bed to the nursery. But if we plant an untied, newly-made graft direct in the nursery, we are apt to lose many during the planting.

An attempt was then made, with the aid of moss, to pack the untied grafts in boxes until the callus was formed, the grafts and the moss being taken out of the boxes in the nursery with one handling, and the moss allowing of better handling than the sand. Since the first trial of this method many improvements have taken place. The moss is mixed with charcoal, which absorbs the excess of moisture and prevents the formation of molds. The moss has been replaced to great advantage by sawdust, especially for the packing of the sides of the boxes.

The boxes used are generally 3 feet long and 18 inches wide; the depth depends on the length of the cuttings and scions used. Allowing 4 inches for the bottom packing, 12-inch cuttings, 4-inch scions, 2 inches for the top covering, and a 2-inch edge, we have a depth of 24 inches. This size of box (36 by 18 by 24 inches) has proved to be quite handy to handle; a larger one is too heavy and the temperature inside can not be kept even.

In the bottom of the box three or four rows of holes are bored, so that if dipped in a bath the water can run in and out easily. Inside of the box, on the upper side and two inches from the top, a line is drawn to help in placing the grafts evenly.

The dry moss is kept in storage until needed; it is then dipped in water and placed on trays to drip; after which it is spread in a layer, and coarsely-crushed charcoal sprinkled on it; then another layer of moss and another of charcoal are made, and so on; when all is thus prepared it is worked up with a pitchfork, so as to get a homogeneous mass. Moss is used for the bottom and for the sides of the box. To cover the tops of the scions the moss is first chopped up before being mixed with the charcoal; the proportion of one of charcoal to three of moss, by volume, has been found to give the best results. The volume of the moss is estimated after it has dripped on the trays.

When ready to start the packing of the grafts, the box is placed on its small end, the sliding or hinged side being on the top. Two inches of unchopped, prepared moss are laid on the lower side; the grafted cuttings are then laid flat on this moss, close to one another, two inches of moss being placed on the sides as the pile is made. This packing of

moss on the sides must be fairly tight, so that the cuttings will not move when the box is handled. When the box is filled up to two inches from the top, the balance is filled with moss and the lid is brought down and fastened. The box is then straightened up, and we have before us a center part showing the sections of the scions, and around this on all four sides we have a layer of moss mixed with charcoal. If care has been taken to lay the tops of the scions level with the aforementioned line, the surface will be level. The top of the box is now covered with two and a half inches of the chopped moss and charcoal.

When this process was first tried, the boxes were handled in a way similar to the method pursued with the "sand callusing bed"; they were placed out of doors in a sunny exposure, and covered up at night or on rainy days so as to keep the temperature as regular as possible. This way of handling gave fairly good results, but an improved method of handling the boxes has been devised by the Moët & Chandon Viticultural Station. I must say that it is to their courtesies in furnishing me with complete data on their experiments that I am able to give you this information to-day.

In this method, the boxes are placed in a hothouse, where the temperature is kept constant by means of a stove, or better, by a system of hot-water or steam pipes. In a small room a chicken-incubator regulator and lamp could be used, or a gasoline or oil stove. The hothouse should be well built with double walls, or it may be buried in the ground up to the roof. It must have good ventilation, so that an excessive temperature accidentally obtained may be promptly dropped. It must not be too strongly lighted.

We will give a description of a small building that would take care of from 170,000 to 250,000 bench-grafts; using boxes 36 by 18 by 24 inches, as we described before, that will hold about 4,000 grafts. Such a building would be 12 by 18 feet inside measurement, sides 8 feet high; on three sides it is buried 7 feet in the ground. A run-off should be made under the roof's eaves for the purpose of carrying away the rain water. Three inches are allowed between the boxes in the rows and at the back; two or three rows of boxes, one above another, are allowed on each side of the house. If three rows of boxes are used one above another it would require 10 feet of walls instead of 8 feet. Two rows high are handier to handle, and would permit the taking care of 170,000 bench-grafts—enough for over 120 acres, estimating that 50 per cent would be good grafts. Hot-water pipes are run close to the floor; a small kitchen stove with water-back being used for an ordinary room like this. In this particular building the top of the gable and the double walls were filled with chopped straw; the roof had large glass sashes, which were covered most of the time with matting, so as to

allow a diffused light to pass in until the very end of the stay of the boxes.

After numerous experiments at different temperatures it was found that 86°, with a variation not to exceed 9° more or less (77°-95°), was most favorable.

Now let us follow a box packed as we have explained. After it has been in the hothouse twenty-four hours the buds start to swell; toward the fourth day they have grown quite a little, and about the sixth day they may be one inch or more in length. The callus has clearly started and a whitish streak of new tissue can be seen along the section of the graft. Rootlets have also started on many of the stalks. This is the time to remove the top covering so that the exact condition of the buds can be seen. If the start is even on all the surface a new layer of chopped moss and charcoal should be spread over the growing buds. A one-inch layer is thick enough and will retain sufficient moisture, as the callusing and the buds having started, the danger of drying out by the top is not feared. If the box shows an uneven vegetation—dry places, moldy spots, etc.—the thickness of this new layer of moss can be varied on the different parts; it should be made thicker where it appears dry and thinner where it appears moldy. If some spots seem to be decaying they may be left uncovered for a day and then only a thin layer of moss placed over them. At the end of three or four days this new layer should be removed and replaced by a new layer half an inch thick.

To remove the top covering of moss the easiest way is to have a large box, with two cross pieces fastened on the top. The box of grafts is then carefully placed on these cross pieces, and with the hand or a wooden spatula the moss is made to drop into the large box below. The moss and charcoal which fall into the box are carefully mixed again, and without wetting are used for the new layer which is replaced over the grafts; there is enough moisture in this newly mixed moss to keep the growth in good condition.

The question of keeping the proper amount of moisture in the box was found to be a hard one to solve. At first, sprinkling lightly the top cover was tried, but this was not found satisfactory. The method which has proved to be the most valuable consists in giving the boxes a bath; that is, dipping them in water kept at the room temperature. The water must not go above the lower four inches of moss, and it must be allowed to drip out before the box is replaced on the shelf. The first bath is given when the first examination of the boxes takes place (*i. e.*, on the sixth day); then another one is given on the tenth day, and finally another about the fourteenth day before they are taken out. An iron, wooden, or cement vat is used for the dipping. The dipping of

the boxes acts not only through the moisture it gives, but also through the strong aëration that takes place in the box.

When the callus is well formed, the roots are generally fairly long and the bench-grafts are ready to plant. If the light in the hothouse has been diffused, as is generally the case, the new growth of the scions is yellowish and looks weak, and therefore could not stand a direct transplanting in the nursery; the boxes on that account are placed for a few days in a glass house where they can get plenty of light, so that the tissues can harden and get used to the change of temperature. The temperature of the glass house is generally from 59° to 77° , and the boxes should remain therein about a week.

We may thus calculate that it takes about three weeks between the grafting and the planting in the nursery.

It is good to give the boxes another bath when they come out of the glass house, and before planting in the nursery. This bath may be at about 68° F.

This method of handling the bench-grafts makes the work more rapid; it does away with the tying of the grafts, and is carried on without much danger of loss through breakage. It enables the saving of time if the weather is not favorable to good callusing out of doors, and permits grafting until late in the season, as the grafts are forced in three weeks. It gives a callus that is perfect in its formation; therefore, the grafts will be strong and will not blow down at the first wind.

The grafts after being unearthed do not need to be earthed up again, so that there is little trouble about roots on the scions.

Only fair-sized wood ($\frac{1}{4}$ inch or over) should be used in making warm-room grafts, as it allows a better circulation of air in the boxes. This will leave us a lot of small cuttings; but a very good way to utilize these, and one that pays, is to plant them out and let them root, and then the following year use them to bench-graft in the hothouse after cutting the roots off quite close. Such rooted cuttings give a very high percentage of good grafts.

As I said before, a temperature of 86° (with an allowance of 9° more or less) has been found to be the most favorable for the hot-room. Below this the callusing is too slow; the grafts have to stay too long in the boxes and are apt to decay. Above that temperature the callus is too soft, and it takes too much care to get them used to the change of temperature at the time of planting.

Before the bench-grafts are planted in the nursery they should be carefully examined and assorted; the weak grafts should be set aside and planted together; the strong grafts should also be planted by themselves. The poor bench-grafts should be discarded. This helps us in the care of the nursery, an uneven stand in the checks being always an objection.

The usual care should be given in planting and cultivating the

nursery. About the first of July we can begin to uncover the scions, cut off the roots, and leave the grafts exposed instead of covering them up again as we do in the other methods. It is good to give an irrigation two or three days before uncovering the grafts.

This method has given splendid results at the Moët & Chandon Experiment Station in France, where it was devised. Over 1,500,000 bench-grafts were made as a test last year; the returns in the fall of the year were 56 per cent for the grafts on *Riparia* and 54 per cent for the grafts on *Rupestris du Lot*. When we consider that the growing season in that district of France is short, being nearly at the limit of the northern vineyard section, and that the ordinary method of bench-grafting had been considered as impracticable, this result is highly satisfactory. With our better soils, better irrigation facilities, and longer growing season, we ought to get from 20 to 25 per cent more grafts. If we can thus count upon 75 per cent of our bench-grafts, it will encourage the vineyardists to plant on resistant stock, as it will nearly cut in two the cost of good grafted cuttings. This would be still more the case if the vineyardist should raise his own resistant stocks and thus bring their price to what it ought to be—a couple of dollars a thousand.

The Agricultural Experiment Station at Berkeley is going to carry on in the spring an extensive experiment in bench-grafting to test these different methods. This experiment will be made on a practical commercial scale; about 25,000 bench-grafts will be made. We have found some new improvements to the hot-room method that may give us still better results.

I hope that we will be able to encourage planting on resistant stocks wherever there is danger of being attacked by phylloxera; until this is done the planting of vineyards in those districts will be a speculation and not a safe investment.

FRIENDLY INSECTS.

BY ALEXANDER CRAW, OF SAN FRANCISCO,
Deputy State Horticultural Commissioner.

When Californians first suggested the idea of controlling the injurious insect pests of our orchards by the aid of beneficial or friendly insects, some of the prominent entomologists of the country ridiculed the proposition and one even advanced the statement that few pests meant few parasites. Certainly if there were only few injurious insects, they could hardly be considered pests, and few parasites would be required to keep them in subjection. It is now a well-recognized fact that injurious insects are those which have no parasites to keep in check their excessive increase.

Insects which live at the expense of growing plants, trees, or fruits

must be considered injurious, and the greater their numbers the more destructive will their presence be to the trees attacked. Some injurious insects are more or less restricted in their food habits or tastes; again, others attack a great variety of plant life, and on this account are difficult to control by artificial methods such as poisons, sprays, or fumigation. In the great majority of cases the latter method is the most effective, as it is far reaching and deadly, if sufficient chemicals of the proper strength are used and the tents or fumigating rooms are gas tight. Fumigation is a California invention forced upon us by the imperfect results from spraying—even by experts—owing to the impossibility of reaching every part of an orange tree with its dense, evergreen foliage. Even fumigation with hydrocyanic acid gas in recent years has not been entirely satisfactory, possibly because of inferior grades of cyanide of potassium or defects in the tents. The orchardists themselves are probably to blame in a great measure, for they have demanded lower prices for the chemicals and given the contracts for the work to the lowest bidders, and thereby produced a state of affairs that has led to economizing both in materials used and in time spent in the work.

Artificial methods have in no instance exterminated or even prevented the spread of insect pests when once established in a district. Of course, their too rapid increase and spread have been checked to greater or less extent by such remedies, and it would be the height of folly to await the advent or introduction of a parasite or beneficial insect to destroy a pest when it can be destroyed in great numbers by either spraying or fumigation. Extermination is out of the question with either method; the work has to be repeated at least once a year, and in the case of certain insects, from two to six sprayings are necessary in order to save the crop (as with apples and pears) from destruction by the codling-moth. No member of the late Board of Horticulture, or the Commissioner of Horticulture, or any one connected with his department, has ever advocated the *laissez faire*, or "let alone policy," with respect to the control of injurious insects for which we have no parasite or predaceous insect enemy. On the contrary, this department has issued numerous bulletins giving directions in the methods of spraying and fumigating orchards. Californians do not believe in the "let alone policy" or "wait for something to turn up" and destroy the destructive insect pests that were introduced into the State during the years we had the open door for everything in the tree or plant line with accompanying insects, not in myriads, but a few scattering scales or clusters of insect eggs. Once introduced and established, without their natural checks, man's wisdom has proved puerile in his efforts to exterminate such pests or even prevent their spread. It was only after very heavy loss and expensive experience that we determined to try

nature's method and introduce the insects that keep such pests under control in their native country.

It has been claimed that the same insects have always been in existence and the same fruits have been cultivated in the Old World for centuries, and that therefore we have no reason to become alarmed; but in those countries the orchardists were content to propagate and grow the same varieties which their grandfathers grew, and there was little danger of introducing new pests. In the newer portions of the world where fruit-growing has assumed the commercial importance that it has in the United States, and especially in California, the balance of nature has been upset and we are paying for our ignorance of her laws. The pioneer orchards—I now refer to those planted before 1849—were mostly grown from seedling trees or propagated from locally-grown trees and were free from pests. The orange and lemon trees were bright and free from smut. The bright and thrifty condition of the trees induced our pioneers of the fifties and sixties to bring or send for new varieties. The "soft brown scale" (*Lecanium hesperidum*) was introduced into the orchards and gardens of Los Angeles, and spread with alarming rapidity. Orange trees were killed by that scale and orange-planting was stopped. Years passed, and the parasites of this scale were unintentionally introduced upon other plants, and now this scale is not classed as a pest, unless where the constant presence of ants prevents the parasites from accomplishing their destruction. The parasites of this scale are both chalcid flies. One, *Coccophagus lecanii*, is parasitic of the small scales, and the other, *Encyrtus flavus*, attacks the full-grown scale. The former deposits but one egg in each scale, and the *Encyrtus* from one to eight, and each egg develops into a maggot and then into a perfect fly—all under the scale, so you can understand they are exceedingly small insects, each with four wings, six legs, and two antennæ. The orange-growers overlooked such diminutive insects, and their valuable work was ascribed to some mysterious disease, or as several growers stated, "the scales had run their course and were naturally dying out."

The next serious scale that was introduced was the "black scale" (*Lecanium oleæ*). This is a more general feeder, and besides olive trees it also attacks the orange, lemon, lime, plum, peach, apricot, pepper, oleander, cratægus, pittosporum, abutilon, pelargonium, photinia, and a variety of wild shrubs and weeds. We have a native internal parasite, *Tomocera californica*, that in some seasons destroys from 25 to 75 per cent, but as each scale produces from 1,500 to 2,500 eggs, it will be readily seen that this parasite alone could not cope with such a pest, as it has but one generation each year. Another internal parasite is *Aphelinus mytilaspidis*, a more slender species but not so prolific. The "black ladybird" (*Rhizobius ventralis*) was introduced from Australia

by Mr. Albert Koebele, when collecting beneficial insects for the State Board of Horticulture of California. Twenty of these valuable beetles reached us alive, and they have been of great service in cleaning out the black scale in the coast regions. In the southwestern portion of Alameda County, William Barry, Horticultural Commissioner for that part of the county, made a canvass of the orchardists in Washington township having five acres and over, and learned that since the introduction of this beneficial insect nine years ago, they have saved over \$171,000 for disinfection. The *Rhizobius ventralis* breeds the year around, and destroys the eggs, larvæ, and adult "black scale." Unfortunately they do not appear to thrive away from the sea breeze. At Ellwood, in Santa Barbara County, Mr. Cooper before the introduction of this ladybird spent from \$3,000 to \$5,000 per annum in spraying his orchards with kerosene emulsion. Since then he has relied upon the ladybirds, and his trees bear better and cleaner olives. We have a new internal parasitic fly, *Scutellista cyanea*, to which I will refer more fully later on in this paper.

The next serious pest introduced was the "cottony cushion scale" (*Icerya purchasi*). This came on trees brought into Menlo Park from Australia in 1868; in the eighties it had spread over a great portion of the State, and it was such a destructive insect that the orange industry was threatened. Two years after it attacked the Shorb groves at San Gabriel, it reduced the crop from fifty carloads per annum to six cars of inferior oranges on that estate alone. The expensive fight made against this pest in California with sprays, fumigation, etc., did more than any other one thing to advance the study of economic entomology and was the cause of our belief that, where the scale was a native, nature had a more efficient and cheaper remedy than our artificial appliances. Once started in this direction, our orchardists held meetings, in Los Angeles especially, and discussed ways and means to have an expert sent to Australia to make a search for the parasite that prevented the great increase of that scale in Australia and to introduce it into California. A Californian, the late Frank McCoppin of San Francisco, was appointed United States Commissioner to the World's Fair in Melbourne in 1888, and generously put aside \$2,000 of the funds allowed him for his expenses to defray the cost of an expert entomologist to be attached to his retinue. Mr. Albert Koebele of Alameda, an attaché of the Department of Agriculture of the United States, was selected, and he discovered and sent us the *Vedalia cardinalis*, a ladybird that was hardly known by the entomologists of its native country. Since then the State Board of Horticulture has taken the precaution to keep a stock of this valuable ladybird under artificial propagation, or rather their propagation in confinement in the San Francisco office. In this way we can generally furnish colonies promptly upon applica-

tion of our orchardists. Colonies have also been sent to Cape Colony, South Africa, Egypt, Portugal, Mexico, Hawaiian Islands, Society Islands, and Florida. When sending colonies of *Vedalia*, within the State, we request the applicants to send us, at our expense, a box of scale-infested twigs. In this way we secure food for our colonies in our breeding jars. Besides the *Vedalia*, we have three other Australian ladybirds that prey upon this scale alone, viz: *Novius koebelei*, *Novius bellus*, and "black *Vedalia*." We have also two internal parasitic flies, *Lestophonus iceryæ* and *Ophelosa crawfordi*. With such a list of active workers you can readily understand that the "cottony cushion scale" has a hard struggle for existence in California.

Another foreign pest that has done serious injury to orange and lemon groves is the "yellow scale" (*Aspidiotus citrinus*). The late L. J. Rose, of San Gabriel, purchased a small Japanese orange tree and planted it on his Sunny Slope estate. The existence of scale was overlooked at the time. The scale spread to other orange trees in the vicinity, and soon after the celebrated avenue of four rows of grand old orange trees appeared to be hopelessly ruined. Mr. Rose ordered the trees cut back to the trunks and the latter scrubbed with soap solution, but even such heroic measures failed to check the spread of the pest, for as soon as the trees again sprouted, the leaves were found to be again infested. This was in the early seventies. The effect of this scale was to cause the leaves to turn yellow and drop and thus injure the health and productiveness of the trees. In 1889 I called the attention of the orchardists to the existence of an almost microscopic internal parasitic fly, *Aspidiotophagus citrinus*, that was reducing this scale at Sierra Madre, and advised that no spraying or fumigation should be done in that neighborhood. Colonies were sent to other infested districts, and now it is rather a rare scale in the seven southern counties. The Horticultural Commissioners of Los Angeles, San Bernardino, and even Riverside allow the parasite to fight it out, and it is most efficient. This parasite, like the scale, is a native of Japan.

You all remember the hard-fought battle that was waged against the so-called "San José scale" (*Aspidiotus perniciosus*). Although it has a local name, it is nevertheless of foreign origin, and according to Prof. C. L. Marlatt it is a native of China. The late James Lick, of San José, was a great lover of and experimenter with trees and plants from other countries, and it is claimed that this scale was first observed in his orchard. The "San José scale" is not plentiful now in California, owing to an internal parasite, *Aphelinus fuscipennis*, assisted by the "twice-stabbed ladybird" (*Chilocorus bivulnerus*) and *Rhizobius too-woombæ*. Prof. W. G. Johnson records having bred 1,478 internal parasites, *Aphelinus fuscipennis*, in Maryland from a four-inch peach shoot that was seriously infested with "San José scale." As each parasite

destroys the scale it attacks before the scale reproduces, it can not long remain in injurious numbers.

The "brown apricot scale" (*Lecanium armeniacum*) was a very filthy pest on prune, apricot, peach, and plum trees, owing to the great amount of honey dew exuded by the insects. The leaves and fruit were consequently badly attacked by black smut. Since its parasite, *Comys fusca*, became established in infested orchards, it is not so troublesome. It takes two years to thoroughly stock an orchard when 90 to 98 per cent of the scales are killed by its parasite. There is but one generation of this scale and its parasite, so its work is not as effective or expeditious as other internal parasites, still it is a valuable enemy of this scale. We send out colonies of this parasite during the end of May and early in June.

Twenty years ago, the large green "katydid" did much damage to the blossom twigs of orange trees in the southern counties. It is very rare now, owing to a very interesting parasite that attacks its eggs. This parasite, *Eupelmus mirabilis*, lays but a single egg in each katydid egg. The latter is very flat, and the mature parasite has the same character of body. If the katydid eggs are perfect they assume a convex shape just before hatching, but if they are parasitized they remain flat, and the parasite in issuing cuts a small round hole through the upper side of its host. The katydids are large and voracious feeders and would be destructive pests were it not for the work of our friendly *Eupelmus*.

Numerous other friendly insects could be mentioned, but a brief review of what has been accomplished by the South African parasite of the "black scale," *Scutellista cyanea*, will be interesting. This parasite was introduced through the kindness of Prof. Charles P. Lounsbury, Government Entomologist of Cape Colony, two years ago. Several colonies were sent by Professor Lounsbury to Mr. E. M. Ehrhorn, Horticultural Commissioner and Entomologist of Santa Clara County. He bred a colony in confinement, but did not succeed in establishing them out of doors. On October 1, 1901, Professor Lounsbury wrote me that he would send me, on the following day, two boxes containing parasites. The packages took thirty days to reach us, and we bred seventeen *Scutellista cyanea* and a few secondary parasites; the latter we destroyed. Only four of the true parasites were females, and unfortunately one of those was killed by a small spider, leaving but three with which to stock the State. On February 7, 1902, the *Scutellista* began to issue from the scales, and the descendants of those three have increased to millions and wonderful work has been accomplished by them in this short time. During July I made an extended tour of the southern counties, and reported my observations of the work of the *Scutellista* to State Commissioner of Horticulture Cooper. Since then we have had most encouraging reports

from County Horticultural Commissioners, orchardists, and others, showing that the good work still continues.

In a letter from Horticultural Commissioner J. W. Jeffrey, of Los Angeles, under date of September 24th, he writes: "This part of the commonwealth is being overrun by the *Scutellista cyanea*. For a while we got all our supplies from the pepper trees at Pasadena, but to-day we have transferred our base to the sunflowers of Hollywood. You remember examining the grove of Mr. Harrington at Hollywood and that you did not find any evidence of the fly. Mr. Harrington has just come in with a lot of sunflower stalks literally alive with black scale. It is almost impossible to find a scale that has not been parasitized. On our tables the grubs are rolling around in great profusion. We never before had the multitude of grubs that are found on this lot of stalks. You sent Mr. Payne, of Monrovia, a lot of *Scutellista* last February, and Mr. Strong was out there last week to examine the trees and found the flies circulating among the branches all over Monrovia. The telephone company had been cutting into the tops of the trees with their usual liberality, and the thrifty farmers were hauling away every vestige of the cuttings and placing them in their orchards, and so the story goes. Hoping the good work may continue until the last insect foe has expired and that the black scale is now doomed."

Under date of September 12, 1903, Mr. W. E. Hughes, of Los Angeles, sent the following: "I write to report to you the encouraging work done by the *Scutellista* in my orchard and elsewhere. They seem to be in the orchard by the millions. I have sent them in almost every direction. These, with the ones sent out by the County Board of Horticulture, as well as those sent from your office, ought to put this section of California in pretty good shape next season." Mr. Hughes cites the good work done in the extensive orange and lemon groves of Mr. A. B. and A. Scott Chapman of San Gabriel.

Mr. F. Austin, Horticultural Commissioner of Escondido, San Diego County, and Dr. W. B. Wall, of Santa Ana, Orange County, have been especially successful with this parasite.

I have referred to some of our friendly insects in previous papers, and the only excuse I now give for taking up your valuable time is because of a remark, or question, asked by one of our best entomologists some time ago at a meeting of fruit-growers and farmers. The question was in substance: "Do you know of any benefit derived from beneficial insects outside of the *Vedalia cardinalis*?" Evidently the fruit-growers present at that meeting had forgotten some of their past experiences with fruit-tree pests, for no response was made. State Commissioner of Horticulture Ellwood Cooper is still making determined efforts to introduce other friendly insects that will be of incalculable value to the fruit-growers of California.

INSECTS OF THE YEAR.

By EDWARD M. EHRHORN, OF MOUNTAIN VIEW,
Entomologist of Santa Clara County.

To make an annual record of the presence or absence of injurious insects seems to have become an important matter among entomologists, generally speaking. Here in California this has not received as much attention as our various horticultural industries warrant, and may be this is caused by the greater task of collecting data in so great a territory as the State of California. My attempt to-day is to give you a list of the insects of the year as far as it has been possible to collect data from the various counties, and I hope that in the future, by co-operation with others interested in this line, we shall be able to make a complete record of all injurious insects, and it may be well to also make a record of our friends, the predaceous and parasitic insects existing in our State.

Aphids, or Plant Lice.—The present season has been characterized by the abundance of plant lice in every locality. This abundance can probably be attributed to the cool spring and summer months. In the apple districts, the woolly aphid (*Schizoneura lanigera*) was present in greater numbers, despite the fact that our common ladybirds were plentiful. Prune aphid (*Aphis prunifoliae*), especially on young trees, was reported from a great many localities. The black aphid of the peach (*Mysus persicae niger*) has been reported as numerous and doing damage. This is a dangerous pest, and every effort should be made to exterminate it. The root form could possibly be attacked during the winter months, and tobacco or other insecticides may prove valuable. Although, generally speaking, no serious damage has been reported on account of other species of this multiplying group, yet the abundance of honey dew, with dirty, discolored foliage in autumn, has caused much inquiry from nearly every quarter.

Shade trees have not been exempt. The elm tree cockscomb gall louse (*Colopha ulmicola*), the brown willow louse (*Lachmus* sp.), the poplar louse (*Pemphigus* sp.), and the fir tree louse (*Chermes pinifoliae*) have been very numerous, and in places some of these species have covered the walks and roads with honey dew to such an extent as to give them the appearance of oiled roads.

The grape louse (*Phylloxera vastatrix*) is slowly encroaching upon the vineyards, and some of the resistant stocks are proving to be not as resistant to the attacks of this insect as at first announced.

Scale Insects.—Generally speaking, there has been a little increase in the apricot scale (*Lecanium armeniacum*, Craw). In nearly every case, where samples accompanied the inquiry, indications were found of the

presence of *Comys fusca*, parasite of the scale. From 20 to 75 per cent of the scales were invariably found parasitized. The increase of this scale may be attributed to the cold, damp spring months, which would have no influence on the scale, but would prove fatal to the delicate chalcid fly.

The black scale (*Lecanium oleæ*) in deciduous orchards is on the decrease, partly due to the work of *Rhizobius ventralis* and *Tomocera californica*, both enemies of this scale. In nearly every orchard can be found quantities of these parasites. The African parasite, *Scutellista cyanea*, can be found in good numbers here and there, especially in localities where more or less orange, olive, and other evergreen shrubbery exists adjacent to the deciduous trees. It will be a greater task to keep this parasite in the deciduous orchards, owing to the existence of but one yearly brood of scale. From the citrus districts come encouraging reports of the good work the African parasite is doing in eradicating this pest.

Among the armored scales, those that lie loosely beneath a true scale, we find the greedy scale (*Aspidiotus rapax*), red scale (*A. auranti*), pear diaspis (*Diaspis pyricola*), and the purple scale (*Mytilaspis citricola*) the most numerous and the most destructive. The greedy scale can be found on all kinds of trees and shrubbery, and seems to thrive best where plenty of shade exists, which is very noticeable on umbrella trees with heavy tops. The red scale, according to reports, seems to be rather at a standstill, and in some localities it is claimed to be kept in check by the golden chalcid (*Aspidiotophagus citrinus*). The pear diaspis is present in a few sections only, but owing to its habit of getting under moss, lichens, and loose bark, it is a very difficult scale to combat, either by artificial means or by natural enemies. The purple scale is also found in a few districts and is being vigorously fought by fumigation and spraying. Other species, like *Aspidiotus citrinus* and *A. perniciosus*, are not numerous and are not considered dangerous, although reported from several localities at intervals. These species are kept in check by natural enemies, and the expense of fumigation and spraying is saved.

Codling-Moth (Carpocapsa pomonella).—As far as I can learn, this pest has been more abundant than usual this season. One cause for this I am certain is the neglect of the grower to gather up fallen wormy fruit. This pest should be easily controlled if, as reported, the experiments in Pajaro Valley successfully reduced the pest from 50 per cent loss to but 5 or 10 per cent loss. What we want is a parasite, and I understand that one has been found in Europe.

Cankerworms (Alsophila pometaria).—This pest was again present in numbers in several counties. The ill success with the paris green spray

does not seem to warrant its use. As usual, the reports from the use of this spray were conflicting, some growers reporting a total failure, while others claimed an entire success. Some report that a spray consisting of 1 pound of paris green to 25 gallons of water, with 20 pounds of lime, has killed the worms after a few days. I believe the cause of failure is mostly due to the drenching of trees instead of using a mist spray. I have examined sprayed orchards and have found but little poison on the leaves, generally along the lower edge of the leaf. It is no use spraying trees *à la* buggy-washing—better save money and time. Good results have been obtained by the mesh-wire trap when properly applied to the tree. Here again great care must be taken to see that the trap is correctly adjusted.

Cutworms.—Reports from all over the State regarding the appearance of and damage by cutworms, the larvæ of the owlet moths, have been received. In this case we may say that where there is plenty of food we find plenty of consumers, for this year produced enough food (weeds and grasses) to warrant the presence of myriads. When the natural food is suddenly destroyed (plowed under), new pastures are hunted by these crawlers and are generally found in succulent vegetables and tender foliage, and then the trouble begins.

Tent Caterpillars (Clisiocampa sp.).—Early in the season my attention was called to the vast amount of tent caterpillars which were attacking prune and apricot trees in the lower foothill regions. In many instances the larvæ stripped the trees of their foliage. Such work is no doubt the result of neglect. If the tents containing the caterpillars had been gathered the previous season, it would have checked the pest considerably.

Leaf Rollers.—Among this group we have a species of *Cacæcia* which was rather abundant and caused much alarm. It is a green caterpillar, with black head, and often is taken for a cankerworm, but its movements and habit of living in rolled-up leaves at once dispel this error.

Cabbage-Worms.—Although this pest has been reported again at intervals, we find that it is not as plentiful as in previous years; possibly the parasite (*Apanteles glomeratus*) is reducing it.

Oak-Tree Caterpillar (Phryganidea californica).—This has been a seasonal year for this pest, and a great deal of inquiry has been made and labor performed. Seasonal as this pest is and attacking mostly its natural food, the live oak, the damage is only temporary and local. Remedies in this case are hard to suggest, and spraying with poison is too expensive an undertaking.

Pear or Cherry Slug (Eriocampa cerasi).—This insect takes its name from the close resemblance of the larva to a slug. The larva destroys

the green surface of the leaf, often causing it to become skeletonized and drop, in this way defoliating the tree. This pest is generally found quite abundant every season, and was so found this season, attacking pear and cherry trees. The remedy generally used is road dust thrown into the trees; but better results are obtained by using air-slaked lime in its place, as it is finer and more astringent. Spraying with paris green can be successfully done, but again the trouble will be in the drenching of trees with little or no good results.

Diabrotica soror.—This pest is not as bad as in previous seasons, but occasionally appears in goodly numbers. Its appearance the past season has caused considerable correspondence. The bean crop seems to be the favorite food, although the young trees and squash vines in some localities help to entertain the feeder. This pest is becoming less, and this may be attributed to the work of its natural enemy, *Celatoria crawii*.

Peach Moth (Anarsia lineatella).—Several reports of damage by this pest have been received, and this is probably due to neglect on the grower's part, as it has been demonstrated that by good and faithful spraying at the right time this pest can be held in check. The lime, sulphur, and salt wash, or a good kerosene emulsion, is sure to give good results.

Peach-Root Borer (Sanninoidea opalescens).—The pest is confined to a few counties only, and is being reduced considerably by vigorous fighting. The prize for the best remedy for the pest, which has been offered by the Farmers' Club of San José, has induced many people to try remedies, and many are the materials and appliances put forth. One of the most promising I have noticed is crude oil of an asphalt base. This has been tried by Mr. D. B. Pickering of Santa Clara, with considerable success. He has been able to keep the borers out of the treated trees, and the digging-out is dispensed with, as the oil causes the borer to leave its burrow shortly after applying the oil to the trunk below the surface of the ground. This remedy was tried last season on an extensive scale, and so far no damage to the trees has been observed. It must, however, be borne in mind that great care must be exercised, and growers should experiment on a few trees the first year. The reason for this is that Mr. Pickering's experiments were carried on on adobe soil, a soil which is cold, so that nothing is known of the results to be had on soils which retain heat during part of the night.

Strawberry Borer (Aegeria impropria).—This pest has been reported from several localities, but no particular damage complained of. It is a very common pest and is easily controlled, but much depends upon the growers in destroying the old and infested plants which generally harbor the pest.

Corn-Ear Worm (Heliothis amiger).—This pest is reported every season, and yet there seems to be very little chance so far to fight it satisfactorily. It is supposed that the moth lays her eggs upon the silk of the corn and from there the young worm works its way into the top of the ear. Here is a good field for some investigator to undertake a thorough and interesting study, and no doubt future success in combating this pest will greatly depend upon such course.

Squash or Pumpkin Bug (Anasa tristis).—This insect is a great nuisance, so much so that in several districts the raising of the true field squash has been abandoned. Hand-picking the insects, after the young plants have several leaves, has reduced the pest, but this is only practicable on small acreage.

Thrips.—These minute insects have caused considerable trouble and damage to vegetation this season. Beans and other garden crops have suffered much, and citrus trees have also been attacked.

Grasshoppers (Melanoplus devastator, et al.).—The grasshopper plague has not been so bad this year as last, although several large swarms were reported in Fresno, Kings, Tulare, San Diego, and Placer counties. The swarms did little damage as compared with last season.

Currant Fruit-Fly.—During the last few years this insect has been recorded as doing damage to currants in the State, and again inquiry regarding it came to our notice this season. In the Eastern States, this pest, or its cousin, causes much damage to currants and gooseberries, and it should be closely watched here and prevented from spreading. It would be better to gather one crop for the furnace before the larvæ drop out of the berries and thus check the pest, than to continue producing infested fruit every year.

Mites and Red Spider.—Under this head we include the red spider, yellow mite, orange mite, walnut mite, and pear-leaf phytoptus. All these species have been rather more numerous this season and a great deal of alarm has been felt. It was hoped that the cool spring months would have checked these pests, as they are an ever annoying class. Only persistent fighting will accomplish good results.

SCALE INSECTS.

BY PROF. A. J. COOK, OF CLAREMONT.

We can not know too much, or too definitely or too accurately, all the details of that which most affects our business. This is my excuse for bringing before you this oft discussed topic.

The life history of all scale insects is much the same, and in brief is as follows: The young are hatched from eggs beneath the mother scale in oviporous species, as illustrated in the common black scale; or born

alive (that is, the eggs hatch within the parent scale), as in the San José scale. In all cases the young scale insects—usually yellow, oval in form, very minute, a mere speck—move about, may crawl upon foot of bird or insect and be borne to other plant or tree, or mayhap are carried by wind to other pastures. Soon they insert their long beaks into leaf or tender twig and commence vigorously to pump the sap or life from the host plant. Thus they seem to be permanently anchored (though they will be seen to move if the leaf or twig dries up), even until well grown. Soon after anchorage, they secrete the well-known honey dew, which attracts a black fungus, and we are vexed by the appearance of the black smut on our oranges or lemons. This nectar also attracts bees, wasps, and ants, which repel insectivorous birds, and thus the young scale insects are protected. Usually, in less than a year, often much less, they become full grown, have lost their legs and antennæ, and now the eggs again appear, either under the scale or within the mother insect.

There are three distinct types of coccids or scale insects. The first type are those which always move freely from the time of hatching until full maturity. The mealy bugs and cottony cushion scale are examples. In the second group, the scale is the insect, and it moves little, if any, after it once settles to work. These are often referred to as the unarmored scale. The black and apricot scales are examples. Here, when we touch the scale, we touch the insect. The third division is armored; that is, each insect is protected by a scale, separate and distinct from the insect. This covering consists of the first two molts, or cast-off skin, which form the little nipple-like projection of the scale, and a border of fibrous secretion which completes the scale. Here, we do not touch the insect when we touch the scale. We must raise the scale to find the insect, which is just beneath it. The red scale and San José scale are illustrations of this group. It goes without saying that the armored scale, protected as it is, may be more difficult to kill than are the others, although all are very tenacious of life. It is a curious fact that the males of all the coccids are unique among insects. At first, they are scale-like, similar to the females, although the form and size of the male generally differ from that of the other sex. At last they come forth with wings, but have only a single pair. The males are usually much less common than are the females. In some species, the males seem to be largely wanting.

Injurious Species.—Of the first group, I am familiar with the following California species: Mealy bugs, which infest the citrus orchards; the cottony cushion scale, which attacks not only the orange and lemon, but also many other trees and plants; the maple *Pulvinaria*, which infests grapes and apple trees. Of the second group, we have the black scale, the soft brown scale, the hemispherical scale, and the *Coccus*

longulus of our citrus trees, and the apricot and prune scale of our deciduous orchards. Of the third division we have the red scale, the yellow scale, San José scale, the small round white scale (often referred to as the lemon-peel scale), the greedy scale, the purple scale, and the narrow, slim rose scale. All these species are serious checks to the vigor of the plants which they infest, and all would call for great expense of time and money to stay their havoc, except that in several cases their natural enemies become our effective abettors.

I wish to impress upon you two facts in the life history of scale insects that are of practical import in our battle with these pests. The ovoviviparous species, in which group the young are born alive, are hatching all the season through in our genial California climate, and thus we find scale of all ages at any time. Even the oviparous species, like the black scale and the purple scale, are wont, in our warmer seasons, to anticipate the usual hatching time, and thus want of uniformity is not rare in the hatching of these egg-laying coccids. The fact that the older scale insects are very difficult to kill by any known method makes this a matter of great moment in our practical work in this contest. Thus with many scale insects always, and with almost any species at times, two applications of an insecticide within a few weeks are absolutely requisite to complete success. This fact must be faced in planning our orchard economics.

Again, the armored scale pests are protected by their coat of mail and so are less easy to successfully combat than are the others. This matter should not be lost sight of as we consider the scale pests and plan for their overthrow.

Natural Enemies.—No one who has not studied scale insects in the field can have any adequate conception of the value and importance of our insect friends. Many which would be our most formidable foes are wholly kept under by these Lilliputian friends. The greedy scale, the lemon-peel scale, the yellow scale, the apricot scale, the soft brown scale, the prune scale, and most important, the cottony cushion scale, have all lost their terror because of their insect enemies. Surely, we little appreciate our debt of gratitude to this great host of efficient insect friends.

Insects, like fish, form the rich, coveted menu of a great army of life forms. So insects, like fish, are enormously prolific. They must reproduce sufficiently to feed millions, and yet provide for the continuance of their own species. This very fact of redundant egg-laying would be quick proof to any naturalist that natural enemies in the native habitat of any such animal were legion. Our scale pests are striking examples. My students have counted over four thousand eggs under one prune scale and over three thousand under one black scale. The ovoviviparous species are a close second in this enormous fecundity.

Our first law, then: Insects of extreme prolificness must have myriad enemies in their native home; else they would soon multiply to the entire destruction of such plants or animals as supply their daily food, and they would in this very habit commit race suicide.

Again, almost all noxious insects in California are introduced species. They are often—usually—introduced without their specific enemies. Thus their new home and life are a perpetual and veritable picnic. All undisturbed, they yet retain their tremendous fecundity and they sow ruin with a broad, free hand. Our second law, announced by Darwin, fifty years ago: Introduced species always forge to the top. The conclusion is inevitable. In case of any serious pest, like the black scale, we should seek out its nativity and go at once for its specific enemy. This has already served us in our *Vedalia*, *Rhizobius*, *Chilocorus*, and *Scutellista*. The *Vedalia* already looks after the ruinous cottony cushion scale. The *Rhizobii* are fast getting their bearings and are promising to eradicate the black and purple scales. The *Scutellista* seems to keenly relish the task of sweeping the black scale from our citrus groves, and we may hope splendid things from the newly introduced *Chilocorus similis* from northern China, the native home of the San José scale. Here comes quickly a suggestion which we should have acted on years ago: We should keep a bright, energetic, competent young entomologist in the field all the time to do just this important work. He will seek out the nativity of all our insect pests. Then he will hasten to the place and secure for importation the specific parasites which will, in their new home, as well as in their old, hold them in a state of "innocuous desuetude." I wonder that, with the startling success which crowned California's first experience in this then wholly novel enterprise, she has been so full of apathy since. I believe we should make all haste to redeem the time and appoint without further delay the right man and hold him exclusively to this promising work. The cottony cushion scale menaced our entire citrus industry. The *Vedalia*, upon introduction, at once put a stop to the scale's depredations. The *Scutellista* bids fair to repeat the experience with the black scale. If it does it will save thousands and thousands of dollars to our orchardists.

Artificial Remedies.—Spraying was the first means employed to stay scale ravages. Kerosene emulsion and the resin wash were used with some success. The lime, salt, and sulphur wash in the deciduous orchards was used on leafless trees in winter. This lessened its cost and made the application easy, and it still holds a place among our cherished insecticides. In the citrus orchards, with their dense foliage, it was difficult to reach all the insects with a spray, and the foliage and fruit were likely to be injured. Partial or complete failure and injury together uttered a double protest of un wisdom, and both kerosene emul-

sion (often imperfect) and resin wash were almost absolutely abandoned.

The cyanide process next came forward. This, rightly used, was surely thorough, as the gas went everywhere. Fumigation was long in highest esteem because of its efficiency. It is true beyond contradiction that fumigation, properly performed, will kill all scale insects that are not too far advanced toward maturity, and that, too, without injury to the trees or fruit. It is equally certain that it does not kill old or mature scale, nor does it destroy the eggs. If, then, we could be sure of a uniform hatch so that all the scale would be young when treated, this method would surely retain its popularity. But in late years, we have not had this uniform hatch. Young and old scale alike were in evidence in every month of the year. We see, then, that two fumigations were required for extirpation, and the cost of two fumigations is prohibitive.

The points rightly urged against fumigation are: Cost; virtual failure in case of want of uniformity in time of hatching; the necessity of doing it at night, when the owner finds it difficult to give the work personal supervision; the fact that it must be done by uninterested parties, who will rarely exercise the caution requisite to success. The fact that, in late years, the failures have almost equaled the successes proves that the above points are well taken.

In case fumigation is employed, enough cyanide must be used to burn slightly the tender twigs. If this is done, and the insects have hatched uniformly and are fumigated when all are young, we may surely expect a very complete extirpation, and may surely expect not to need to fumigate again for the next three years. If the work is done by contract, the orchardist should stipulate that enough cyanide be used to slightly injure the tender twigs and yet that no serious injury shall be done to either tree or fruit. The carrying out of this contract must precede any payment for work. The orchardist must also see to it that fumigation is done when the insects are of a suitable age and that the orchard is in the best condition of thrift. I think it is certain that with as uniform a hatch as we have had this past season, in many parts of southern California, fumigation, conducted as suggested above, will be very effective and the cost not prohibitive. The fact, however, that in late years the time of hatching has been so varied, has proved fumigation very uncertain, and many of our best orchardists have lost confidence in it and have cast about for a better method.

We have seen that spraying with resin wash and kerosene emulsion has been abandoned for years in our citrus groves. About three years ago the distillate emulsion became quite popular. It was found more effective than kerosene emulsion, but was soon abandoned because of serious spotting of the fruit. About two years ago, the Stearns brothers

substituted a distillate spray for the emulsion. They used a specially prepared distillate at a strength of two per cent in the orange groves, and of three per cent in the lemon orchards. This was applied as a mechanical mixture, the machine mixing it thoroughly by violently agitating it in the tank. The plant costs about \$400. A distillate engine mounted on the wagon furnishes the power and also works the mixer. A long rubber hose conducts the spray to the nozzle, and two or four of these may be used, and so two or four trees sprayed at a time. Two good men can use six or seven 100-gallon tanks a day, and do good, thorough work. The wagon is drawn by horses which require no driver and move on at the word of the sprayers. The spray does no harm to tree or fruit if the orchard is in good condition and the distillate of approved quality and the mixture of the right strength. It is effective upon all young scale which it touches. It may touch nearly all or every leaf if the sprayers are sufficiently intent and cautious. I think I have seen as efficient work from spraying as I have ever seen from any method. The cost is about one third that of fumigation, while the spray kills older scale and many eggs which fumigation fails to injure. The spray also kills all red mites that it touches, and many of the mite eggs. These mites are now serious pests in many citrus orchards and are wholly unharmed by fumigation. We see, then, that distillate spray has very much in its favor and we are not surprised at its rapidly gaining popularity. That it has come to stay and will claim the field seems now more than probability. But spraying must be thoroughly done, more thoroughly than the mere hired man will usually do it. The sprayer's mind must be on his business every minute of the time. Thus, economy in the work, as well as thoroughness, will demand that the orchardists of each neighborhood own their own machine, and supervise, or better do, the work. Then it will likely be rightly done, and done at the right time and at the minimum cost. Unless our insect friends relieve us of this perpetual fight, this last method seems a solution of the problem of scale warfare.

A late bulletin (No. 88) prepared by Mrs. M. E. Fernald, of the Hatch Experiment Station of the Massachusetts Agricultural College, has furnished us the correct names of all the coccids of the world. This valuable work has been most carefully done, and richly merits the meed of admiration and appreciation which it will surely receive from us all. I append the correct names of the insects which interest us, giving in parenthesis the names previously used:

- Mealy Bug—*Ceroputo* (*Pseudococcus*) *Yuccæ*, Coq.
- Cottony Cushion Scale—*Icerya purchasi*, Mask.
- Maple Pulvinaria—*Pulvinaria innumerabilis*, Rath.
- Black Scale—*Saissetia* (*Lecanium*) *oleæ*, Bern.
- Soft Brown Scale—*Coccus* (*Lecanium*) *hesperidum*, Linn.
- Hemispherical Scale—*Saissetia* (*Lecanium*) *hemispherica*, Targ.
- Coccus longulus*—*Coccus* (*Lecanium*) *longulus*, Dougl.

- Apricot Scale—*Eulecanium (Lecanium) armeniacum*, Craw.
 Frosted Scale }
 Prune Scale } *Eulecanium (Lecanium) prunosum*, Coq.
 Red Scale—*Chrysomphalus (Aspidiotus) aurantii*, Mask.
 Yellow Scale—*Chrysomphalus (Aspidiotus) aurantii citrinus*, Coq.
 San José Scale—*Aspidiotus perniciosus*, Comst.
 Oleander Scale }
 Lemon-Peel Scale } *Aspidiotus hederæ (nerii)*, Sall.
 Greedy Scale—*Aspidiotus rapax*, Comst.
 Purple Scale—*Lepidosaphes (Aspidiotus) beckii (citricola)*, Newm.
 Glover's Scale—*Lepidosaphes (Aspidiotus) gloverii*, Pack.
 Rose Scale—*Aulacaspis (Diaspis) rosæ*, Bouché.

NEW OBSERVATIONS ON THE CODLING-MOTH.

BY PROF. C. W. WOODWORTH, OF BERKELEY.

During the past summer quite extensive operations have been under way in the Pajaro Valley for the control of the codling-moth. These activities were brought about by the action of the Pajaro Valley Orchard Association, which obtained from the Supervisors of Santa Cruz and Monterey counties an appropriation amounting to \$2,500; Santa Cruz County subsequently made a second appropriation of \$250, and these amounts were supplemented by the further sum of \$175 subscribed by individual orchardists. This money was placed under the control of the Experiment Station to pay the expenses of conducting an exhaustive study of this insect. The desire was expressed that this work should include a careful testing of all the various means that have been suggested for the control of this insect, and in order that this might be done on a large scale many of the growers about Watsonville placed the spraying operations of their orchards under the control of the investigation. Our purpose was to so arrange the work that we could give quite definite directions for the control of the insects another season. At the same time it was desired to accomplish as much as possible during the current season in the control of the pest, without, however, sacrificing the experimental work.

The work was under the immediate control of my first assistant, Mr. Clarke, and several advanced students from the Entomological Department also rendered valuable aid. The mass of data accumulated as a result of this work is too large to present at this time, but will be given in detail in bulletins to be issued by the Experiment Station. I will only attempt to detail a few observations upon this insect which are among the more important additions to our knowledge of the habits of the insect. No insect has been studied more extensively and exhaustively than the codling-moth, but it appears that we are still far from knowing the insect as intimately as would be desired. One point in its life history which remained for a long time entirely unknown, was the

egg-laying habits of the moth. The commonest conception, and the one which is still found in many of the books on entomology, was that the egg was laid at the blossom end of the apple at about the blooming time, but curiously enough this statement was made without a particle of actual observation to support it. I need not go into the detail of the steps in the discovery of the egg-laying habits and the changes made necessary in the theories regarding the reason for the effectiveness of spraying with arsenicals.

In the Pajaro Valley this season the moths did not begin to emerge in numbers until the fruit was of considerable size, and early in the season the eggs were not laid upon the fruit at all. It has been known for some time that many codling-moth eggs are found upon the leaves as well as the fruit, but no observations previous to those of the present year appear to have been made early in the season. The egg, as many of you are aware, is a flat disk, about the size of a pin-head, which is cemented fast to the surface of the leaf or fruit, and is so transparent that the green color shows through and renders it very difficult to see one except when looking in the right way. Being cemented to the plant it will be evident that only the smooth surfaces of the leaf or fruit would be suitable for this purpose. Indeed, it was extremely rare to find eggs anywhere except upon a smooth surface. Now, early in the season when the first eggs are being laid the whole surface of the apples and young leaves is covered with downy hairs. A few of the older leaves soon become smooth on the upper surface, and it is here that the first eggs are laid. These old leaves may be, perhaps usually are, far away from the fruit, but the most careful search of the surface of the fruit and of the young leaves failed at this time to show any trace of the eggs. Later, but still during the time of the hatching of the winter brood of moths, the under side of the leaf becomes smooth, when eggs may be found beneath the leaves, as well as above them, though never as abundant as on the upper side. Finally, the fruit itself also becomes smooth, especially on the upper exposed side. As soon as this is the case the moths show a decided preference for the fruit, and while the eggs are still laid in considerable numbers on the leaves, the number on the fruit is out of all proportion to the amount of surface exposed. This preference is maintained throughout the year with the later broods, although the insects never cease to lay upon the leaves, but deposit perhaps a third of their eggs in such situations. The part of the apple last to become smooth is the hollow of the two ends, and it is the rarest thing to find eggs in these situations, even after they do become smooth. The commonest place to find the egg is upon the side most exposed, and they are laid here at random without regard to any peculiarity of the apple and sometimes in considerable numbers. Half a dozen eggs upon a single apple is no uncommon

thing where the moths are abundant; for instance, in the neighborhood of packing-houses.

As to the time of egg-laying, there seems to be a great difference according to the locality. In some places it is very evidently conditioned upon the weather. One may find, for instance, upon a tree, the majority of the eggs in about the same stage of development, indicating that they were laid probably the same day. Apparently this evident periodicity in the laying of the eggs is dependent upon the effect, upon the moth, of weather conditions. Every one has noted that some evenings insects will be extremely abundant about electric lights, and that possibly the very next night there will only be a stray insect here and there. It is supposable that the weather condition which affects the moths which we find about lights would also have an equally striking effect upon the activities of the codling-moth and that unfavorable weather would prevent the laying of eggs sometimes for days at a time. This at least seems to be the most feasible explanation of the practical immunity of one portion of the Pajaro Valley from ravages by the codling-moth. That portion of the valley between the city of Watsonville and the sea is apparently free from these insects. In some orchards the codling-moth has been introduced repeatedly upon fruit-boxes and has been observable in some cases the succeeding year, but the uniform testimony of the orchardists of that region is to the effect that this slight attack never lasts longer than a single season. One of the characteristic features of the climate of the Pajaro Valley are the fogs which float in from the ocean with the afternoon winds, causing a chill in the atmosphere at just the time of the day that the moth would ordinarily be active. And the region where the greatest evident periodicity in egg-laying was observed is immediately adjacent to the immune area. Apparently, in this area showing periodicity in egg-laying the conditions are such during most of the time that the moths are prevented from flying, but now and then there comes a day in which they can lay their eggs, so that these areas may be nearly as badly infested with worms as though the weather was favorable all the time.

We have in California two classes of localities free from the codling-moth: Those interior points, especially among the foothills, where young orchards are isolated from other orchards and which have not yet become infested with the codling-moth; and such areas as this part of the Pajaro Valley, where apparently the proximity of the sea produces a permanent immunity. Such permanent immune areas are found all along the coast from the northern end of this State southward, certainly at least to Santa Barbara County. Judging from the experience in the Pajaro Valley, orchards but a short distance inland from the perfectly immune area may be very seriously injured by this insect.

There have been very few observations of the hatching process, and I am not aware that there are any detailed published statements in regard to the process of entering the apple. This is a very important matter in the theory of control of the codling-moth. The usually accepted theory is that the worm must receive a poisonous dose before entering the fruit, or otherwise it is beyond the possibility of control. How the destruction of the worm might be brought about through arsenical spraying was first clearly expressed by Professor Slingerland of Cornell University, who emphasizes the necessity of putting the poison into the blossom cup, in order that the young insect upon hatching from the egg would find awaiting it, in the cup of the blossom end of the apple, a quantity of poison through which it must burrow in order to enter the fruit. Another idea was first brought out prominently by Professor Card, of Kansas, now of the Connecticut station. He observed that the young worm very often ate holes in the leaves before finding the fruit, and his idea, based upon this observation, was that the poison placed upon the leaf and outer surface of the fruit was quite important in the control of the insect, perhaps as much so as that in the blossom end. The observations made at Watsonville throw a new light upon this problem of the theory of the effectiveness of the spray. Contrary to the observations made upon this insect in Eastern and Northern regions, a very small percentage of the insects enter the fruit in the blossom end. Of those that might be classed as entering in this place the majority actually enter the fruit outside of the calyx lobes instead of going within the cup.

There were a few worms, however, that entered the blossom end and which could be killed by the application made according to the directions now most commonly given of placing the poison within the cup. According to our observations, the worms live quite a while within the cup before attempting to burrow into the fruit, and will often be found of considerable size and with an appreciable amount of excrement, showing that they have been eating the surface of the cup, and still no trace of a burrow. Apparently they have fed simply upon the surface of the fruit, and have found that the cavity between the calyx lobes offered sufficient concealment to satisfy them and have not, therefore, been forced to bury themselves to secure this protection. This habit of feeding on the surface within the blossom cup furnishes the best possible conditions for the efficiency of the sprays applied according to the accepted idea. The blossoming period in the Pajaro Valley, and probably in most parts of the State, extends over considerable time, so that the first fruit setting on the tree often becomes as large as one's thumb before the tree is out of bloom. Long before this, the cup is closed, so that if the poison is to be placed where it will accomplish this result there must be more than one application, and the first ap-

plication must be made while the tree is in full bloom. If delayed until after the majority of the petals have fallen, we have positively determined that in some cases no poison will be placed in any of the fruit, since in these cases none of the late blossoms produced apples.

Again, there seems to be very good evidence that many of the worms, often those hatching upon the surface of the fruit, may be killed without ever gaining entrance either to the blossom end or to any other portion of the fruit. We have never observed the actual feeding upon the leaves in the orchard by the freshly-hatched worms, but have repeatedly made such observations on worms hatched in the laboratory, and it was very evident that the ratio between the number of eggs and number of entrances was very appreciably larger upon unsprayed trees than upon sprayed trees, and the only explanation of this difference would seem to be that upon sprayed trees many of the worms would obtain the poison and die which would otherwise ultimately find an apple and enter the same.

By far the greater part of the worms enter the fruit away from the blossom end, and the process has been followed with great care, both in the laboratory and in the orchard. The commonest procedure after the worm emerges from the egg is to crawl about the surface of the fruit until finding a satisfactory spot and then to proceed to burrow itself beneath the skin of the apple without tasting a bite of the fruit, simply chipping it off with its jaws and using the particles to aid in forming a protection over the mouth of the burrow. The whole operation from the breaking of the egg shell until the entire disappearance of the insect ordinarily does not require more than fifteen or twenty minutes, and during the whole time the worm has evidently taken no food, so that it is very doubtful if any of the poison that might be upon the surface of the apple would cause the death of the worm.

As to the places selected for entrance, there seem to be two classes of localities selected. That which is evidently preferred by the worm is the point where two fruits touch, or where a leaf lies against the fruit. In the orchard the upper side of the fruit was very commonly chosen, generally in the most exposed point. This was apparently due to the difficulty experienced by the worm of walking over the surface of the fruit. Like most caterpillars, the codling-moth spins a small quantity of silk as it walks, and this aids materially in its progress by affording a foothold for the minute claws with which the feet are provided. These claws are so minute that the downy hairs of the young fruit seem to afford even less foothold than is obtained on the smooth surface. Repeatedly in our field observations a young, freshly-hatched worm would suddenly lose its hold entirely and fall from the tree. Doubtless a good many worms perish in this way. The front legs are best able to hold onto the plant, so that usually the body

would simply swing around and when the insect had regained its hold it would then climb upward. Thus an insect would sometimes start time and again to go around an apple and would be brought back to the upper side by slipping as just described, and finally would proceed to enter the apple on the upper side. A rough surface seems to be preferred to a smooth one, and blotches of lime and poison were certainly not avoided by the worms.

In our breeding-cage experiments which were conducted in a wax cell covered by a thin piece of glass the burrows were invariably made either under the edge of the wax ring, or at the point where the cover glass nearly touched the surface of the apple. In this latter case the worm could be observed under the microscope very satisfactorily. It would first make a silken carpet and then spin a series of threads connecting the glass to the apple, making a strong, but an almost invisible cell for itself, the silken threads being so delicate as to be seen only with the use of the microscope and the proper illumination. After accomplishing this preliminary work the worm would begin the process of excavating a hole for itself, the most difficult part of the operation seeming to be the first breaking of the skin, which would often require a great many attempts before the jaws would tear through into the softer tissues beneath. As soon as the first piece is removed from the surface of the apple the worm fastens it to the silken structure which it has erected about itself, and then another bite is pried off and added to the first, and this is repeated until quite a wall of apple chips has been built around the burrow. By this time the worm has made a hole pretty nearly as deep as its body, and finds it necessary to withdraw itself after each bite is obtained. The hole is not dug straight down into the apple, but somewhat obliquely and considerably larger than the diameter of the insect. It is soon, therefore, able to turn itself about within the burrow, and then only pushes its head out far enough to add to the chips already accumulated on the sides, and finally the mass entirely covers over the opening which it has made in the fruit. Up to this time, the worm has worked incessantly and the stomach has received none of the material removed from the apple. Shortly after the completion of the burrow, however, the digestive tract is seen to be well filled with chips of exactly the same character, so far as can be observed, as those that were used in the construction of the covering on the outside.

It would appear from this observation that under the conditions existing at Watsonville by far the larger percentage of the worms gain entrance to the inside of the apple before the poison can reach them. In sprayed trees it was observed that the majority of the worms died before going deep into the fruit. This is in striking contrast with the history of the worms in unsprayed trees adjoining. There

can be no doubt, therefore, that in some manner the poison that was on the surface of the apple reaches the worm after having gained entrance to the fruit. How this can be accomplished can be explained in one or two ways: Possibly there is a gradual solution of the arsenical, the material spreading itself over the surface of the fruit and some of it finding its way into the burrow and there being eaten by the worm. One would expect, if this were true, that the worms should show signs of chronic poisoning rather than be killed outright, which appears to be the case. The second possible explanation is that the worms after entering the fruit get out to the surface again and obtain the poison in larger quantities. According to our observations this seems the more probable. A single particle of the green would, probably, be sufficient in the young codling-moth to produce violent poisoning. It is a matter of positive observation that comparatively large areas of this surface immediately adjacent to these burrows are eaten off by the insect. This is true of both sprayed and unsprayed trees, and it is only after the insect has increased considerably in size that it penetrates deeply into the fruit. A rather complicated burrow is made immediately beneath the skin of the fruit, and while it lives in this surface burrow it feeds, in part at least, upon the surface of the apple. It is during this period of surface feeding that the destruction of the worm is liable to happen.

A microscopical study of sprayed leaves shows that the particles of green are really found only at rather distant intervals upon the surface of the leaf and fruit, and unless the insect feeds over a comparatively large area of the surface it is difficult to understand how it would obtain the poison in sufficiently large number of cases to account for the efficiency of spraying operations. The surface eaten over, however, by a young codling-moth larva, as described above, is amply sufficient to enable it in most cases to find one or more particles of the poison on a well-sprayed tree.

The practical bearing of these observations upon the spraying operations is that they emphasize (1) the advantage of filling the blossom cup in any except in semi-immune areas, like a portion of the Pajaro Valley; (2) the importance of covering the whole tree with poison in order to reduce, as far as possible, the number of entrances, since each entrance means a blemish on the fruit; (3) the benefit of continuous work season after season, so as to keep the insects down to as low a number as possible, to further diminish the number of entrances; and finally, (4) during the whole period when the eggs are being laid the need of extreme care in the spraying, so as to keep the fruit thoroughly and uniformly covered with the poison.

SPRAYING OPERATIONS IN THE PAJARO VALLEY.

BY PROF. WARREN T. CLARKE, OF BERKELEY.

The spraying experiments carried out by the University of California Agricultural Experiment Station, working in co-operation with the counties of Santa Cruz and Monterey, during the season of 1903, have produced very interesting results and furnish a fund of data that will be of great value in future operations against the codling-moth. It seems quite pertinent to review briefly at this time the work done and to indicate in a general way the results obtained and their application to the problem of the economic control of this scourge of our apple and pear orchards.

The Scene of Operations.—The territory covered in these spraying experiments extends from the Carmel Valley in Monterey County to Boulder Creek in Santa Cruz County, a distance of some sixty-five miles, and is in some places twenty miles in width. This extent of territory afforded a great diversity of climatic conditions to be studied, because of the different exposures and altitudes of the many apple orchards therein. Some of the orchards on which our experiments were made are not more than twenty feet above sea level, while others were used that ranged up to near nine hundred feet altitude, and all intermediate elevations were represented. The climatic conditions encountered ranged from the rather cool, moist weather so characteristic of the Pajaro Valley, to the warmer, drier conditions found in the sheltered valleys of the Santa Cruz Mountains and in the hills of northern Monterey County. In this territory, also, many different soil conditions are found. The moist, rather heavy alluvial soils of the main Pajaro Valley, the occasional adobes of this same valley, the rather lighter gravelly loam of the mesas, the sandy and very light sandy soils of some of the hill regions, on all of which apple orchards are commercially grown, were represented in our experiments. These various and diverse climatic and soil conditions are valuable in experimental work of the character of this under discussion, because they render that work and its results more general in their application in the region studied than could otherwise be the case. The conditions found in this region, however, are not generally the same throughout the State, and therefore the recommendations based on the experience here obtained might have to be modified to meet local conditions elsewhere. The numbers and activity of the insect under consideration vary quite materially in the different zones found in the region described, due to climatic differences, and the vigor of the apple trees also varies according to both soil and climatic conditions.

These differing conditions suggest immediately the fact that spraying

operations which might be quite successful and satisfactory in one part of the territory could not reasonably be expected to be satisfactory in all its parts. The necessity of considering these conditions was clearly shown in the spraying experiments of this season.

General Principles Governing the Work.—The opinion of most investigators is that the most effective time to spray for this pest is when the blossom petals have fallen and the young fruit is still upright. The theory underlying this recommendation is that at this time we may place a small amount of poison in the blossom cup, and the calyx lobes closing together later on will retain this poison ready to be eaten when the young worm enters the fruit. This, of course, presupposes that many, if not most, of the worms will make their entry at this point. This principle is so strongly insisted on in much of the literature on the subject that the time of many of our first sprayings was governed by it. When, in our experiments, we began operations at this time we usually made our subsequent operations follow at intervals of from three to four weeks. In other experiments the timing was not based on this idea. Indeed, we have aimed in the work to begin operations at various periods in the development of the fruit, for the very purpose of determining the soundness of this and other theories and the value obtained from greater or less numbers of sprayings. To illustrate, we have sprayed some orchards at the time the petals have fallen and at intervals of from three to four weeks thereafter until these orchards have been sprayed five times. On other orchards our experiments have been begun from twenty to twenty-five days after the petals had fallen, and on others work began forty and sixty days after this had occurred. Under this system we have orchards that have been sprayed five, four, three, and two times, the last spray being, in each of these cases, put on from three to four weeks before the fruit was picked. On other orchards spraying ceased in some cases forty, in others sixty, and in others ninety days before picking. By these methods the comparative value of early and late spraying may be demonstrated, and also the comparative value of many and few sprayings. Indeed, we have endeavored to experimentally prove the value of few and many sprayings and of early and late sprayings under all the climatic changes to be found in the territory where these experiments were conducted.

Machinery and Devices Used.—It was early recognized that the time of application of the spray used was but one of the many problems which confronted us in the work, and that the method of application was of large import in the matter. We have, therefore, carried on many experiments with different pumps and spraying outfits, both hand and power, and with many makes of nozzles. We have also had made numerous devices, suggested from our field experience, looking

toward better and more uniform distribution of the material at a less cost than is usually the case. Time does not permit us to enter into the detail of these experiments in this paper. They will appear in full in the series of bulletins soon to be published by the Experiment Station.

All we will attempt now to say is that work with platforms built upon the spray wagon which permits of an economical and thorough distribution of the material from above has proved such an improvement over the present methods in this State that it should lead to a very general adoption of the method in the future, as is the practice in many parts of the East. That the use of power outfits is in the long run more economical and undoubtedly more satisfactory than that of hand outfits in well-grown orchards we consider as also amply proven in our experiments.

As for the most satisfactory nozzle to use, our experiments seem to indicate that early in the season a rather coarser spray is to be desired than is the case later on in the year. A nozzle, therefore, that would be satisfactory for the first two sprayings would have to be replaced by one throwing a more finely divided and fog-like spray in subsequent operations. This is a very complicated subject, however, and will be thoroughly discussed in a bulletin about to be issued by the Experiment Station.

Arsenicals Used.—In the greater number of our spraying experiments during the past season the arsenical poisons were used, and in no case were satisfactory results obtained from the use of other materials, many of which were experimented with. It will not be necessary to give details of our work with these other materials in this paper. Of the arsenicals, the paris green is the best known and was most extensively used in these experiments. The reason for the very large use of this arsenical is primarily the fact that it is easily obtained and its purity or impurity can be readily determined by analysis under the law governing its sale in California. All of the paris green tested and used by us this season was well below the limit of four per cent free arsenious oxid allowed by this law, and its physical condition was, generally speaking, good. In our spraying experiments the paris green was always applied in combination with lime, on account of the liability of burning the leaves under those climatic conditions. The amount of lime used per pound of the green varied on different orchards from four to twenty pounds, and on all but one orchard the milk of lime, well strained, was used. In the case of this one orchard clear lime water was used, and while very satisfactory results were obtained such a method of procedure can not be recommended until further experiments along the same line have been made. At least fifty per cent of the orchards of Monterey and Santa Cruz counties were sprayed with some combination of lime

and paris green; some of them five, some four, some three, and some two times, and some early in the season only and some late. We also experimented very fully with the arsenite of lime, made up under the so-called Kedzie formula. This arsenite was used on fewer trees than was the paris green, but so far as number of applications is concerned the experiments with it were as extensive as were those with paris green. The lead arsenates and arsenites made up from the soluble soda arsenite and both the acetate and nitrate of lead received their due amount of attention, as did also the manufactured lead arsenate which is sold under the trade name of Disparene.

"Dust" Spraying.—Besides this work with the arsenicals used as sprays, we experimented to some extent with the so-called "dust" method of applying the poison, using the paris green in combination with dry slaked lime well powdered and sifted. Various devices for applying the "dust," which are more or less unsatisfactory, are on the market. The devices all use either the ordinary bellows or the rotary blower to scatter the material where it is desired. The former is quite out of the question for orchard use, but there may be a future for the rotary blower. Our experience this season with the "dust" method leads us to consider that with the devices at present available for the purpose thoroughly satisfactory results can not be obtained except on a very small scale. We would consider that were these devices better adapted for work on a large scale, the "dust" method would be quite desirable under such conditions of climate as obtain in some parts of the Pajaro Valley and in some other portions of California where there is a maximum of atmospheric moisture (dew or fog) and the minimum of wind that the "dust" may remain in position upon the foliage and fruit.

General Results.—When we come to consider the results obtained in the experiments for the control of the codling worm we are confronted by an interesting and very extensive series of facts and figures. The major part of these results fall readily under two heads: damage to foliage and control of the codling worm.

Damage to foliage when the arsenicals are used as a spray may be either acute or chronic. The acute damage, commonly known as "burning," was noted in a number of cases, and is usually, perhaps always, preventable; that is, it is generally the result of some accidental condition, such as the use of a paris green in which there is an excessive amount of uncombined arsenious oxid, a failure to properly stir the spray mixture, thus allowing the arsenical to come from the nozzle in an overdose, overspraying or letting so much of the mixture fall upon the leaves that it runs together in drops, and too small an amount of lime for the arsenical used. Any of these conditions may cause the

characteristic blackening and scorching of leaves or "burning." In our experiments this season the cause of every case of this trouble was found to be some one or more of the above noted factors. This acute damage can be seen plainly within a week after the application of the spray, and a recognition of the accidental cause and an elimination of it from subsequent operations will doubtless always prevent a repetition of the trouble.

The chronic damage to foliage is a rather more obscure and difficult matter. It may be described as a chronic, cumulative arsenical poisoning of the cells of the leaves, causing them to ripen, turn yellow, and the leaves to fall prematurely. Some of the orchards upon which our experiments were conducted suffered very seriously from this trouble. The locality is one in which poisoning is extremely liable to occur. We trust that this damage may be prevented in future operations if due caution is exercised. This is a point on which we intend to make further studies the coming season. We know that this chronic poisoning of the foliage occurred only on those orchards where spraying was done often and at short intervals of time. A study of the surrounding conditions on these orchards seems to indicate that so far as the codling worm is concerned as good control might have been obtained if the number of sprayings had been fewer and the intervals between sprayings greater. Furthermore, it was noted that the orchards sprayed with paris green suffered more from this chronic poisoning than was the case where any other of the standard arsenicals was used. Quite evidently there is necessity of careful observation in the orchards that are liable to damage from burning to avoid excessive spraying. As soon as the foliage shows distress in the slightest degree we have evidence that the accumulated doses of arsenic have exceeded the necessary amount for efficient protection against the codling-moth. Perhaps in the regions most susceptible to chronic poisoning it will be necessary to discard wholly the use of paris green and to substitute one of the less dangerous arsenicals.

Turning now from this question of possible damage to the foliage which must be guarded against, we come to the consideration of control obtained of the pest in question, the codling-moth. As for the effectiveness of the different standard arsenicals used, there seems to be little to choose between them. The paris green is not, generally speaking, so satisfactory to work with as either the lead or lime arsenicals. These latter are more flocculent, that is, they "stay up" better in the tank, as it is expressed, than does the paris green, and a more even distribution of the poison is probable when they are used. While the results obtained by us, when either the home-made or commercial lead arsenates were used, were slightly less satisfactory than with the other arsenicals, our experiments this season point to a possible great value in these compounds of lead and arsenic.

The fact that both the lead and lime arsenicals can be made at home is a point in their favor in the minds of some growers, inasmuch as the danger from impurities and neglectful methods of manufacture is removed when they are used. Our experiments this season certainly show their great value, and they are deserving of extensive use in this State in the future. The results of this season's work indicate that a very large degree of control can be obtained, but the seasonal conditions in the development of the worms must be studied to obtain this success. There are times in the life history of the moth when the presence of the poison on the fruit will be very effective in protecting the crop, while at other times the need of protection would not be so great.

Our studies during the season just past indicate two times of maximum appearance of the moths in the Pajaro Valley, and the most effective sprays are evidently those applied at these times. These times of maximum development may be roughly stated as occurring in the late spring or early summer and in the late summer or early fall. We know from our studies this season that, owing to certain climatic conditions, a portion of the region under discussion may be classed as immune against the codling-moth. Other parts of the territory suffer exceedingly from this pest, and various grades of susceptibility are found between these two extremes. Where the condition of immunity exists, of course no spraying operations are necessary. In all other cases studies must be carried on in each individual orchard, or at least in each local group of orchards, to determine the time for spraying and the number of applications to be made. As for the spring spraying for placing the poison in the blossom cup, this may, under certain conditions, as has been pointed out in the previous paper, be omitted. How widely this policy is safe can only be known after careful experiments have determined the point for each locality.

The time to spray for the spring brood of worms, where this brood causes a considerable loss, can be readily determined by the breeding-cage method. This consists in placing a number of the hibernating worms in glass jars and covering the mouths of the jars with cheesecloth. These may be taken in their pupa cases from old boxes, bands, or other likely places during the winter. These jars should then be put out in the orchard in such situations that the sun will not shine on them, nor water leak into them, and yet where the pupæ in them will be subject to all the temperature changes of the season. A careful watch of these improvised breeding cages should be kept, and when moths begin to appear in them in numbers spraying should begin about a week thereafter, and this spraying should be repeated in about three weeks. It will be advisable to examine the jars regularly once a week and to remove the living moths from the jars each time, so that the count of appearances may not become confused.

The timing of the later sprayings can be determined by the band method. This consists in placing bands of burlap about the trunks of a number of trees in the orchard and keeping a careful record of the codling worms found beneath them. For the purposes of this study the bands should be removed at least once a week, and when the worms beneath them have been counted and destroyed the bands should be replaced. Spraying for the second brood should begin as soon as the worms become common and comparatively numerous beneath the bands, and as long as they continue to appear in numbers the spraying should be repeated at intervals of about three weeks to effectively protect the fruit against this second brood. This may require as much as three treatments in the Pajaro Valley, possibly even four in the interior. These studies will, if carefully prosecuted, indicate for each orchard and season whether two or three sprayings or five or six are necessary to obtain control of the codling worm. It may be possible in those localities where the seasonal variation is not great to determine a definite program for times of spraying by continuing these studies through two or three years. Indeed, the whole series of results obtained by us indicates the necessity of a proper timing of the spraying, if the best returns are to be expected, and this timing, as before stated, can only be determined by a study of the development of the worms.

In conclusion, we can say that our spraying experiments in the Pajaro Valley this season have demonstrated the possibility of keeping the loss from the codling worm down to about five per cent of the crop, as against from twenty-five to forty per cent where no spraying is done. The cost of this work will be from fifteen to thirty cents per tree for the year's work, reckoning on trees ten or twelve years old.

Our positive recommendations as to the all-important question of timing the sprays are:

First—In every locality, until definitely proven that it can be omitted, spray at such a time as to leave a dose of poison in the blossom cup.

Second—One or more sprays for the spring brood of moths, as determined by the breeding jar.

Third—Spray against the summer and fall worms, as determined by the examination of bands.

RESOLUTIONS RELATIVE TO WORMY APPLES.

MR. ROGERS, OF WATSONVILLE, presented the following resolutions, in pursuance of instructions from the Pajaro Valley Orchard Association:

WHEREAS, It is an established fact that some of the leading markets of our State are supplied with such large quantities of wormy and scaly apples that those markets are constantly glutted with this inferior grade of fruit, to such an extent that there is slight

demand or sale therein for first-class apples; and further, the price that this low grade of fruit sells for is so low that little or nothing is netted the grower for the sale thereof; therefore, be it

Resolved, That it is the sense of this Convention that steps be taken to relieve the markets of this State, particularly San Francisco, of wormy and scaly apples, by promoting such legislation as may be necessary to prevent such grades of fruit being received and sold in said markets; and be it further

Resolved, That a committee of three be appointed by the Chairman of this Convention, and empowered to take the necessary steps to secure the enacting, by the Board of Supervisors of San Francisco, and by the State Legislature, of such legislation as may be necessary to keep said markets free from wormy and scaly apples.

Referred to the Committee on Resolutions.

AFTERNOON SESSION—THIRD DAY.

THURSDAY, December 10, 1903.

VICE-PRESIDENT McINTOSH. Members of the Convention, you are all probably aware of the fact that the program for this afternoon has been turned over to the ladies, and will therefore be recognized as a ladies' session of this Convention.

I desire, before proceeding to the program proper, to appoint a committee of three, in compliance with an order of this Convention passed day before yesterday, to inspect the exhibit in this hall and to report upon the same before the close of this Convention. I will now make that appointment, with your consent, viz: Mr. Leonard Coates, Mr. W. D. Weaver, and Mr. R. D. Stephens of Sacramento.

Ladies and gentlemen, the first topic upon the program this afternoon is that of "Co-operation and Organization," an essay or paper by Mrs. E. Shafter-Howard.

ORGANIZATION.

BY MRS. EMMA SHAFTER-HOWARD, OF OAKLAND.

(Read by MISS INA DORE.)

In coming before this Convention, I am called upon to qualify the subject "Organization" as given to me, by reference to the Union of "Women in Agriculture and Horticulture," as suggested three years ago.

I had just returned from a trip to England as a voluntary delegate to the "International Council of Women." At this great council only the broadest conceptions of the relations of the individual to the interests of humanity were considered, and the various educational, industrial, and economic working forces leading thereto. There were

delegates from seventeen countries of the world. Among the many subjects presented, none proved of greater interest than that which dealt with the soil and its products. It touched the keynote of human dependence and interdependence in economic relations, and offered something concrete and demonstrable as a working basis. England was awakening to a sense of her failure to compete with Denmark, Holland, and Belgium in the matter of domestic supplies; and aside from the national aspects of the situation, individuals were arousing themselves to heroic efforts to establish agricultural and horticultural training schools for women as well as men; proprietors of great estates were learning the technicalities of butter-making, cheese-making, poultry-raising, etc., that they might stimulate these industries in their own neighborhoods, and, as in France, multiply national schools.

The small initiative taken at this council by the delegate from California resulted in an "International Agricultural and Horticultural Union" between the delegates of seventeen countries as a *practical demonstration* of the "council idea."

Facts and statistics, gathered in California, of the work of women in the making of homes upon the land served as the stimulus to this union. Upon my return to California, I was convinced that if the registration of such work throughout the fifty-seven counties of our State could go on—that if this registration and representation of concrete work could be made to center in a bureau of information—a great deal of *capital for promotion work* in this State would be added to that which men already represent in conventions and organizations.

When it comes to queries and answers from far and near as to the advantages of home-making upon the land, many of these bear closely upon the concerns of *women who make them*. This is true, whether in co-operation with men, or, as has been frequently the case, where women have been thrown upon their own exertions in order to keep their homes; in many cases developing small industries in raising and preparing fruits, etc., for market.

When I ventured to suggest to the few women present at the Fruit-Growers' Convention three years ago that the keynote of this organization was to be "co-operation," that every factor that was ready for co-operation would therefore be welcomed, that those women who had already entered the lists of producers were entitled to the recognition of their work as being of economic value, and that their experience and interest were needed in the deliberations of both men and women working for a common cause, I hoped that the response would be hearty and generous. It certainly was such, so far as the hospitality of the Convention was concerned.

A small beginning was made toward the "Union of the Women of California in Agriculture and Horticulture" at that time. Cards, setting

forth the objects of such union, were sent broadcast throughout the State; officers were elected whose names carry weight along lines of actual achievement in agriculture and horticulture; names, facts, and statistics were solicited by the corresponding secretary that the work of registration might go on.

The objects, as stated, were: 1. For the benefit of each separate county and its workers; 2. To circulate useful information, to compare methods of different districts and counties, and to encourage and stimulate (a) farming, dairying, stock-breeding, bee-keeping, poultry-keeping, etc., (b) fruit and flower growing for profit, landscape gardening, arboriculture, forestry, etc., (c) the management of estates as employers and employed, (d) the encouragement of working amateurs in the making of fruit gardens as distinguished from fruit orchards, etc.

This was done before the organization of the Merchants' Exchange and business men of San Francisco into a "*promotion committee*" to advertise the resources of California and to promote its settlement.

Women are already engaged in the various industries referred to, and their record is phenomenal. Facts and statistics only need recording, co-ordinating, and representing in order to become important factors in co-operation and in "promotion work." For want of a vigorous method to this end, many inquiries have come to me, as corresponding secretary of a prospective "Union of Women in Agriculture and Horticulture in California." The International Union of the women of seventeen countries has been responsible for these inquiries, as well as the separate unions formed in a few of these countries. The women of California have no bureau of information to which practical women can apply for knowledge of opportunities and conditions for the making of homes upon the soil in California; nor are they represented, individually or collectively, in organizations of men. It is in the power of organized bodies, such as the Fruit-Growers' Convention and the Promotion Committee, to solicit and register the efforts of both men and women upon the land in this State; first of all, to recognize and assert that the growth from *within the State*, as already peopled, is quite as important as prospective growth from without. I would therefore suggest to this Convention that special efforts be made to accept and to follow up the initiative already taken by the "Women's Agricultural and Horticultural Union of California," and its incorporation into all "promotion work" of whatever sort already undertaken by men.

Having printed and distributed all that I can say in detail upon this subject, I shall only add that one need not be an agriculturist or horticulturist to be intelligently interested in the economic problems of one's State, nor to know "where one's bread and butter comes from," to earnestly wish to help in the work of organization. As for plan—the

simple extension of the work of our hands as well as the work of our brains is an individual privilege as well as a duty. The contribution of individual effort to the sum total of human effort, regardless of sex, or class, or creed—this is our privilege and the world's need.

TRAINING CHILDREN IN THE RURAL IMPROVEMENT IDEA.

BY MRS. AMOS HARRIS, OF FOWLER.

To train children in rural improvement ideas means to train children to see, to observe the beautiful in nature, to become interested in plant life. It means to awaken in the child mind a desire to have a plant, a tree, or a garden of his very own, where he can study out the mystery of "how to make things grow." When we have interested the individual child in the individual plant we have formed a nucleus for rural improvement ideas, which may unfold into an association for creating "homes beautiful" on the treeless lands of the yet unreclaimed deserts. Senator Stanford gave California horses a world-wide reputation for speed by putting his colts to do precisely what he desired them to excel in on the track in after years. In other words, he sent his colts to school to learn to *do* by *doing*. Parents should learn a lesson from Senator Stanford's experiment. It is a mistake to bring children up in idleness and expect them to become industrious men and women. That child is defrauded of its birthright which is mistakenly allowed to grow up in idleness, instead of being taught from babyhood to be helpful.

Our public schools are doing a great deal with their nature studies to interest children in rural improvements, but to the parent should the child be indebted for its first lessons in the industry of tree-planting.

Children naturally love to *do* things, but they do not love drudgery, and that which we are compelled to do becomes drudgery. There is, in Booker T. Washington's interpretation of the negro problem, a thought for parents and teachers that should be generalized: "After the war," he says, "it was not unnatural that a large element of the colored people at first interpreted freedom to mean freedom from work with the hands. They naturally had not learned to appreciate the fact that they had been *worked* and that one of the great lessons for free men to learn was to work. They had not learned the vast difference between working and being worked." Their difficulty was not peculiar to their color. How many boys have been driven from the home farm because their fathers insisted on working them, instead of allowing them to work. How much better if parents would lure their children to industry by companionship and pleasant stories.

When you give your boy his first lesson in tree-planting, don't set *him* to digging the hole while *you* hold the tree, but you dig the hole while he examines the tree. Tell him to carefully cut away all the

bruised and broken roots. Call his attention to the little roots with their network of feeders. Give him a microscope to examine the shield-covered points that push their way through the earth to find food. Give him your idea of a well-balanced top, and see how quickly he will carry your thought into action by clipping the right branches, and now will be a good time to give him the scientific theory of pruning, the difference between pruning for shade and pruning for fruit. Children take naturally to science, because they naturally love the truth. They want to know the truth about the things that interest them, and it is easy to interest them, even in a hole to set a tree. Show him that you have put the top dirt on one side and the bottom dirt on the other; that when you set the tree you put the surface dirt around the roots because it is already prepared, by the action of the sun and rain, for plant food, and that the tree will thrive better for taking that precaution.

When cultivating time comes, don't send your boy out to *kill weeds*, but rather tell him to loosen the soil about the trees and clear the ground of everything that will rob the tree of moisture or plant food. Fix the mind on life and growth, not on death and destruction, and the weeds will incidentally disappear. It is the same with the garden of the soul—cultivate the virtues and the vices will disappear.

Life has become too strenuous. In our eager desire to make money we forget to enjoy what we already have. Let us relax, become children with our children. Stand still and listen until we feel our pulses beating time to the throbbing of nature's heart. Some one has beautifully said: "He who plants a tree by the wayside plants a thought of God in the hearts of his fellow men." Let us take our children into partnership with us and go on planting trees till our highways and byways, our streets and alleyways become shady avenues, where birds and squirrels will build their homes without fear of gun or sling in the hands of depredating boys and men. For it is true that the boy who becomes interested in plant life soon becomes interested in the sacredness of animal life and loses his savage desire to kill and destroy. The God thought planted in his breast is beginning to bear fruit.

Disabuse children's minds of the idea that they go to school to get an education so that they will not have to work with their hands, as their fathers do, to make a living. But rather inculcate the idea that they get an education so that they may work more intelligently at whatever occupation they may choose to enter. I know a small girl who is allowed to use the pruning shears on a few trees according to her own fancy. She is ambitious to go to the University some day, so that she may learn to become a landscape gardener; and why should she not some day realize her dream of a home surrounded by grounds made beautiful by her own hands?

We want educated people in all ranks of life. Then work will become

honorable and idleness a disgrace, whether practiced by a millionaire or a mendicant. Then our streets and parks, public buildings, and private residences will delight the eye with artistic effects. All will have correct ideas of rural and civic improvements, from the least to the greatest, and each will vie with the other in giving expression to his thought ideas. Truly, labor is worship, work is prayer, when it is done with willing hands and a joyous heart.

FLOWER GARDENING.

By MRS. FRANK COOK, OF FRESNO.

The subject of flower gardening is the poetry of the horticulturist. Even a layman enjoys looking at a beautiful flower garden, if he is sure it won't cost him anything to maintain it; but the true lover of nature sees gardens everywhere—in every landscape, in every mountain meadow, in every public park. But the true spirit of gardening is shown in the little plot about our homes. If the members of a household possess an innate love of flowers, it will manifest itself in some way in and about the home.

Some people have the idea that a garden is an expensive luxury, but so far is this from being the case, that there is nothing brings such rich rewards of pleasure for so small an outlay. The success of a garden lies more in the person than in the purse. A few cents' worth of seeds, a trowel, and the will to do, are all that are absolutely necessary. In fact, I know a woman who raised an excellent garden with no other implement than a butcher-knife.

Only this year a friend of mine raised a little hanging garden on a broad veranda without a cent's worth of extra expense. She gathered up little cast-away pots and jars and bottles and filled them with soil and placed little sprays of Wandering Jew and slips of geranium—anything—everything—and hung the pots to poles of bamboo along the sides of the veranda, and with a little attention the plants grew and prospered until that veranda was turned into a veritable fairy bower—the effect was striking and artistic.

For town gardens, a little plot of grass with a high background and border of flowers is more effective than a front dooryard full of shrubbery and trees. If trees are planted, it is advisable to use the deciduous varieties nearest the house, as they drop their leaves in winter and let in the glad sunlight at a season when it is most welcome.

If neighbors would collaborate in regard to the general appearance of lawns, it would add to the symmetry of the street and yet give each an opportunity to display individual taste in the variety of flowers and the arrangement thereof.

It is well to choose such plants as are indigenous to the soil, or such at least as will readily adapt themselves.

In the way of annual vines for verandas or trellises, the momardica, or balsam apple, is among the first. It luxuriates in this climate and has many excellent qualities—is remarkably free from insects, is a rapid grower, and can be festooned and draped like a lace curtain. In autumn it hangs full of red apples, and is usually fresh and green until Christmas. I saved three quarts of seed the first year I grew the balsam apple and sent it to friends in different parts of the United States, but from reports it did not flourish as it does here. A high board fence covered with the balsam apple makes an artistic background for a small garden. Next to this fence one could plant chrysanthemums, which can be grown quite tall, and the fence would make a good support. Then a row of summer-blooming carnations would flourish with little care, and to finish all, a border of violets, gradually sloping down to the grass plot—and there you have a little flower garden, with a succession of blossoms throughout the season, and all choice varieties—the violets for every spring, the carnations for summer, and the chrysanthemums for autumn.

The next dooryard could be varied with climbing roses for a background, or the moonvine, which flourishes here, with standard roses or dahlias for tall flowers, with stock for early bloomers, and a border of gaillardias, which bloom all the time; and so on, each garden being varied in accord with the taste of the owner.

Such plants of hardy varieties, well cared for, give more genuine satisfaction than all the novelties advertised in the catalogues. A little time each day will work wonders, and it is within the possibilities of all to grow a few things well without the technical knowledge from books or scientists.

In a small garden where space is limited and plants are numbered, I would give the preference to those having the qualities for cut flowers, always choosing the most fragrant, for the scent of a blossom appeals more to me than the sight, however gorgeous in coloring it may be. There is a subtle perfume in fresh flowers that steals over the senses and soothes the nerves, that comes like a balm to rest and refresh the whole system, and perhaps the time will come when physicians will treat cases with highly sensitive nerves with the perfume of fresh flowers, as they now treat with colors.

A kitchen garden of a few square feet is a real help to the housekeeper, and I have derived lasting pleasure from a little Dutch garden with sweet herbs for garnishing dishes for the table. There is a blending of sweet marjoram and lavender, of rosemary and rue, of hyssop and thyme, of sage and tansy and tarragon, and all the old-time herbs that our grandmothers prized. Such a garden when once started almost takes care of itself, and gives a spicy aroma to many a little home dinner.

In gardening for pleasure I have experimented in a haphazard way with seeds and plants, and have evolved some pleasant surprises.

I once planted some rose seeds which were catalogued to bloom in ninety days—which ninety days was a little ambiguous, to start with, as it didn't state whether it was ninety days from the time the seeds were put in, or from the time they sprouted, or from the time the plants budded. It didn't make much difference anyway, as I only grew one plant and it didn't bloom for three years, but it proved to be a very dainty, graceful climber, and at last when it got good and ready it threw out great clusters of tiny white single roses, of surpassing fragrance, and since I have been unable to find it in any of the rose catalogues, I have decided that it is a new rose.

I also grew a beautiful vine that came up as a volunteer, where the year before had grown the cypress vine and the Cuban belle. It seemed to be a hybrid, with a blossom like the cypress and a leaf like the Cuban belle, only deeply serrated, and was more beautiful than either vine. I sent some of the blossoms and leaves to several florists, but none of them could name it. I grew two of these vines at different times, but was never able to get any seed from them.

I have also experimented with carnation pinks, and find that the choice varieties started in greenhouses are not so satisfactory as some of the commoner sorts. I have finally succeeded very well with a field-grown variety, that has all the good qualities sought for except size—and it could be brought up in that particular with proper care. It is perfectly hardy, is a good crimson, has a spicy fragrance, a long, slender drooping stem, and never breaks the calyx. I know of no other pink that brings such a wealth of bloom and fragrance for the care and time put upon it. I start the slips out of doors in November, as they are not susceptible to winter's frosts or summer's heat. It is not a named variety, but a simple seedling.

After all, the purest pleasure in gardening lies in the ownership. There is no garden, however grand, that can compare with your own; there are no blossoms so sweet as those that are cared for by your own hands. To plant the seed, to watch it sprout and expand, to water and cultivate that plant, to see it thrive and burgeon and blossom under your care, to admire its coloring and breathe its fragrance, is nothing short of rapturous joy.

And then if you pick a nosegay of your own growing and carry it to a friend, there is more in its meaning than mere flowers—there is something of yourself mingled with the moist leaves and fresh blossoms—there is something breathes of a friendship pure and holy—there is a spirit of effort on the part of the giver, a spirit of thought and care and time, that makes it more blessed to give than to receive.

Let us strive, then, to make of our home a haven of rest, a refuge from weariness and strife; let us throw in and around our homes an atmos-

phere of culture and refinement, so that the first glimpse may be inviting; and let us cherish the flower garden as a means to this end, so that every passer-by may receive a waft of perfume and an inspiration to create a garden for himself, and so that every inmate of the home may feel that this one spot is sacred, and that wherever he may roam the flowers are still blooming there for him and nodding a glad welcome.

VICE-PRESIDENT McINTOSH. Members of the Convention, I desire at this time to temporarily at least vacate the chair of this Convention, for reasons of a purely personal character. I will ask Senator Johnston, of Sacramento, to occupy the chair during the remaining part of the program this afternoon. Senator Johnston is a parliamentarian of State reputation, and will no doubt satisfy you all.

MR. JOHNSTON. Members of the Convention, it is my pleasure to wait upon you this afternoon, as I have been called upon to do so. The next paper will be

THE COUNTRY CEMETERY.

BY MRS. MAY S. McNULTY, OF FRESNO.

The subject-matter under the title of "The Country Cemetery" may be subdivided under three heads: "Present Conditions," "Remedies," and "Permanent Improvements."

I will venture the conjecture that most of us here are Eastern born, and among our recollections of that East are the tree-shaded, hedge-trimmed, lawny slopes that hold the bodies of our dead. The Easterner, as a rule, cares for his cemeteries. In many, a fund provides for perpetual care, so that may we wander ever so far from the spot where some loved member of the family sleeps we know that the finger of neglect will never leave its unholy touch upon trees, or grass, or flowers. The walks and drives remain well ordered, the stones do not topple or lean, shrubs are trimmed, the blossoming borders of the drives are replanted each spring, and every portion of ground not allotted to graves is appropriately arranged.

Six years ago, a dear friend of mine drove to our Fresno cemetery on that saddest of all errands, the choice of a lot wherein to lay the body of her dearest and best. The avenue leading to the cemetery passed the dump piles of the city. When she entered the inclosure the deep sand choked the wheels of the carriage, and lot after lot was filled with weeds taller than her head.

Fresno was then twenty-five years old; the cemetery had been crowded from its first location and had been moved two and a half miles west of the city. The contrast between an Eastern town and one of like size and business enterprise here, is obvious. Our West is a land of workers. Our interests naturally at the beginning lie in the

acquisition of the necessaries of life. With these satisfied, we march on to secure gradually the comforts, then the luxuries, and last of all the refinements of the beautiful. We have conditions here, of course, which do not prevail elsewhere. For eight months of the year, as a rule, moisture from above does not touch us. Our irrigation ditches are inadequate, and the arid appearance of ground not under cultivation is discouraging. Those of you from the various localities know of the conditions prevailing there. Is it not true that the average cemetery is wretchedly fenced, unlovely, apparently neglected, because of the parched look that pervades it? Only once a year is the barrenness clothed with the tender green of the up-springing weeds, which must be plowed under, as they can not be allowed to reach maturity.

Organization for improvement is the first essential; then the commission, or committee, or trustees, call it by any name, must be in sympathy with a plan decided upon. As a rule, each town seems to have entered the woods of experience from its own particular corner, finding no paths and but few blaze marks to guide it. Our dead will be with us wherever we live, and often a spot on the outskirts, hastily chosen, is the nucleus of the cemetery; and as the town widens to a city in growth, the resting place of our dead is pushed farther and farther from the business and residence portions, so that it becomes out of sight, and naturally the farthest from the minds of all but those whose interest is personal and unforgettable.

After organization, the procuring of a water supply is the next essential. Wells and ditches are utterly inadequate. We have proved this on ground of an acreage suited to the cemetery of a growing town. A pumping plant owned by a stock company, or by the city, or possibly by individuals, with pipes conveying water to all portions and with rates established by the company for its patrons, cuts the difficulty in half.

Suitable fencing, too, must be provided; the most permanent kind, having iron posts cemented in the ground, and with heavy galvanized wire webbing, of which there are many kinds and designs upon the market. The entrances may be of a memorial character, but do let us build them of a permanent character, not the flimsy wooden arch, but pillars of brick cemented, or best of all of granite, which will stand and remain a monument to the wisdom of the selection.

It is absolutely necessary that on the committee should be one or two members who know something of soils and fertilizers, of artistic grading, of planting and pruning, of the nature and habits of trees and shrubs, of the effect of time on their form, and with these individuals let the rest of the committee work in sympathy. Plans must be made and trees must be planted. In planting trees we might choose those which develop rapidly; but by placing in their neighborhood those of

slower growth yet longer life, they may be ready to fill in any gaps which may occur through blight or decay.

Shrubbery is another feature of the cemetery. Our trees must be placed along the avenues, or as boundary lines, as in Mountain View Cemetery of Fresno, where the Southern Pacific Company's roadway is its southern boundary. At this line, a row of trees, banked by shrubbery of a lower growth, would prove an appropriate and desirable screen.

Captain Kellner, of the Agricultural Experiment Station at Berkeley, suggests the names of several creeping plants which have been used successfully in arid regions to cover the sand wastes and clothe them perennially with tender green. These creeping plants, or grasses, are easily established, but have not the annoying tenacity of Bermuda grass. Ivy geranium, once established, withstands drought and frost, and would lend brilliant color and glossy leaf to many spots now unredeemed.

With only the earth, sky, and water at our command as materials, and with taste, and above all, an intelligent, loving interest in our task, we can make the wilderness to blossom. There are limitations to cemetery work which the city or county parks need not consider. Our labor must be confined to the laying out of a general plan of avenues and foot walks which will reach all portions of the cemetery. To these avenues, their repair, their shade, and their beautifying by a judicious interspersion of hardy shrubs and bordering plants, with provision for water, which is the life of everything in creation, our attention should first be engaged. Trees are unsuited to the plot proper; their roots penetrate too deeply and disturb the permanence of the graves. Confine the trees to the avenues or boundary lines, and choose shrubs and hardy rose trees for the plots.

In the improvement of our town and country cemeteries, there is an opportunity lying ready to the hands and interests of our women's clubs. The Parlor Lecture Club of Fresno began four years ago to take the matter up locally, resulting in the planting of an avenue of trees two miles in length, the grading and oiling of the avenue, an improved water system at the cemetery, whereby larger mains were laid, and the installing of a pumping plant of increased capacity. Money has been raised to erect a substantial and permanent iron and wire fence, and the Club members have pledged themselves to build a memorial entrance gate to be made of Raymond granite and wrought iron. Through concerted action other improvements will follow, and this precedent established, surely others may find it an advantage.

“There is no flock however watched and tended
 But one dead lamb is there.
 There is no fireside howso'er defended
 But has one vacant chair.”

These cherished ones of ours, whom we have loved, and cared for so tenderly, to whom we gave only the best while they lived, when Death has gone away with the spirit, and our last care is to deposit in the earth the empty shell, empty indeed, yet so unspeakably dear, if it were in our power would we not seek for them a spot, the loveliest there is, surround it with flowers of the rarest hue, and ask only that gentle winds visit it, that the sun beat not too fervently, that the softest rains fall upon the earth cover? Is it not *this* that we all crave for them? And what *is* their portion and ours, in this great sun-kissed valley?

RANCH LABOR—FIELD AND HOUSE.

By MRS. G. W. AKIN, OF OLEANDER.

(Read by MISS NELLIE BOYD.)

MISS BOYD. The paper is by Mrs. G. W. Akin. I am always sorry for the writer when a paper has to be read by some one else. The reader may get the words, but very rarely can one imbibe the spirit which gives color and life to the paper.

Last year my paper read before this meeting brought forth a spirited argument for and against the importation of Chinese labor. The newspapers took it up, and some went so far as to suggest turning our beautiful vineyards and orchards into hog ranches sooner than be defiled by the "heathen Chinese," and tried to show the danger of the amalgamation of races. The editor evidently took a social view of the matter. It was the practical side to which I referred, not the social, for I do not fear the mixing of the races, because girls are rather particular.

The Chinese Exclusion Act I liken to the proverb, "Straining at a gnat and swallowing a camel." I have changed it to "swallowing an elephant," as a camel is too small. It has closed our Western ports to a class of men who were single; took no part in politics, consequently hatched no plots against our government; were quiet and peaceful at work, lived to themselves, and worked well for us. Now, these are the people who are shut out.

At the same time our Eastern ports are thrown wide open to the scum of Europe. The danger of this wholesale immigration is plainly shown by Frank P. Sargent, the Commissioner-General of Immigration. In his report he says: "An influx of aliens such as the last twelve months have witnessed constitutes a general peril to national interests. The year ended June 30, 1903, was a record-breaking one in the history of immigration. Nine hundred and twenty-one thousand aliens applied for admission at our ports, and only 8,769 of them were rejected. Certainly on this showing some basis can be found for the suggestion that the United States is being deluged with a horde of Italian push-

cart-shovers and organ-grinders, with an army of ignorant, unskilled, and degraded humanity. The majority of these immigrants go to fill the slums of the great cities, and become, when prosperity slackens and the demand for their labor lessens, a burden on our industrial life."

That is Mr. Sargent's report, but it is not all the danger. This undesirable class will, in time, become voters, and help to make our laws. Now the question is, can these ignorant people, born with the seed of discontent so thoroughly sown in their hearts by the tyranny of despotic rulers, be contented with our government, or any government?

No; I am afraid not. To them all rulers are tyrants; all capitalists are oppressors. You see it is your duty to take prompt action in insisting that laws shall be made to keep these people out—and the laws enforced.

The steamship companies are responsible, to a great extent, for bringing this class to our shores. With them it is not "what kind," but "how many." They have freighted their ships to suit themselves long enough. Now let them freight their ships to suit us.

We *do* want immigrants. We want half a million, or more, strong young girls for domestic servants. You may think it imprudent to bring so many unprotected girls here without any visible means of support; but it is not, for what was carried out successfully half a century ago in Australia can be accomplished in America to-day. When Great Britain transported her convicts to the colonies, the colonists were allowed the better class of female prisoners as help, and, as a rule, they were good servants, grateful and glad to get away from prison life. But when transportation to New South Wales was stopped, and the prisoners were removed to Norfolk Island, the settlers were destitute of help. The Home Government then inaugurated an immigration system, and sent girls to take their places. The girls, on their arrival, were taken in charge by the Immigration Commissioners, and the newspapers notified the people when they were to be hired. On the date specified, the ladies went to the government depot, presented their credentials, which had to be signed by a minister or a member of parliament, and got the girls. They were hired for six months at ten shillings per week, which is a little less than \$2.50. If the mistress or girl was dissatisfied, the girl had to be returned to the barracks, and found another place. I understood there was no trouble of that kind. The majority of the girls were Irish. They were quick, witty, kind, and honest. And, by the way, Irish people, as a rule, are honest; there is not as much thieving among the Irish as there is among other nationalities.

In those days it took as many months to go to Australia from England as it now does days to come from Europe here. If they could take care of the girls, so can we. Immigration bureaus could be placed in the large cities, with competent ladies in charge, whose duty it

would be to find homes for them. These girls would grow into our ways, and under good influences would make good wives and mothers.

In the East there are schools to teach girls to do housework; but from what I can learn, they only take up a special line of work; therefore, in order to get the whole house taken care of one must hire a cook, a laundress, a chambermaid, a parlor maid, a woman to do the scrubbing, and a lady to open the door, consequently the housekeeper with moderate means is as bad off as ever.

Our family received a letter from a relative in Indiana lately, in which she says: "I am compelled to sell the farm, as I can not get help in the house, and I am not able to do the work. The girls here are above work." I wonder what the next generation will do? All board, I suppose. But who on earth are they going to get to run the boarding-houses?

One would naturally ask, Where are all our girls? The question, I think, is easily answered. The system of education in America is so complete and knowledge is so easily acquired that when a girl leaves the high school, if she is obliged to earn her living her ambition takes her above the kitchen. Most girls dislike to be called "the servant," or "the hired girl"—although, for that matter, we are all servants. The maid in the kitchen serves her mistress; the President of the United States serves his country, and are we not all servants of God? It is true that the girl in the kitchen is looked upon as a menial, but it does not follow that she has always to stay there. "Servant to-day, mistress to-morrow." *It is brains, not blue blood, that counts in America.* But no matter in what capacity you serve, it is an honor to be a good servant. How well the old negro understood the true value of honorable service when he said to his grandson: "Julius, yo' can't neber be der President ob de United States, honey, but if yo's a good boy yo' can black his boots, an' dat's an honor, I tole yo'."

But if the girls dislike the appellation it is their privilege to reject it. American girls are somewhat independent, and they can afford to be in California, where they get so well paid for their work; and especially in Fresno County, where a girl can earn enough in one season cutting fruit and packing raisins to take her through the business college.

Can any one blame them for wanting to better their condition? Certainly not; it is what we are all trying to do. So, if we can not have our own girls, let us welcome the foreign girls, and give them a chance.

Now, it does not follow, because we object to being burdened with the cast-off of other nations, that we do not want foreigners. America holds out a welcome and protecting hand to all thrifty and intelligent people who are willing to help build up the land of their adoption, not drag it down.

We have a good example of foreign energy in our town. Most of our business men are foreigners, who came here years ago and by their thorough business methods, politeness, and honesty secured the confidence and good will of the people, becoming one with them in the financial and industrial interest of Fresno. We are justly proud of our town. Thirty-five years ago it was a spot on the desert many miles from civilization; to-day it stands the *raisin center of the world*. It is the place for rich and poor: work for one, investment for the other. In what other State of the Union can eleven field laborers make over \$1,400 in twenty days? A gang of Japs made that amount last summer. I know it to be a fact.

No wonder people flock here and that we can not build houses fast enough to accommodate them. A real estate agent told me that he advertised a house for rent, and the applicants had him out of bed before daylight to answer the 'phone.

"I'll take the house you advertised," shouted a woman.

"Do you know the rent? Have you seen the house?"

"No; but I'll take it any way. For eight weeks I've been paying storage on my household goods for the mice to eat up, and I'll go crazy if I don't get settled."

The pessimists predict overproduction, and that raisins will be a drug on the market in a few years. There might have been such a possibility if the raisin-seeders had not come to our rescue, for since the people have found out they have a *vermiform appendix* and that it is a seed-catcher, it behooves them to eschew all small seed fruits. But now they can eat our raisins with perfect safety, and have no fear for that dangerous little part of their anatomy—therefore, our raisins *are safe*.

I anticipate a great future for Fresno. Take a drive through our suburbs and notice the houses springing up like mushrooms. Look at the magnificent business blocks being erected on our streets. What does it indicate? *Prosperity*. With California's glorious sunshine, and abundant snow on her grand Sierras, Fresno has everything to make it and little to mar it.

GOOD ROADS.

BY MRS. LAURA RHEA, OF WEST PARK.

(Read by Miss Ethel Rhea.)

It is not my purpose to tell how to *make* good roads, but rather to ask *why* our roads are not in a better condition. Here in this broad and almost level valley there are no great obstacles in the way—no hills to level, no great engineering feats necessary, no storms or washouts, no snow to be shoveled, no ice to make dangerous traveling; but one great broad plain having many avenues systematically laid out, and named like the streets of cities.

Do our roads lack for travel? Over 46,000 tons of raisins and hundreds of tons of hay, grain, fruit, and all kinds of produce are yearly hauled into the city of Fresno, all of which has given the city its phenomenal growth, and without all of this produce there would be no city.

Do we lack for machinery to build our roads? Examine the road plow, graders, and elevators; you will find them marvels of ingenuity, and a great improvement over anything used by road-makers a few years ago. They are all up to date, and ought to make first-class roads.

It is true that some, if not all of our roads are now in much better condition than they were in the early settlement of the country. Substantial bridges have been built over most of the canals, and some of the roads have been regularly plowed up every year, and during the past summer, in *some* localities, they have been well oiled or sprinkled. One objection to the present system of road-making is, that more work is done in some localities than is really necessary, and a good many well-traveled roads are wholly neglected. Generally, when residents in a neglected district asked when *their* roads would get any work, the reply was, "No more money. You will have to wait another year." They waited, only to see the road plow start up again in the favored locality.

The editor of "Farm and Vineyard" in the "Fresno Republican" says: "We have the worst roads in any civilized country." He evidently had fallen into some of the chuckholes which are so numerous on our roads, or perhaps he had stumbled over some of the garbage or unpolished tinware which is so lavishly strewn on and along our beautiful avenues.

Good roads are a necessity. They save much valuable time to the farmer, who wishes to get his produce to market as quickly as possible. In this country they do not require great expense in building, and large sums are appropriated every year to build and keep them in good shape. Many of them would be greatly improved by filling up the chuckholes and making them smoother. They greatly enhance the value of the land in the country as well as in the city. It is more necessary to have nice smooth roads than to have them plowed up so often, for we do not always find the smoothest roads where so much plowing has been done.

The new railway now being constructed across Great Salt Lake is an example of how much railway companies value time in running their trains. The San Francisco "Chronicle" in a recent article says: "Of course the carrying out of such a stupendous undertaking will cost a mint of money, but modern railway magnates do not count the cost when time-savers are under consideration. Fifty million dollars will unquestionably be required before the work" (of changing grades and shortening distances) "is completed." All this work has been done to

shorten the distance from Ogden to Lucin 40 miles and to save two hours in time for every train. In one portion of the lake it is said that they encountered a bad sink, or crevice in the earth's crust, which required a *cubic mile* of earth to fill it up. That amount would amply fill every chuckhole in the county.

Good roads are a splendid advertisement for the country. Who can estimate the value to California of the road leading to Yosemite Valley? Those who have traveled it, say it is the best mountain road they ever saw. The Yosemite Valley is not a commercial place. The road was built at great expense, and is used mostly by tourists who visit the valley for pleasure and to see its wonderful beauties. If it was necessary to have a good road leading there for pleasure, how much more important it is to have good roads over which we must haul our produce to market. The days of ox-teams and prairie-schooners have passed. We live in an age of bicycles and automobiles, which require good, smooth roads. Railways and electric roads are usually built by private means, and no pains or expense is spared to make them efficient. Public roads are built by taxation. Every one must contribute a share of the taxes. How necessary that this money should be used wisely. The National Grange at Rochester, New York, November 17th, submitted the following resolution:

Resolved, That a standing good roads committee be appointed, whose duties shall be to gather all the information possible regarding the workings of the road laws and systems of the various States, and any and all information obtainable bearing upon the subject; this matter to be published in such form as the committee deem best for distribution.

Resolved, That all State granges be requested to co-operate in this movement.

These resolutions were for the building of national roads. In Congress last year a bill was introduced appropriating \$20,000,000 for national road building. A similar bill will go before Congress this session.

We have over fifty miles of roads in this district, and most of them are in fairly good condition, except the numerous chuckholes, many of which are near and some within the city limits and all dangerous, especially at night.

I can not close this subject without speaking of the weeds and cockle-burs which are allowed to grow along our highways. They are never cut until their seeds have fully matured and are well scattered over the ground. They have spread so rapidly that many pastures have more cockle-burs than grass or alfalfa. They are often thicker on the cattle than bacteria in the milk. There is no "race suicide" about a cocklebur.

A few years ago at a public meeting a gentleman spoke of the possible damages from Johnson-grass. He said that if any one should tell him that Johnson-grass had made its appearance in his vineyard, and at the same time some one should say, "Your house is on fire," he would

reply, "Never mind the *fire*, pull up the Johnson-grass." How many vineyards have been ruined because this grass is allowed to grow and mature along the highways.

How much better our roads would look if they were bordered with trees or flowers. The road leading to the cemetery is greatly improved by the trees which now border it. Also Kearney, Elm, and the beautiful avenues east of Fresno are all improved by the lovely trees and shrubs which now border them.

Many cities take great pride in having nice suburbs, where those who do business in the city can have a nice home with pretty surroundings. These pretty places really add as much to the beauty of the city as a pretty yard adds to the house which it surrounds.

Road-making is everywhere engaging the attention of, we might say, the entire civilized world. Representatives are sent to other countries to study and report the best and most economic methods.

People everywhere who use the roads are complaining of their present condition. All of which is proof that they *do* need improvement. Owners of land could greatly assist the road-makers by keeping their borders free from weeds and cockleburrs. Many of them carefully cultivate their vineyards and orchards, but never touch the land near the fence or roadside. Some of our enterprising vineyardists have planted oleanders and roses on their borders. These need very little cultivation, but what a beautiful sight when in bloom. Others have palms and umbrella-trees. We should encourage this planting along our highways. In a few years this valley would look like a vast garden of trees and shrubs.

Does it pay to plant trees along the roadside? One of our neighbors, whose land is bordered with palms and umbrella-trees, trimmed up the umbrellas last year, and the trimmings furnished many cords of good wood. Another owner on Muscat Avenue sold his figs on the trees for \$400, and every tree was on the border of his land. Another owner obtained over fifty cords of wood from cottonwood trees, all of which grew on one side of a twenty-acre lot.

Our people spend much money every year in advertising the resources of the county. Would it not be money well spent to give us better roads? Every farmer would be certain to say yes, and good roads would be a great inducement for people to locate here.

EXPERIENCES OF THREE WOMEN IN RUNNING A POULTRY RANCH.

BY GERTRUDE WILSON, OF PETALUMA.

(Read by MRS. SHERMAN.)

MRS. SHERMAN. Mr. Chairman, and ladies and gentlemen: I must crave your indulgence, as the lady who was to have read this paper has just sent it to me. I have not read it over, but I will do the best I can with it.

We began our venture three years ago last March. "We" means three middle-aged women—my two sisters and myself. We were providentially led to a small place on the outskirts of Petaluma. We rented the ranch (3½ acres) and bought all the outfit already there, consisting of incubators, brooders, houses, wire fencing, many useful tools, and three dozen hens, forty pullets, and about four hundred chicks about six weeks old.

We set an incubator at once. As the man we bought out had one nearly ready to hatch, we had the benefit of watching the eggs cared for and the chicks come out in that before we had to wrestle with our own. We succeeded fairly well with it, and in the fall had quite a fine flock for the winter-laying hens.

I remember most clearly our experience in teaching those chicks we bought how to roost. As soon as we could get to it we prepared for them some nice perches in the middle of the room, shutting the chicks out of the brooders; then we all arranged for a free evening and attempted to make those poor little things roost. We were told to take them one by one and gently put them on a stick; if left to themselves they would pile up in the corners and smother. Some of them stayed on the perches, but most of them would hop down and hike away to the corners again. We worked in grim silence for some time; then the spell was broken, and we compared notes and commented on the depravity of chicks. I believe we did get them all on the sticks, but it was a hard evening's work. After a few nights they got some idea of it, and in the course of time they learned to sleep on the perches. But the next lot were treated in a different fashion. We made an inclosed platform of laths so that they could go nowhere else when they came in at night. And we have always used something of the kind since. The chicks are always quite frantic the first night, and you feel sure half of them will be killed; but after the first night it is not so hard on them. Of course when they are changed to the open roosts they are sometimes troublesome by wanting to sit in the corners, but a few nights' discipline gets them all in line on the sticks. We always sigh with great relief when they have learned to roost in grown-up style.

We always swing our perches on wire hung from the roof. Some one told us it was a safeguard against vermin, and as we have very little trouble with lice, we believe in the wire. Sometimes, after reading in a poultry paper about lice, we get scared and go and look things over, applying coal oil or carbozine, but even with a microscope we fail to find lice on the perches. Occasionally we find that a hen which does not feel well has body lice; but most of our hens seem clean, and we comfort ourselves that vermin can not be doing much harm if we can not find them.

We whitewash once a year in the early summer. The first year we did it ourselves with a small hand pump. We made a good wash according to government recipe: rice flour, glue, etc., and it stuck. Since then we have hired it done, but the wash is put on so thin that it does not wear so well. The whitewashed houses on the hillside look neater than the weather-beaten ones, and we consider the lime a good thing. We use a great deal of air-slaked lime on the floors of the houses after they have been cleaned. We do that work once a week. I can clean the seven houses in a forenoon. I suppose that in the three and a half years there have not been a half dozen times when we have varied a day in our regular cleaning, and then on account of storms. We have the theory that regularity is a big item in doing the work. It is not so disagreeable if done at regular times, but woe betide thee if the work is neglected.

Our flocks are healthy. Of course we lose hens, but usually from indigestion. In feeding so many hens together, it must happen that some are overfed, but we have never had numbers taken away by disease.

We are systematic in our duties. One of the firm is the housekeeper. In the morning the other two go out to care for the flocks; one does the feeding, and the other empties the water troughs and washes them with a broom. (There is water piped to each yard; it is one of the nice things that were done by the former owners of the place.) While the troughs are filling with fresh water, she opens the laying-house doors and shuts the doors of the roosting-houses. Then we go in to our breakfast, after which we are ready for the work of the day.

We began to have a little income that first fall; but expenses were heavy, as we had to hatch again, and had no old hens to sell, to counterbalance the outlay.

From the first we did our own work, except the plowing. The first summer a neighbor planted our garden on shares, but since then we have made our own, and I assure you that vegetables taste extra good when they are of your own growing. We set out about one thousand kale plants each year for our hens.

One of our trials is that men who plow for us do not leave the ground

in as good shape as our father and brothers used to prepare the garden at home. That often means hours of hard work, making the ground smooth, and fine enough to plant seeds in.

Another of our trials is the fact that our little place is on a well-traveled street leading into town, and our efforts at fence building, gardening, and care of our flocks are of absorbing interest to the passers-by. I suppose it is rather startling to see one woman running a small hand plow through the rows of kale, another hoeing in the garden, while the third pushes the lawnmower; but it is getting to be an old story now, and we do not receive as much notice as at first.

As our flocks grew we needed more house room. During our third summer we were able to put on about \$200 worth of improvements. We had a new brooder house built, which we find very satisfactory; it has two brooders, 8 and 10 feet, heated with gasoline, which we like much better than the oil lamps.

We moved two houses to the back of the place, and fenced across, so that we could use the land up there to better advantage. Four of our houses were old brooder houses, which we have made over, with the help of wire netting, into laying and roosting houses combined.

We plan to keep 800 laying hens, which, with the growing stock, means most of the time 1200 or 1400. We have this fall our best brood of chicks. We always hatch both fall and spring. We do not know why this flock is the finest we ever had. It may be on account of the good weather, they may have come from extra good eggs, or the feed may have been just to their liking and administered just right. We do not know, but we rejoice with thankful hearts, and shall be happy in the possession of three hundred pullets, and as many broilers to sell in January when they are four and one-half months old. We must have another house built for these pullets, as they will be crowded out of the brooder houses long before the old hens are through with their spring laying and ready for market. And so it goes, always more to be added in houses or fences.

We take great pleasure in our flowers, have quantities of them, and to people who have lived on a city street where there was nothing green to be seen, our flowers and green lawn seem like a bit of paradise. We do so enjoy seeing things grow, and were fortunate in getting a bit of earth that grows any and every thing.

We have not made much money, but we have proved that three women can make a good living by raising poultry, if they do not mind hard and rather rough work.

I want to impress the fact that we are very well located. Petaluma is the place to get all kinds of chicken supplies. We are in the city limits, have city delivery of mail, are a pleasant walk from the business center so do not keep a horse, have a telephone, and feed supplies are

delivered to us. The express company comes for our eggs, ships them to San Francisco and returns our empty case for 25 cents—two cases for 40 cents. Our place has increased in value. We could sell it, stock and all, for twice what we put into it; but the gain is not altogether the result of our hard work and care, for property is higher in price than when we came to Petaluma. We like the work, we enjoy the outdoor life, and after these few years of experience know of no other way by which we could earn our living together so comfortably and happily.

MR. JOHNSTON. Now there will be discussion on either one or all of these papers, and we will listen to five-minute speeches on any of the subjects. If no one wishes to talk, the Secretary has an announcement to make.

SECRETARY ISAAC. All those who have not received tickets to the entertainment this evening will please come forward and get them.

At this time a recess was taken until Friday, at 9:30 o'clock A. M.

PROCEEDINGS OF FOURTH DAY.

FRIDAY, December 11, 1903.

The Convention was called to order at 9:30 o'clock A. M. Vice-President McIntosh in the chair.

VICE-PRESIDENT McINTOSH. Before proceeding to the program I will recognize Mr. Markley, chairman of the Committee on Resolutions.

REPORT OF COMMITTEE ON RESOLUTIONS.

MR. MARKLEY. I have here some resolutions passed on by the committee.

Resolution of Thanks to the University of California.

WHEREAS, During the year just past a study of the codling-moth has been carried on under the direction of the Experiment Station of the University of California, working in co-operation with the counties of Monterey and Santa Cruz; and,

WHEREAS, This study and its results are of great value to the apple- and pear-growing interests of the whole State of California; therefore, be it

Resolved, That we, the fruit-growers of California, assembled in our twenty-ninth annual convention, do extend to the President and Regents of the University of California our thanks for the active interest they have taken in this work of State-wide importance, and do express our appreciation of this and all other efforts made and being made by the University of California to further the agricultural and horticultural interests of the State of California, and request them, if conditions permit, to extend such most useful researches; and be it further

Resolved, That the Secretary of this Convention be instructed to forward a copy of this resolution to the Secretary of the Board of Regents of the University of California.

Adopted.

Resolutions Indorsing Work of the Labor Committee.

Resolved, That this State Convention of Fruit-Growers of California does hereby heartily indorse and approve the efforts of the Labor Committee of this Convention in its efforts, during the past year, in bringing labor to California to work in our vineyards, orchards, and packing-houses.

Resolved, further, That we recommend that the efforts of the committee in this direction be continued, and that Mr. H. P. Stabler, chairman, and the committee receive the thanks of this Convention for the successful work performed in this direction.

Adopted.

Resolution of Thanks to the Electric Railroad, Ladies' Parlor Lecture Club, and People of Fresno.

Resolved, That we express our most hearty thanks for the hospitable treatment received from the good people of Fresno, for the courtesies extended to us by the Electric Street

Railway Company, for the elegant reception by the Ladies' Parlor Lecture Club, and, especially, for the arrangements made for the entertainment of the Convention by the local committee.

Adopted.

Resolution on the Isthmian Canal.

Resolved, That we most heartily indorse the construction of the Isthmian Canal, and we also urge the construction, by the Government of the United States, of a trans-continental railroad to fully meet our transportation necessities.

Adopted.

Resolutions favoring the enforcement of the Woodward Act, the postal check currency, and the exclusion of wormy and scaly apples from the San Francisco market, previously laid before the Convention, were reported favorably and adopted.

REPORT OF THE COMMITTEE ON EXHIBITS.

MR. LEONARD COATES. On behalf of the Committee on Hall Exhibit, I present the following report:

Your committee begs leave to report as follows:

The exhibit of apples from Watsonville, by A. N. Judd, is especially worthy of note, the varieties being Smith's Cider, Yellow Newtown Pippin, Langford, White Winter Pearmain, and Missouri Pippin. Among them the White Winter Pearmain is particularly fine.

Strawberries, from the same place, were noted for their large size, firmness, and lateness of season.

Mrs. I. C. Coates contributes very handsome Navel oranges from Red Bluff, almost under the shadow of Mount Shasta.

The Japanese persimmons of A. H. Powers, of Kings River, were a sample of a large crop grown for market and sold at remunerative prices.

In the exhibit of lemons by N. W. Moody, of Kings River, a sample which had been picked fifteen months, being full of juice and in prime condition, is highly commended. The thinness of rind in connection with the other good qualities is evidence of good natural conditions combined with great skill on the part of the cultivator.

"Sunnyside," five miles east of Fresno, contributes freely of Washington Navel oranges, of good color and excellent quality.

Mr. J. P. Bolton, of Fresno, exhibits the "Oil Fire Pots," with electric alarm thermometer, which experience has already shown are a great success in preventing injury from frost.

Mr. J. A. Ashley, a fruit-grower of Yuba City, has exhibited a fruit ladder with a unique and inexpensive device for holding the steps in position. This adds to the efficiency of the ladder without increasing the cost, and is commended to the attention of fruit-growers.

Fancher Creek Nursery makes a comprehensive display of olives and olive oil, Calimyrna fig trees and cured fruit, orange and olive trees, deciduous fruit trees, and grapevines. Attention is called to the Sevillano olive, with recommendation for its further trial, and to the grafted resistant grapevines. The orange trees are especially fine, being grown near the foothills a few miles south of Fresno. Altogether the exhibit of Mr. Roeding is worthy of the highest praise.

Respectfully submitted.

LEONARD COATES.
RUSS D. STEPHENS.
W. D. WEAVER.

Adopted.

RESOLUTIONS RELATIVE TO THE DEATH OF MRS. E. SHIELDS AND B. N. ROWLEY.

GENERAL CHIPMAN. Mr. Chairman, I have been requested by the committee appointed for that purpose to offer these resolutions relating to the death of former members of our Convention and of our society.

Resolutions of Sympathy, Mrs. Elizabeth Shields.

WHEREAS, Since the last meeting of the State Convention of the Fruit-Growers of California, death has removed from among its members Mrs. Elizabeth Shields of Sacramento, a woman of broad ideas, generous mind, sterling integrity, and who, by reason of her extensive interests in and great devotion to the fruit-growing industry, had come to be known, among her fellow workers, as the fruit queen of California; and

WHEREAS, In her death we recognize a loss to the industry, of one of its most enthusiastic and successful exponents, whose energy inspired effort on the part of others, and whose confidence gave stimulus to the work of all with whom she came in contact; therefore, be it

Resolved, That it is the sense of this Convention that in the sad, sudden, and tragic death of Mrs. Shields, the fruit-growers of California have lost one of their most valuable members, and the industry one of its strongest and most practical supporters. Her life was a striking example of what a strong woman can do in the fruit business in California. While recognizing her loss, as one not easily repaired, we extend our sympathy to her immediate neighbors and associates, and especially to her bereaved children, and as a fellow worker we will cherish her memory and ever hold her in grateful esteem.

Resolved, That these resolutions be spread in full on the minutes of this Convention, and that a copy thereof be transmitted to her bereaved children, as a slight evidence of the high esteem we had for their mother.

Resolutions adopted by the Convention by a rising vote.

Resolutions of Sympathy, B. N. Rowley.

WHEREAS, Death has removed from our midst Mr. B. N. Rowley, proprietor of the "California Fruit-Grower," whose recognized talents and great energy were devoted to fostering the great horticultural interests of this State, and whom we had come to regard as a most enthusiastic and effective fellow worker, and whom we were glad to recognize as a gentleman of splendid talents, unquestioned integrity, and great value in promoting one of the State's greatest industries; therefore, be it

Resolved, That in the death of Mr. Rowley the Convention of California Fruit-Growers improves the opportunity to express its appreciation of his great work in our behalf and in behalf of the State we love, and to make suitable acknowledgments of his work as a citizen, as a neighbor, and as a fond and indulgent parent. Few men by their work have made themselves more conspicuous in defense of a great industry, than did our advocate and friend, B. N. Rowley, by his persistent and able exploitation of the horticultural interests of this State, and while pointing with pride to his distinguished services, and holding in grateful remembrance his great life's work and its potent bearing on our interests, our welfare, and on the welfare of our State, we take this occasion to give expression of our sorrow which the fruit-growers of California everywhere feel, in the death of their great advocate; and while condoling with one another in the hour of this great bereavement we extend to the family of the deceased the expression of our sincerest sympathy, and point them for consolation to the words of the great Law-giver, wherein it is said, "He doeth all things well."

Resolved, That these resolutions be spread in full on the minutes of this Convention, and that a copy thereof be sent to the bereaved wife and children.

Resolutions adopted by the Convention by a rising vote.

VICE-PRESIDENT McINTOSH. I now will ask the indulgence of this Convention for a few moments while we hear from General N. P. Chipman, independent of the regular program of this session.

REMARKS BY GENERAL N. P. CHIPMAN.

GENERAL CHIPMAN. Mr. Chairman, and Gentlemen of the Convention: I do not know that I have any message of very great importance to bring to you to-day, but I want to say that when I came into the hall yesterday morning it seemed to me that there was an atmosphere pervading the Convention which was entirely at war and out of harmony with the true condition of the fruit industry of this State. I had read in the morning papers in San Francisco the utterances of your esteemed President, and must confess to have been very much astounded and very much disappointed at some of his conclusions. I am sorry he is not here to-day, because I wanted to combat, in an earnest manner, the conclusions he has reached upon some of the branches of the fruit industry of this State; and I think it is due to us, it is due to the fruit-growers throughout the State, that the truth should be known, and that we should not give out to the world impressions about this great industry of our State that are not proven and that are disappointing and disheartening to the fruit-growers and will be repellant to those who want to come to this State for the purpose of engaging in this industry. Now, I have been in a position, and am in a position relative to the California State Board of Trade, which enables me to speak with some degree of certainty about the condition of this industry, and I say that it is not true that the orange industry, for example, as reported, is in a discouraging condition, the prune industry in a discouraging condition, the raisin industry in a like situation, and so on through quite a list—the wine-grape industry, for example, added to the list. It is not true, my friends, my fellow-workers in the cause of fruit-growing in this State, that any one of those industries is in a discouraging condition.

Now take the raisin industry. We have an example right before us, an object lesson all around us in this beautiful, prosperous city. They tell us that the crop this year is something like 110,000,000 pounds, the value of which circulates through this community. What does that mean in money, my friends? It means, at present market rates, pretty nearly \$5,000,000. It certainly means four and one half millions of dollars going through the avenues of commerce of this one county. I believe that Fresno practically controls the raisin situation in this State. Now, any of you may take pencil and paper and sit down with any one fruit-grower of this county, get from him the cost of production, all told, in the sweat-box here at the packing-house, and what he

expects to get for them and will in all probability get for them, and the result will show a very handsome profit in the raisin business.

Now take the prune. I am a grower of prunes. I obtained only a $2\frac{3}{4}$ cents basis for my prunes this year, but the entire crop averaged me nearly $3\frac{1}{2}$ cents a pound. I don't want any better fruit business than that. Of course, I should like to get a 5 cents basis, but we can't hope for any such results; but the prune industry, at a $2\frac{1}{2}$ cents basis or a $2\frac{1}{4}$ cents basis, where the industry is pursued with intelligence, with proper varieties of fruit and taken care of in a proper manner, is as profitable a business as a farmer can engage in, and so I may say of any one particular fruit industry now being prosecuted in this State.

Mr. Chairman, the State Board of Trade is sending forth literature inviting people to come to California. We are doing it honestly, in the interest of this great commonwealth, and doing it largely upon what we believe to be the truth, that the horticultural industries in the State are the great attraction.

In 1880 the exports of fruits from this State amounted to about 585 carloads of ten tons each. By 1890 we had reached over 16,000 carloads, and then we began to talk about overproduction. I remember when I first began to attend your conventions that I was asked to address the Convention upon this subject. For three successive seasons I combated that idea, until finally I believe the Convention came to the conclusion that it wasn't worth while to hear any more argument on that subject. Because we had increased from 585 carloads in 1880 to over 16,000 in 1890, it was supposed the world could not stand any more fruit. In 1900 we had reached over 60,000 carloads, and in 1902, taking the products of the orchard, vineyard, and garden, it was over 77,000 carloads of ten tons each. This has been taken into the avenues of commerce, the money has come back to this State, and, as I have figured it, it means \$35,000,000 for these products for the year 1902 for this State, and that is more than the value of the exports of all our flour, wheat, barley, hops, wool, and sugar combined. You see the fruit industry means something, Mr. Chairman, to the people of this State, and if it is to live, it means a great deal more in the future. We are not increasing our production as rapidly as population is increasing in this country. Besides, we are greatly and constantly enlarging our foreign market for our fruits.

Let me say a word to the raisin-growers here. What was the condition of the world with regard to raisins before we began to grow them here in California? They were all produced in Spain and the countries surrounding the Mediterranean basin, principally south of the Mediterranean. They were brought into this country under a tariff not particularly high, because there seemed to be no necessity for protection. We got our raisins from abroad, and all the people of the globe

got their raisins from the same regions. The raisin-growing regions of Europe have not extended. They are the same as they have been for centuries. Now, we went into the raisin business and we extended it in that remarkable way which we have of extending any industry which we take hold of with energy, and when it became important that we should take care of our tariff I had an opportunity to go to Washington with a committee from this city—Dr. Rowell and Colonel Forsyth—and we made a fight for you before the Dingley committee which resulted in the present tariff upon the raisin. We showed the committee that prior to the production of raisins in California we had been importing into this country quite as many raisins as we were then producing. There had been some years when we had imported into this country more raisins than we had up to that time produced in this country, and after our raisins had begun to reach the markets of the East the importations began to fall off, until now there are practically no importations of raisins into the United States. We have the market, but we are not to-day producing a great deal more than in former years when people paid 15, 20, or 25 cents a pound for them. I haven't the figures with me now, but my recollection is that there were years when we imported as many as 83,000,000 pounds of raisins, and that was a good many years ago, when the population of this country was not more than perhaps two-thirds of what it is now.

Now, the truth about the fruit industry can not be comprehended and thoroughly understood by taking examples of failures any more than the condition of any other business can be shown by examples of failures. It seemed to me, when I came in here, that this Convention, for a moment at least, had resolved itself into a convention of fruit-destroyers, rather than a convention of fruit-growers. What is the true function of our Convention? Is it to assemble for the purpose of discouraging the growth of the business in which we are engaged? Should we meet together to demonstrate that we ought to all go out of business, and that our nurseries should be destroyed; to say to the people abroad that, while we have these great natural advantages—unparalleled in the world—we are not to utilize them?

If it is not fruit-growing, what inducement have we to offer the immigrant coming here to make this State his home? We have the dairy interest, it is true. We have the wonderful productions resulting from irrigation of these plains, which may be brought to great perfection here and in enormous quantities. The dairy interest may be very greatly extended, but suppose everybody goes into growing alfalfa and making butter and cheese? How long will it take to stock the home market with your butter, and then what condition are we in, shipping butter to New York City, for instance, or to Chicago, right in the midst of the great dairying interest of the East and West and North-

west? No; we must hold to diversification. Go on with your alfalfa-raising. Sometimes it may be that there is more profit in alfalfa than there is in fruit. I saw in a paper some months ago that I had taken out peach trees and sowed alfalfa on the land. That is true, but the bare statement of that fact does not show that raising peaches is not profitable in that locality. I happened to be swindled, as to variety, in a lot of peach trees. When they came to bearing I had peaches almost as worthless as seedlings, and I took up the trees, and as I wanted alfalfa I sowed it, and I have been quoted as an example of the fruit-growers of this country and this State who were going out of the business of fruit-growing.

On motion, a vote of thanks was tendered General Chipman.

NEEDED HORTICULTURAL LEGISLATION.

BY HON. A. M. DREW, OF FRESNO.

The right of the people to make rules and regulations for the control and management of the affairs of individuals, as well as of the affairs of the public generally, I presume will not be questioned; neither will the necessity for such rules and regulations in relation to the fruit industry of California be questioned. Such need usually increases in like ratio with the growth of an industry.

In the early days of our State, when the miner was content to labor with the pick and pan, the rocker and the longtom, the question of rules and regulations controlling that industry was left entirely to the local community; but later, when the same miner became dissatisfied with this slow process and began to tear down the mountains with the hydraulic monitor and to send those mountains by the rivers to the valley, then the people arose and said, "So far shalt thou go and no farther."

When the fruit industry of our State was in its infancy and the supply was insufficient to meet the demand there was little need of rules or regulations to control the production and marketing of the crop, but now, with the great quantity produced and its enormous value, it has taken front rank among our industries and has become the foundation of our material growth and prosperity. With its 36,000 carloads of oranges, 4,600 carloads of raisins, and about 60,000 carloads of other orchard and vineyard products, making a total of nearly 100,000 carloads, representing a value in excess of the gold of our mines, it warrants and demands the careful attention of the best minds of our State that it may be protected, not injured; advanced, not retarded; increased, not diminished. That the legislation already enacted for the control of this industry has been of valuable assistance to it goes

without saying. Our State horticultural bureau has been of incalculable value and is now doing excellent work, but it is circumscribed in power and therefore limited in usefulness.

That we may the better understand what is needed, let us in a few lines review the legislation that is now in existence. The Act of 1883 provided for a State Board of Horticulture, for the districting of the State, the appointment of the members of that body, and defined the duties thereof, which duties are: (1) To receive and manage donations; (2) To meet semi-annually; (3) To appoint instructors, without compensation; (4) To open and maintain an office, and provide rules and regulations therefor. Which Act, with the several amendments thereto, is the present law. The work of this board has been of untold benefit to the fruit industry in the diffusion of information, and in the general assistance rendered to the fruit-grower the results have largely exceeded the cost. But as this law was enacted when the fruit industry was in its infancy, it does not at the present time meet the demands.

The Act of 1897 provided for County Boards of Horticulture and defined the duties of said boards, which are: (1) To inspect, when it shall be deemed necessary; (2) To declare nursery stock or individual premises a public nuisance; (3) To give notice to clean up or abate the nuisance; (4) To abate the nuisance if not done by the owner, charging the cost to him. This was also a step in the right direction, and where the law has been properly applied and enforced much good has been accomplished.

The Act of 1883 is general in character, is intended to be and is merely supervisory and educational. The Act of 1897 is intended to provide a means whereby each county may improve its sanitary condition and protect itself from its neighbors.

The Act of 1899 provides a means whereby our State Board of Horticulture may protect us against foreigners; that is, prevent the shipment of infested stock into our State.

The question now is, "What changes should be made in order to make more effective our present legislation?"

Our laws should be amended to provide:

1st. That the State Board of Horticulture shall have general control of local commissioners; that the county horticultural commissioner or commissioners shall be appointed upon the recommendation of a State or local board, our State University, or some other competent authority. The law of 1897 should be amended reducing the county horticultural commissioners from three to one; that one member should be required to have some knowledge of the business in which he is engaged; he should at least be able to recognize a cutworm from a tapeworm, a *Cimex lectularius* from a *Blissus leucoptarous*, and a codling-moth from a coddled politician; he should be appointed because of his knowledge

of the industry which he is to supervise and the pests to that industry upon which he is to wage war, and not because he has done political work in the election of some county officer. It may not be possible in every instance to obtain thoroughly qualified men to fill this position, and in order to prepare for the education of young men capable of filling this responsible office, the law should provide that experience should be a stepping-stone—that is, that a young man might be taken and educated in this line of work, receiving for his first year a nominal compensation, and increasing the same as he becomes more efficient. In this way we could educate or bring about a thoroughly competent class of men who would be prepared to cope with the difficulties that confront us. To these specially prepared men I would apply the civil service rules to protect them against the political changes in the appointing power.

2d. Nursery stock should be placed under strict quarantine regulations. Every person growing trees and plants for sale should be required, before placing his product upon the market, to procure a certificate of health from a properly qualified horticultural commissioner, showing that the stock he is offering, or is about to offer, for sale, is free and clear of disease and insect pests. If this was required and strictly enforced the State would not be flooded with such insect pests as the San José scale, as it was a few years ago.

3d. I would also provide for county horticultural boards of five or more, who should serve without compensation and who should be selected by the fruit-growers of the county from their own membership. Each board should meet at least once a year, and prior to the State Fruit-Growers' Convention with the fruit-growers of the county; the object being to bring about concerted action in each community with the State Board; also to afford a direct means for the dissemination of information.

Eternal vigilance is the price we must pay for the protection of this industry, and without this eternal vigilance we can not succeed. This may only be brought about by strict rules and regulations controlling its management.

If I might be permitted to suggest, I think it would be well for this State Fruit-Growers' Convention to appoint a legislative committee, consisting of prominent fruit-growers throughout the State, who shall prepare and submit to the next Legislature proposed legislation which shall be deemed for the best interests of the fruit industry. Laws so prepared and proposed will come nearer meeting the requirements of the industry than will the heterogeneous mass of proposed legislation that is biennially dumped upon the Legislature.

MR. DREW. Allow me to add just a few words. I regret that I could not have been here during the sessions of your Convention, but

it has not been possible. Fruit-growing is an industry in which I am particularly interested. I came to this State, Sacramento County, twenty-six years ago, and stayed there about a year. I was then somewhat younger than I am now, and was engaged in teaching school. It was in the vine district of that county and there were some beautiful vineyards in the district, and that year wine and table grapes sold at a very low price, the former as low as \$6 or \$8 a ton. I returned to that district the following year, and found that from several vineyards the vines had been removed. I remember one beautiful vineyard of eighty acres in particular where that had been done, and I asked why it was. The owner said that it was on account of overproduction, that he could not get any price for his grapes, and therefore had pulled up his vines and was going to sow the land to wheat. That was twenty-six years ago, and, as General Chipman said, we have heard of overproduction ever since. Fresno then had the Eisen vineyard of one hundred and sixty acres, the only vineyard in the county. I came here in 1878, and since that time have seen the acreage in vines in this county increase to seventy-eight thousand acres, and we are not any nearer overproduction to-day than when we had but one hundred and sixty acres of vines in Fresno County. We can double our fruit-producing acreage in California in the next twenty years and not exceed the demand for our fruit in the United States alone. However, there is one thing which it seems we do forget; that is, that we are producing luxuries and not absolute necessities. We must get this product to the people, we must take it to the consumer, and must not think, because we sit in our offices and have put a price upon the product and the people do not take it at that price, that we are therefore overproducing. This is not the fact. Take the breakfast foods which are put upon the market; they are advertised upon every fence in the United States, and the result is an enormous consumption of them. The price is put upon every package, and the putting of the price upon the packages of seeded raisins was the best thing that was ever done for the producer and consumer thereof in the way of marketing them, and we certainly ought to prevent, if possible, this product from selling here at home for 35 cents a pound, when the producer only receives 10 or 15 cents a pound for the same raisins. When we put this product into the consumers' hands at a reasonable price, we will find that the production will not meet the demands of the consumers, that there will be a demand for every pound of fruit we can produce.

FUTURE OF THE FIG INDUSTRY.

By GEORGE C. ROEDING, OF FRESNO.

Fig-growing in California took its inception on a plane which might truthfully be called unique for an industry that gives promise of developing into one of such magnitude. Long before California had the remotest prospect of becoming a factor in the horticultural world, figs were planted by the padres in their missions, but only one here and there, more for the purpose of supplying the table with fresh fruit and for the ample shade given by the trees, than with any other object in view.

The first apparent interest in fig culture as a commercial proposition was awakened when the San Francisco Bulletin Company made its first importation of fig cuttings from Smyrna in 1880, followed by another shipment a few years later. As is well known, these trees were widely distributed throughout the State; but as all the fruit which formed, dropped off when quite small, never reaching maturity, fruit-growers came to the conclusion that it was a useless waste of time to cultivate a fruit not adapted to California conditions, and the trees were either dug up or were neglected and allowed to grow at their own sweet will.

In 1884 renewed interest was taken in fig-growing. A fig said to have been imported by the late W. B. West, of Stockton, one of the leading nurserymen in the earlier days of California, was beginning to attract attention. It was claimed for this fig that it possessed all the virtues of the Smyrna fig, and trees were very extensively planted throughout the State, but more largely in the Fresno district of the San Joaquin Valley, where they were used as border trees, and for aligning the avenues of the Muscat vineyards; very few being planted in orchard form. When the demand for the trees was at its height, it was found that they were not of recent introduction, for trees twenty-five years old were discovered growing at Knight's Ferry, Stanislaus County. The fruit when dried was apparently superior to the ordinary varieties of figs; its virtues were highly extolled by the nurserymen, and in consequence of their recommendation, which was sincere, for they had the fruit to exhibit (and it was apparently of good quality), the trees were planted not only in California, but also in Arizona and Florida. It was conceded later on by fig-growers that this fig was not equal in flavor and fine texture of skin to the imported Smyrna fig. Still it was thought that these shortcomings were largely due to a lack of experience in handling rather than to any other cause. After these trees came into bearing, no matter what processing the fruit received, no improvement in quality was shown. The interest which had been so keen to begin

with languished, and the figs were allowed to drop to the ground and go to waste, or were fed to the hogs, and they not only relished them keenly, but fattened on them as well.

Meanwhile, F. Roeding, having concluded that there was a future for the industry, decided to send one of his foremen to Smyrna, for the purpose of investigating the subject of Smyrna fig culture on the spot, and also to secure cuttings of the variety from which the finest dried figs were exported.

The successful solution of the problem, in connection with the production of the Smyrna fig in California, is a subject familiar to all of our horticulturists, so it will not be necessary to recapitulate the facts, which have so often been presented.

It was not until 1892, when Seropian Bros., of Fresno, started to pack the Adriatic figs, in a small but commercial way, their output in the first year being in the neighborhood of 10,000 ten-pound boxes, that the industry in California first received commercial notice. The price of 4 cents per pound had the immediate effect of stimulating more planting, and also caused many growers to give better care and attention to their trees than they had done before. The inferiority of the Adriatic figs was a matter of comment among Eastern jobbers, but nevertheless there was a demand for a cheap fig to fill in the gap before the Smyrna figs were received, and as the Adriatic figs were retailed at a much lower figure, a regular trade for them has been established. In 1896, the output by this one firm alone was in the neighborhood of 60,000 ten-pound boxes. The method of packing the figs in layers had been followed up to this time, in imitation of the Smyrna pack, although the character of the work was far inferior. In the same season a novel idea was adopted by a member of this firm. Wooden forms were made, divided into four or five compartments, each form, when filled with figs, holding a pound of fruit. These bricks, as they are known to the trade, were then wrapped in waxed paper, and afterward tied with ribbon, and then packed ten in a box. The trade evidently appreciated this style of package, for, within a few years, it practically superseded the old layer style. A dealer knew what he was selling to the customer, and was relieved of the necessity of weighing the figs and getting his fingers sticky at the same time.

In the natural course of events, other packers engaged in the fig business, and in the year 1897 the combined pack of the four firms in Fresno alone was not far from 1,200 tons, or 240,000 ten-pound boxes. The year 1898 was the banner year for the Adriatic fig, the Smyrna fig crop having been seriously curtailed by a tremendous freeze in the fig district of Smyrna, which not only injured the trees, but destroyed the Capri-fig as well, so that the crop was two-thirds short. The demand for the Adriatic figs on this account was unprecedented. Fully 2,000 tons were

packed and shipped, selling readily at higher prices than they had ever brought before, or since.

There has been a gradual increase in the output of the Adriatic figs since the year 1898, although at no time have the shipments been more than 2,500 tons annually. At least seven-eighths of the Adriatic figs packed have been shipped from Fresno. Strange as it may seem, still it is an actual fact that very few orchardists cure their own crops. Most of the crops are sold on the trees, and in many cases the prospective crops are sold in the winter months before there is any indication of what the crop will be. The Slavonians and Armenians, who are engaged in this line of business, pay so much a tree for the crop, the price being determined by the size of the trees and the quality of the figs from a certain orchard or district, their knowledge of such matters being quite accurate. The handling and curing of the crops are entirely in their hands.

During these years when the Adriatics were selling at such profitable prices, the only Smyrna fig orchard in California was cultivated and cared for by the writer without bringing any returns. At times the task appeared to be a hopeless one, and the temptation to dig up the orchard (grafting in those years had never been satisfactory, very few of the scions growing) was very great. Fully realizing, however, that the success of the undertaking hinged on the fact of establishing the little fig wasp, *Blastophaga grossorum*, I proceeded from year to year to import the insect from Smyrna and other places, but without success. My failures were largely due to the fact of my not being able to secure the services of a competent man to make shipments of the insects at different seasons of the year to enable me to determine in what stage of their existence they would carry through successfully. Several times I tried to interest Hon. J. Sterling Morton, United States Secretary of Agriculture, in this subject, but all my efforts met with no response, and it was not until 1898, when the California State Board of Trade addressed a letter to Hon. James A. Wilson, United States Secretary of Agriculture, which met with an immediate response, that active steps were taken to introduce the little wasp which was to play such an important part in the future of the fig industry in the New World.

The interest manifested in this subject by Mr. W. T. Swingle, Agricultural Explorer, and Dr. L. O. Howard, Chief of the Division of Entomology, both of the United States Department of Agriculture, is well known. The following year after the insect had been established, Dr. Howard sent a special agent, Mr. E. A. Schwarz, to make a thorough study of the life history of the little wasp. Mr. Schwarz devoted six months of careful study to the matter, and his investigations were fully set forth in a treatise written by Dr. Howard for the yearbook of the United States Department of Agriculture in 1901. Mr. Swingle has not

lost sight of the importance of fig culture, and in his recent travels has been collecting Caprifigs from all the countries, which he visited, bordering on the Mediterranean. Many of these trees, which are now growing in the greenhouses in Washington, will be forwarded next year to California for trial, and if they thrive as well as the other varieties of Caprifigs which have been introduced, new and interesting developments in connection with this subject are in store for us.

The year 1900 marked a new era in the fig industry of California. In that season the first Smyrna figs were produced, being six tons of dried figs. In 1901, twenty-five tons were harvested, in 1902 thirty-eight tons, and this year the crop increased to sixty-five tons. Such success, so closely following the establishment of the wasp, should have convinced the most skeptical that the business of growing the "true commercial fig" in California was firmly established.

It is not necessary for me to emphasize the fact that anything new and outside of that which people are accustomed to, is beset with difficulties, and this has been amply illustrated in the fig business. In the first place, it was predicted by the "know alls" that the bugs would die during the first cold snap that was experienced. When this prediction was not verified, it was claimed that the Smyrna figs would not bear like the Adriatics, and some of my solicitous friends even went so far as to credit me with scientific knowledge (one thing I am sorry to say I do not possess), saying that it would be useless for any one else to engage in this business on account of the many complications in connection with it. The results thus far obtained in growing the Smyrna fig in California ought to set at rest, once and for all, the pessimistic reports which have been circulated.

During the past season a careful and accurate account was kept of the labor of distributing the Profichi, or June crop of Caprifigs. Over 200,000 of these figs were distributed in our orchard, at an expense of \$1.15 per acre. More figs were really distributed than necessary, but having a good supply on hand, it was concluded best to distribute them. This, then, is the only additional expense in connection with the growing of the "true commercial fig," and it is such a small matter that it is not worthy of consideration.

The drying and handling of the Smyrna fig, or "Calimyrna," as we have designated the "true fig of commerce," to distinguish it from the other Smyrna varieties, cost considerably less than the drying of the White Adriatics.

The opening price for dried Adriatics this season was $3\frac{1}{2}$ cents per pound, an inflated price by the way, brought about by competition among the local packers, and not warranted by the market price of the packed goods. This price has steadily declined, until to-day figs of this variety can be bought at $1\frac{1}{4}$ cents a pound, with practically no

market justifying this price. Calimyrna figs sold at 6 cents per pound delivered in the sweat-box. I do not wish to infer that they will always bring this price. They will, however, always have a value in the commercial world, based on the law of supply and demand, with many factors in their favor. Deliveries can be made a month earlier; and our goods will be put up with more care, will be cleaner, and last but not least, they will be packed in attractive packages, all of which will tend to give them the lead.

It must be apparent to the most cursory observer that the success which California has attained in fruit-growing is directly attributable to the fact of her taking the best of certain fruits grown in the Old World, and under our more favorable climatic conditions and improved methods of handling and packing, creating a demand which has become permanent.

Individual success in growing figs, or any other variety of fruit, can only be accomplished by starting with the right variety. How much better it would have been for the citrus business of California if the Australian Navel had never been introduced and mixed with the genuine Washington Navel. There is hardly an old established orchard which has not more or less mixtures in it. These oranges naturally drift into the market, and their inferiority detracts from the value of the true Navel, causing annoyance and loss to packer and grower alike.

The same state of affairs is liable to arise in the growing of figs, unless growers exercise proper precautions. It is an unfortunate fact that the earlier importations of Smyrna fig cuttings into California have been found to be badly mixed. No less than four varieties have been found growing on the Vina Ranch alone. All of this would indicate that the cuttings sent from Smyrna were most likely taken from a fig garden (the name applied to all fig orchards in Asia Minor) started from seed, otherwise there could not have been so many varieties among the trees still to be found growing in California. In my travels through the fig districts of Asia Minor, I took particular pains to inspect a number of orchards, and it was only in rare instances that I found any variety outside of the Lop Injir, which is identical with the variety which has been designated as the "Calimyrna" in California. Occasionally a Kassaba was found growing among the Lop Injir figs, but very few of any other varieties, with which I was familiar, were to be seen.

That the Smyrna fig will not come true from seed is exemplified by the old orchard of seedlings at Loomis, Placer County, planted by Mr. E. W. Maslin in 1885, from seeds taken from the finest of Smyrna figs which could be purchased in the New York market. After Mr. Maslin sold his place the orchard was neglected, and for fifteen years it received no care; still the trees lived, many of them making a good growth. It

was not until the wasp was established in this orchard from a consignment of insects sent from Fresno to Mr. Mazel, the present owner, that attention was attracted to it by the endless number of varieties it contained. Several Caprifigs were also found growing among the seedlings. The hopelessness of the task of establishing a commercial fig orchard from Smyrna fig seeds is therefore apparent at a glance.

No class of fruit can be put to such a variety of uses as the fig. It is exceedingly palatable in the fresh state; it can be canned, pickled, preserved, crystallized, and as a dried product it excels every other fruit, being the only one which is palatable without some previous preparation. Fig pulp is extensively used in the manufacture of crackers, also for making strawberry and raspberry jams. Fortunately for the consumer, no deleterious effects result from this adulteration. Even coffee is made from figs, having properties said to be superior to those of the coffee bean.

No tree is freer from disease or will thrive under so many adverse conditions and adapt itself to such a variety of soils and still produce good crops. With the right variety to start with, there is every reason to believe that fig-growing in California promises to be one of its remunerative industries.

If steps are taken promptly to graft all the Adriatic varieties of figs into the Calimyrna, it will only be a question of a few years when California will be shipping fully as many tons of this variety as she is of Adriatics to-day.

The Smyrna fig has been cultivated only in a limited way in California outside of Fresno County, but wherever found it has done well. Of course there is more than one variety of Smyrna fig. I have five named varieties which I received under names from Smyrna; and in addition to these there are four or five individual varieties, individual trees which are entirely distinct from the "true fig of commerce." None of the other varieties dry or make as fine a fig as the fig of commerce. The Adriatic variety belongs to an entirely different family. It has what is known as mule flowers. You will occasionally find, when the wasp enters the fig, that it will fertilize a few of the flowers, but, as far as changing the general character of the fig is concerned, or preventing the fig from souring, there is no change. We have Adriatic figs, particularly the White Adriatic, immediately adjoining the Calimyrnas, and seventy-five per cent of the Adriatics will be sour while it is almost impossible to find a sour Smyrna fig.

THE WALNUT, AND ITS COMMERCIAL PROSPECTS.

By FRANK E. KELLOGG, OF GOLETA.

The English walnut is a native of Persia. From its native habitat it has been transplanted into many of the countries of Europe, and finally found its way to both North and South America. It is supposed to have been introduced into California by the Franciscan monks during the establishment of the missions, in 1769.

The first plantings outside of the missions were made in San Diego in 1843, by the late Colonel J. J. Warner, and in Napa Valley midway between St. Helena and Calistoga, in 1848, by my father, the late F. E. Kellogg, Sr.

But until recently the industry has been one of very tardy growth. Although the plantings in the northern and southern parts of the State began almost simultaneously, owing to more favorable climatic conditions the southern part has far outstripped the northern, insomuch that the southern counties are to-day almost the sole producers.

And even in southern California few localities possess the proper climatic requirements. The interior valleys are too hot and dry in summer and too frosty in winter, while much of the coast region is too raw and windy. The best walnut-growing districts are those parts of southern California which are sheltered by the mountains from the hot winds of the interior, and which are moistened by occasional warm summer fogs.

These conditions seem to be most perfectly met in the counties of Santa Barbara, Ventura, Los Angeles, and Orange. These four counties constitute the most important walnut-growing region on the earth to-day, exceeding all others both in the quality and in the quantity of nuts produced.

The soil best adapted to walnut-growing is a deep, sandy loam containing a slight admixture of adobe, which has no underlying hardpan, and where the surface water is from 10 to 25 feet from the surface in the dry season of the year. Where the average annual rainfall reaches 17 or 18 inches, no irrigation is required; but where the rainfall is much less than this, irrigation is necessary.

The walnut tree requires no pruning, except the removal of the lower branches which interfere with cultivation; also, any dead branches should be removed.

In respect to cultivation, the walnut should be treated the same as any of our common orchard trees. Thorough cultivation should be the rule.

There are two principal varieties of walnuts, known respectively as "soft-shell" and "hard-shell." The former is the more thrifty, bears

the younger, matures the nuts earlier in the season, and produces the more abundantly; the nuts are more easily harvested, look the better, and command the higher price.

Nearly all the orchards now in bearing are seedling trees; but the more recent plantings are largely of grafted or budded stock.

The most serious menace to the industry is what is commonly known as "walnut blight." It is a bacterial disease, for which no efficient remedy has yet been discovered. It does not seriously affect the growth or vigor of the tree, but manifests itself chiefly in the destruction of the nuts in the early stages of their growth. In the affected orchards it manifests itself from year to year with greatly varying severity; in some seasons the destruction being very slight, and in other seasons reaching as high as fifty per cent of the crop. Prof. Newton B. Pierce, the Government pathologist located at Santa Ana, is devoting much time to the study of the disease, and all walnut-growers are anxiously looking for a favorable report from him. To encourage a widespread study of the disease and search for a remedy, the walnut-growers of southern California, in their organized capacity, have offered a reward of \$20,000 to any person who will produce an effectual remedy. Any one desiring to know the exact conditions on which the reward will be paid can obtain full, printed particulars by applying to the secretary of the Walnut-Growers' Executive Committee, Mr. J. A. Montgomery, of Rivera, Los Angeles County.

The harvesting of the walnut is accomplished by simply shaking the trees and picking up the nuts by hand, and costs from \$12 to \$15 per ton.

The marketing of the nuts—which includes the preparation for market, consisting of grading, bleaching, and sacking—is done chiefly by the walnut-growers' associations, of which there are ten in number. These associations are incorporated and are strictly co-operative concerns.

Not only are the individual associations co-operative concerns, but these individual associations have united in a co-operative body known as "The Walnut-Growers' Executive Committee," which is composed of the directors of the individual associations. Although the executive committee is not an incorporated body, and theoretically has no stronger bond than the simple word of honor, yet in its actual workings it has been very effectual, and its requirements have been carried out with remarkable fidelity.

The executive committee decides what size of mesh shall be used in the grading of the nuts, thereby securing uniformity in this matter; also, it secures the bags for all the associations, and by thus purchasing in vast quantities gets them much cheaper than otherwise.

But by far the most important prerogative of this committee is the

fixing of prices and determining the conditions under which the nuts shall be sold. A few weeks before the walnut season opens, a meeting of the committee is held for the purpose of making a general agreement. For several consecutive years this general agreement has included the following important provisions:

(1) That the associations will all sell at the prices to be agreed upon at a later meeting;

(2) That the agents to be employed shall sell the nuts on a stated commission;

(3) That when the nuts are loaded on the cars the agent must pay cash down in full for them, and must take all the risks of collecting from the man to whom the sale is made.

Next, and finally, comes the meeting for fixing prices, which occurs on or about the 15th day of September. At this meeting the latest consular reports are read, containing the best possible forecast as to the size and quality of the incoming foreign crop; also, the latest and most reliable information is given concerning market conditions—whether any nuts of the preceding year remain unsold or not, and whether general market conditions are good, or otherwise. And finally, a careful estimate is made of the size of the incoming crop. Then, with all these facts before it, the committee proceeds to fix the price as high as the market will bear.

While the average walnut-grower is shocked at the thought that such wicked institutions as "trusts" and "combines" should be tolerated, he can look with perfect equanimity upon the Walnut-Growers' Executive Committee. After all, our opinions depend a good deal on whose ox is being gored! However, this can be said in defense of the executive committee: That while, under its control, the f. o. b. selling price has steadily advanced from year to year until from about 7 cents per pound in 1897 it has increased to 12½ cents in 1903, the man who eats the nut really pays no more for it now than he did then. What has actually been accomplished is this: The profits of the industry have been diverted from the purses of the speculators to the pockets of the farmers, while the consumer has not suffered at all. Also, the executive committee must be congratulated on the fact that this increase in the f. o. b. selling price has taken place while the output has grown from 414 carloads in 1897, to 825 carloads in 1902, and will probably reach over 1,000 carloads in 1904. We will not estimate the tonnage of 1903, as this is an off year and will probably fall below the output of last season.

If all the growers were members of the associations, a still higher f. o. b. price could be obtained—which, this year, would have amounted, probably, to 2 cents more on the pound, owing to the shortage of the crop. The outside nuts are a prey for the speculator, who, in many

cases, is also the agent for the associations; hence, as he is a buyer, it is perfectly natural for him to advise the fixing of the price low instead of high, so as to make his margin of profit on the purchased nuts as wide as possible. Never until the outside grower joins the associations will the interests of the broker and the producer be identical. Then, and not till then, will they unite to put the price up to the full limit which the market will stand.

Also, if there were no outside growers to take advantage and offer nuts for less than the established price when sales happen to be a little slow, the executive committee would have more confidence in maintaining the prices set and a higher price would be the inevitable result. When the outside grower is eliminated, and not until then, may we hope to get the full market value for our product.

As for the commercial outlook of our industry, it is very encouraging. We have only two competitors of any consequence. The one is Chile, whose nuts are harvested in the month of March and arrive in our market so early that they are all disposed of before ours ripen; and the other competitor is France, whose nuts arrive in our market several weeks later than ours ripen, giving us an opportunity to sell in advance of them. And while we may differ concerning the tariff on manufactured goods, etc., all walnut-growers are convinced that the 4 cents a pound duty on walnuts is a beneficent and righteous regulation. We also have the advantage of our competitors in the fact that our goods are superior in quality to theirs.

There is but little danger of overproduction, as the demand seems to be increasing more rapidly than the supply; this will probably continue to be true, owing to the limited area adapted to walnut culture.

As to the profitableness of the industry: We are acquainted with a few orchards that, in normal years, produced a ton of nuts per acre. At present prices, such an orchard will net the owner in the neighborhood of \$200 per acre.

MR. HARTRANFT. Mr. Chairman, I wonder if Mr. Kellogg is not asking for too much when he asks anything more than $12\frac{1}{2}$ cents for walnuts? I wonder if he is not expecting too much of marketing methods?

MR. KELLOGG. Mr. President, there is a price beyond which we can not go, and that is the price which market and crop conditions will sustain, and we want to get all that those market and crop conditions will allow. If we go beyond that we do something that is in opposition to our own interests.

MR. PHILLIPS. I would like to ask the gentleman if he does not have to wait about eight years before he gets any crop at all?

MR. KELLOGG. No, sir. If you plant two-year-old trees, or three-

year-old walnut trees from the nursery, they come into profitable bearing in six years. During those six years you can raise any quantity of squashes, beans, etc., in your orchard, so that you do not lose the use of your land.

VICE-PRESIDENT McINTOSH. We will now listen to the paper by Major Berry, of Yolo County, on "Citrus Fruits in the Northern Counties." (Paper read by the Secretary.) It is a great pleasure to have Mr. Isaac read some of these papers, as he is so distinct and clear in his enunciation.

CITRUS FRUITS IN THE NORTHERN COUNTIES.

BY MAJOR C. J. BERRY, OF WOODLAND.

It is now nine years since the San Diego "Union" published an editorial about citrus culture in the counties of Tulare and Fresno. "Ye editor" took occasion to say at that time, "Advertising of the counties mentioned as possessing the climate and soil adapted to the growing of oranges and lemons was a misleading statement, and it would do great harm to the home-seeker" coming to California. He said, "It was well known that oranges and lemons could only be grown in Tulare and Fresno counties by putting blankets over the trees in winter."

The wheel of time has not ceased to revolve between that time, nine years ago, and the present, and in so far as the growing of citrus fruits is concerned in the counties north of the Tehachapi, one need but look over the advertisements of any of them and he will find that even up to Shasta the golden fruit of the Hesperides is by no means forgotten to be enumerated as one of the attractive features of their soil productions, and as a matter of fact, oranges are grown in a more or less commercial way throughout all of our northern counties.

As for soils which are adapted to the culture of the orange, there is throughout the "big" Sacramento Valley any kind and all kinds of soils, and if one desires to grow oranges, and knows how, he need not feel at all worried on the subject of soils. There is an abundance of land adapted to this industry which he can procure at one tenth the price for which it can be procured in southern California. Moreover, water is abundant and procurable at a minimum cost in comparison with what the orange-grower of Riverside County must pay for his irrigation.

Let us look at the present development of orange-growing in our northern counties and consider if it is possible to select varieties which may become distinctly adapted to our northern counties, as the Navel orange seems to be to the Redlands district. A careful study of the liability to or the exemption of different varieties from various diseases,

and the introduction of new varieties or their production by crossing and selection, thus producing both a tree and fruit adapted to the climatic and soil conditions of our northern counties, may well engage our special attention. Such lines of research are too important to be neglected. While the yearly output of our orange groves has reached enormous proportions, and the promise in the near future is for a still greater yield, the discovery of a stock or variety which would be blight-resistant would be worth millions, and a stock that could withstand the influence causing an ordinary orange to have "die-backs" would be of great value. The influence of climatic and soil conditions on the orange and other citrus fruits is a subject demanding study. This can only be done by trained men, provided with proper equipments. The extreme variability of soils in adjoining fields is a fact well known in California.

The general relation of climate to the orange tree should also be studied. Most important of all is the study of the influence of fertilizing on the health and fruitfulness of the tree. The time of application, the amount, and the kind of different soils, stock, and varieties, and the effects of various fertilizers on amount, size, and quality of the production—all such questions certainly need answering. With fruit trees like the orange, proper investigation of all such matters as soil, climate, fertilizer, stock, and varieties would require a great deal of patience, more, in fact, than the average soil-tiller can give, even admitting he was capable. With cereals and other annual plants, a single season gives results of positive value, but not so with the orange. Therefore, investigation of the kind mentioned should be begun and continued by the Government. This work, conducted in a proper manner, would bring about an increase in the production of all subtropical fruits, which would be a full compensation for the expense, and if nothing more be accomplished, there would be an awakening of interest in this line of fruit culture commensurate with its importance.

Orange-growing in the counties of the Sacramento Valley is no longer an experiment, but it must be admitted that many improvements could be made which would doubtless bring about better results in this industry, so attractive to the home-seeker immigrating from the East.

One thing is certain—that fine fruits can only be had from rich soils, and it goes without saying that very large areas of the northern counties do possess the richest soils of the whole State. This fact in itself must sooner or later have an effect upon the orange industry, the richness of the soils precluding the necessity of using fertilizers for many years to come.

So, to sum the matter up, where fruits can be grown the cheapest and equally as good as elsewhere, there the industry will undoubtedly be pursued, and these conditions prevail in the northern counties—plenty of rich lands at minimum prices per acre, abundance of cheap water for

irrigation, temperature during the coldest winters not so severe as recorded in southern California—so that in the end one can look forward to a time in the near future when orange-growing in our northern counties will assume much larger proportions than it is doing at present.

The growing of lemons is quite a different matter from the growing of oranges in the counties north of the southern counties of the San Joaquin Valley. Perhaps the easiest way to express one's views will be the shortest; therefore, I shall close this paper by saying: Don't try it.

REPORT OF THE COMMITTEE ON LABOR.

SAN FRANCISCO, December 7, 1903.

To the State Fruit-Growers' Convention, Fresno, California,

GENTLEMEN: Your committee appointed at the Fruit-Growers' Convention in San Francisco, December, 1902, to secure orchard help from the agricultural districts of the Eastern States, begs leave to submit the following report:

Twelve of the fifteen members of the committee met in Paso Robles in a three days' session in December of last year, and effected an organization by electing Mr. H. P. Stabler of Yuba City chairman, and Mr. B. N. Rowley of San Francisco secretary. From the membership of the general committee a permanent organization was effected under the name of the California Employment Committee. The following executive committee of seven members was appointed: T. H. Ramsay, Red Bluff; G. H. Hecke, Woodland; L. F. Graham, San José; A. D. Bishop, Orange; B. E. Hutchinson, Fowler; B. N. Rowley, San Francisco; and H. P. Stabler, Yuba City.

In order to accomplish its purpose, the committee decided that a number of representative fruit-growers should be sent to the agricultural districts of the Eastern States to encourage young men and men with families to come to the fruit districts of California and secure employment in harvesting the crops.

Both the Southern Pacific and Santa Fé Railroad Companies extended every courtesy to our committee and materially assisted us in our work. Mr. E. O. McCormick and Mr. James Horsburgh, Jr., of the Passenger Department of the Southern Pacific Company, extended many favors to the committee, and it was through their courtesies that we have been able to make the good showing that this report sets forth.

The California Promotion Committee, through its efficient executive officer, Mr. Rufus P. Jennings, offered to thoroughly co-operate with the California Employment Committee in prosecuting our work in the Eastern States. The Promotion Committee placed its office at our disposal, supplied our committee with a clerk, stenographers, postage, and stationery, also subscribing to our fund an amount equal to the amount

raised by our committee. Our Eastern operations were carried on entirely under the direction of the Promotion Committee. Representatives traveled under the auspices of, and reported to, that committee.

The State Board of Trade and other organizations were equally courteous in offering to assist the committee in its enterprise.

On February 3, 1903, we sent out four travelers to the Eastern States equipped with two stereopticons and complete outfits of slides descriptive of California industries and points of interest. A large supply of descriptive literature was also taken. Mr. George W. Pierce of Davisville and Mr. George D. Lorenz of Sacramento, of this party, spent thirty days in the States of Iowa, Illinois, and Nebraska lecturing and distributing literature. The experience of these two gentlemen showed us that the people of the States named felt a great interest in California. Ten lectures were given, with audiences ranging from 400 to 1,500 people.

Messrs. F. W. and E. J. Crandall of San José visited the States of Kansas, Nebraska, and Michigan, reporting the same interest among the people in hearing of California. Mr. F. W. Crandall also spent a month in England and on the continent of Europe.

H. P. Stice and H. C. Swain of Red Bluff, Tehama County, left on the 4th of March for a thirty days' trip to Ohio and Illinois. These gentlemen were not equipped with stereopticons, nor did they deliver lectures, but were liberally supplied with literature, which they distributed in the agricultural districts of the States visited.

On the 15th of April, Mr. R. C. Kells of Yuba City and Mr. W. H. Murray of San Francisco left for the East as missionaries in our cause. As the former travelers had confined their work to the Middle West, it was deemed advisable to make some inquiry in the far Eastern district of the United States. Mr. Kells was therefore directed to go to New Orleans, and from there to Maryland, Delaware, and New Jersey, in order to see what might be accomplished in securing farm help from those States. He was confronted with unfavorable conditions for the success of the enterprise. Fruit-growers and farmers in the Atlantic States were found to be in need of farm help themselves. Mr. Kells was accordingly advised to go to Illinois and Nebraska, where he distributed literature in the agricultural districts.

Mr. W. H. Murray's itinerary differed from that of the former travelers, as he was directed to spend six months in visiting the country districts of the States lying between the Mississippi River and the Atlantic coast. Mr. Murray's past experience in journalism enabled him to secure much publicity for our enterprise in very many newspapers of the Eastern States, which resulted in a large correspondence from people contemplating a trip to California.

Two members of the executive committee were the last to invade the

Eastern field, Messrs. L. F. Graham of San José and B. E. Hutchinson of Fowler. Mr. Graham covered a large territory in his travels and made investigations at the Barge Office in New York which were of much interest and value to the committee. His report contains many facts and figures accompanied by official documents, and is worthy of the attention of all fruit-growers interested in this subject.

Mr. Hutchinson spent many weeks in Ohio and Michigan, and was abundantly supplied with California literature. He was accompanied by his wife, and they took advantage of every opportunity to present to the Eastern people the possibilities in California for young men and men with families from the Eastern agricultural districts.

In order to properly present our plan throughout the Eastern agricultural districts, we prepared a special pamphlet setting forth the needs of the California fruit-growers in the way of labor, and answering questions that might arise in the mind of the intending settler. Something like 100,000 copies of this booklet, which we entitled "Grasp This, Your Opportunity," were judiciously distributed by our travelers, while application blanks for those desiring employment on California fruit orchards and vineyards were also supplied in liberal quantities. In addition, a great deal of California literature was also distributed. Our travelers without exception found the Eastern people much interested in all printed matter descriptive of California and its possibilities.

The reports of these ten travelers now on file in our office show to this committee conclusively that desirable agricultural help is just as scarce in the Eastern States as it is in California. We find the average farmer in the East so much hampered in his business by the scarcity of help that very many are contemplating selling their holdings and coming to California. It is generally recognized in many Eastern States that a small farm in California, managed and worked by the farmer and his family, will return a larger annual revenue than a much larger acreage in the East, and the discomforts of the severe Eastern winters will be unknown in our mild and genial climate. This serious shortage of farm help in the Eastern States was a revelation to our committee, and has induced us to suggest to the fruit-growers of California the advisability of offering special inducements to men with families from agricultural districts of the East to come to our State and assist us in harvesting our crops.

The California Promotion Committee has evolved a plan which is, in the judgment of our committee, thoroughly practicable, and will if adopted almost entirely solve the problem of help in the harvest season. The Promotion Committee has sent circular letters to fruit-growers and farmers in various districts of California, suggesting the advisability of leasing or selling on easy terms five, ten, and fifteen-acre pieces of land to men with families who will agree to assist the fruit-grower and farmer in his harvest, while acquiring homes of their own. The replies to these

circulars have been most favorable to the proposed plan, up to date 26,614 acres of land having been offered for settlement in this manner. The original plan of our committee, which contemplated securing young men from the agricultural districts of the Eastern States to assist fruit-growers in their operations, could only at the best be a temporary solution of the help problem. The young men thus obtained would in all likelihood drift to various parts of the State and would not become permanent residents of any one district.

The plan of securing men with families and locating them in homes of their own is a far better solution of the help problem than any other plan that has been submitted to our committee. In some districts of the State this feature is not entirely novel, as it has been tried in a small way and has proven satisfactory both to the growers and to the home-seekers.

During the year our committee has received from fruit-growers, packers, canners, and others, applications for 9,301 people to work. These requests came from all parts of the State, and have usually been for the months of July, August, September, and October, although in many instances help has been desired for much longer periods, and occasionally for the entire year.

The records of our office show that we have absolutely placed in positions on orchards, vineyards, and fruit-canning factories 917 people from the Eastern States. This result has been accomplished with an outlay of \$3,500. This made the actual expense of placing Eastern people in positions in California less than \$4 per capita. We know of many instances in which people have come to this State and secured positions through the effect of our advertising and the efforts of our travelers, but as their names have not actually gone through our office we do not include them in the number we have placed at work. We therefore believe that the result of our effort has been much larger than our figures show, and we also feel that our work will be productive of much desirable immigration during the coming year and possibly for years to come.

The ten gentlemen who went East at the instance of this committee were supplied with funds for their actual traveling expenses, but devoted their time gratuitously for the good of the cause. We feel that the fruit-growers of California are under many obligations to these gentlemen, who have so well and faithfully worked for our interests in the Eastern States.

Unfortunately, two of our travelers, Mr. Kells and Mr. Murray, were in serious railroad accidents in the East. Mr. Kells was disabled for several days, and his work was seriously interfered with from the result of the accident. Mr. Murray was severely injured, and for a time his recovery seemed improbable. After several weeks in a hospital he was enabled to return home.

The sudden death of Mr. B. N. Rowley, which occurred in his office at San Francisco on the 20th of November, was a shock to the fruit-growers of California and an irreparable loss to our committee. Mr. Rowley has acted as secretary of the committee during the past year, and has been particularly active in furthering the work. His office has always been at the disposal of the committee, and through the columns of his paper, "The California Fruit-Grower," he kept the fruit-growers of the State informed of the progress of our efforts to secure help from the Eastern States.

In our endeavor to secure sufficient help from the Eastern States to harvest our crops, the committee has obtained a great deal of information that will be available in any further campaigns that may be planned for this purpose.

The committee has effected permanent organization for the purpose of continuing the work if the fruit-growers of the State believe the necessity still exists of bringing more people here to assist in harvesting the crops.

All of which is respectfully submitted for your consideration.

H. P. STABLER, Chairman.

GENERAL CHIPMAN. Mr. Chairman, I desire to ask the gentleman a question or two in regard to his report. I want to know whether any of those nine hundred people have remained in this State, or whether they have returned to their homes in the East; whether they were married, and what became of them?

MR. STABLER. I can answer in a general way. They were not all men. There were quite a number of families, and quite a number of them have returned East. They take advantage of the low rates on the railroads to come to California, during the fruit season earning enough money to return home; but our records show that there are still a great many of these people remaining in the State and in permanent positions in California.

MR. CHAIRMAN. I would like to inquire if this committee is to be retained in the employ of the Convention, or is it necessary to make a motion to that effect?

MR. STABLER. Well, I should say that this committee as organized is not a permanent body, and that if, in the judgment of this Convention, a necessity still exists for continuing this line of work, the committee will probably continue it. I would like an expression from this Convention as to whether the necessity still exists.

On motion of Mr. Johnston, seconded by Mr. Stephens, the Convention requested the committee to continue its work.

At this time a recess was taken until 2 o'clock p. m.

AFTERNOON SESSION—FOURTH DAY.

FRIDAY, December 11, 1903.

The Convention was called to order at 2 o'clock P. M. Vice-President McIntosh in the chair.

VICE-PRESIDENT McINTOSH. Members of the Convention, we shall vary the program for the afternoon to the extent of hearing Mr. G. S. Thurman's paper upon "The Growers' Co-operative Agency," a deferred topic. It has been carried over for the past two days. Will the Secretary read it, please? (Paper read by Secretary.)

THE GROWERS' CO-OPERATIVE AGENCY.

By G. S. THURMAN, OF SAN FRANCISCO.

The Growers' Co-operative Agency was opened in San Francisco June 1, 1902, by the Sacramento River Co-operators, a co-operative body formed under the law of 1895, and was in response to a general and pressing need for relief from many abuses which had grown up among the commission merchants of San Francisco. Returns were not made in accordance with sales, charges were excessive, combinations were formed among the various houses by which they would agree to return a common price regardless of sales, and many other important matters, all of which helped to show the shipper that his only means of relief was by marketing his own goods.

After careful consideration it was decided to organize an agency which would afford every producer in the State who chose to market his goods in San Francisco, an opportunity to join in its support and management, and this opportunity is still open.

From the start the movement met with very decided opposition on the part of the commission merchants of San Francisco. For the first two months the Agency was subject to a boycott by the wholesale houses, which refused to buy from or sell to it; but in spite of this we conducted a successful business, selling our stock to the retail fruit dealers at good prices.

On August 1, 1902, a new move was made; the retailers were told that if they dealt with The Growers' Co-operative Agency they could buy of no other commission house in San Francisco, and this order was enforced in a very systematic manner. That its enforcement was possible was due to the fact that in order to conduct a retail fruit store the dealer must carry a variety of goods which it is impossible for one commission house to supply. For example, bananas are usually imported

in carloads, or in large shipments by steamer, and reaching San Francisco very green must be ripened in a specially prepared room, thus making it a very heavy risk to carry them and therefore extremely difficult for us to supply our customers with bananas. The houses carrying them refused to sell either to us or to our customers. The same illustration would apply to many other classes of fruit. The method employed was to select say six or eight of our customers at a time, and by watching them closely prevent their obtaining all supplies such as we could not furnish, either directly or through an agent. Then when that lot was brought to a proper state of subjection a few more would be selected and the operation repeated. By this means the open accounts with the retailers on our books were reduced from 249 in July, to 7 in November.

In the meantime we had adopted various expedients for disposing of our fruit, and while suffering considerable inconvenience, managed to maintain our house. The growers along the Sacramento River renewed their pledges of loyalty to the movement and offered their money freely to sustain the house. At last the commission merchants, rather than face another season of disastrous competition, proposed a truce and a basis of agreement by which the growers should suffer no disabilities in selling their products in San Francisco, and it was accepted. This was about May 1st of the present year, since which time the Agency has conducted a thoroughly satisfactory and profitable business. It has now no fights on hand, but is most active in striving for the highest efficiency in the conduct of its business, and it needs but the loyal support of the growers who ship to that market to make it a powerful source of protection and profit to the producers of California. As a result of its existence the growers of the Sacramento River have received uniformly higher and more satisfactory returns as compared to market prices on all lines of goods than ever before, not only from the Agency, but also from those houses which are compelled to compete directly with prices as established by its returns. Empty packages have been returned more promptly, and many conditions have been vastly improved as a result of a healthy competition with a house whose interest lies only in the betterment of such conditions for the grower, and securing for him the highest market price for his products.

The Agency has recently been moved from the original location at 503 Front street, which was found entirely too small for its needs, into larger and more convenient quarters at 425, 427, and 429 Front street, where it has splendid facilities for the display and sale of goods, in a situation right in the heart of the commission district. During the time the Agency has been conducted we have been able to secure the services of a thoroughly experienced and able staff of salesmen, book-keepers, etc., which insures prompt and faithful attention to all details.

During the past few years it has been shown that co-operation as applied to the marketing of fruit and produce is a practical proposition and not a dream of theorists. The success of the California Fruit Agency in handling the citrus fruits of southern California, and of the California Fruit Exchange in the northern part of the State, is well known to all growers; but these exchanges deal almost exclusively with the Eastern and shipping trade and do not solve the problem of handling the vast amount of fruit which must be marketed locally. This field is filled, however, by The Growers' Co-operative Agency, and we have only to point to its successful business and the results that have been accomplished during the past season, to convince you that intelligent co-operation will vastly improve the conditions for the producers in the San Francisco market. By reason of selling your products through your own house in San Francisco you have an absolute certainty of honest returns and create a force which, properly handled, will in time obviate many of the disabilities under which shippers to the San Francisco market labor at present. To bring about the most satisfactory condition of affairs, however, we must have organized support from all sections which contribute to that market. We want the rhubarb and other early products from the bay districts, the early berries and apricots, the apples both early and late from various sections, the oranges and lemons from northern and southern citrus belts, persimmons, pomegranates, and all of the many varieties of fruit which are to be found in California from the beginning to the end of the year. This can be accomplished by means of a growers' association in each locality which will participate in the management of the Agency and will market the products of its members through that channel. These associations should be so organized that it will be possible for the management of the Agency in San Francisco to communicate with them quickly (preferably through their officers) in order to be able to hasten or to divert shipments according to the condition of the market. It often happens that there is a keen demand for some particular class of fruit which forces the price up to an abnormal figure; in such a case a compact organization which responds readily and quickly to such a demand will place its fruit first on the market, thus reaping the benefit of the higher price. A glut and the consequent loss may also be prevented by the same means. In all cases the advantage lies with the shipper most closely in touch with the market to which he is shipping, and the advantages of organization in this regard are obvious. Instead of having shrewd speculators take advantage of every sudden rise in the market to buy heavily through their agents in the various localities, thus trading on the neglect of the grower to keep himself informed, we want the grower himself to receive that higher figure, by acting in response to information sent out by his own house, and placing his

products on the market at a time when they can be sold to the best possible advantage.

Another beneficial feature that our past two seasons' work has shown us is the advantage to be gained by the constant influence of the house in pointing out to the shipper the improvements that are necessary in his pack. We must have fruit packed honestly and in accordance with the demands of the market. Our house offers a direct medium of communication between the consumer and the producer, thus making it possible for the one to understand the wants and needs of the other.

With a strong association in each fruit-producing section of the State to insure a continuous supply of all seasonable products, The Growers' Co-operative Agency must become the controlling factor in the San Francisco market. It is our desire, therefore, to devise a plan which will give the shippers of all localities an equal opportunity to share in the benefits to be derived.

The officers of the Agency will gladly afford any desired information, and will assist any locality desiring to organize a local association for supporting the movement.

In the meantime, any one shipping to San Francisco may ship to this Agency and be assured of prompt and honest returns and highest market prices, and may have the satisfaction of feeling that his shipments are lending support to a movement powerful for his protection and profit.

MR. STABLER. Mr. Chairman, and gentlemen of the Convention: A year ago I read a lengthy, if not an exhaustive, paper on the question of "The Fruit-Grower and Orchard Help," and from that essay a committee was appointed, which committee made a lengthy report to you this morning, which report, I am very glad to say, was received by you and commended and the committee duly thanked and all that sort of thing. Now, if I read the paper programmed for me this morning I can only reiterate the points with which you are quite familiar, so I will gain your good will by saying that I will not read the paper; but I am going to say to you that, by invitation, a gentleman is here whom I met the other day in San Francisco and who lives in New York City, and when I found out why he was on this Coast, I invited him to come down here and say a few words to this Convention, and I am going to ask unanimous consent that you will hear Mr. J. D. Barnhill, of New York City.

ADVANTAGES OF ADVERTISING IN FRUIT-GROWING.

By J. D. BARNHILL, OF THE NEW YORK "EVENING POST."

Gentlemen, you have met here to discuss the different ways and means for advantageously growing and placing your products upon the market. You, of course, understand that the main result which you want to attain is to increase the value of your property in every way. This can only be done by having a constant demand for your products, and all efforts along this line are supplementary to the one main factor—that is, the ultimate sale of your products to the consumer.

By creating a permanent and regular demand for an article you aid very materially in overcoming such obstacles as uncertain transportation, and you may be sure that if your cars do not arrive to-day there will be a market for them to-morrow.

This is especially true of such products as raisins, prunes, figs, apples, etc. All of your able efforts toward scientific cultivation of your products amount to nothing, for if they are not in demand you can not sell them. To sell anything of this character you must place it in the hands, as it were, of the housewife, and you can not do this successfully in any other way except by advertising. In this I mean to include packing and labeling your products; and from my observations of the different discussions brought up here, I notice that you have probably overlooked one very important point: you do not advertise properly, if at all. Advertising has been conceded to be the most important factor in successful enterprises of to-day. To illustrate this fact I will cite a few instances.

An obscure chemist discovered that by a certain process of treating grain a marketable article of diet is obtained. He finally interested men who were willing to put up \$20,000 to back his project; yet, when they found that he intended to spend \$8,000 in the manufacture and \$12,000 in advertising his product, they objected very emphatically; but he gained his point, which proved him to be the right man, at the right time, in the right place.

As a result of these enterprises, on every side we see "Force"—in the street cars, on the billboards, in the daily newspapers and magazines. "Force" is applied to everything. Every locality has its "Sunny Jim," with his strenuous principle of vigor and vim.

The result of this has been that the most illogical breakfast food imaginable has reached an almost incredible degree of successful sales. It is estimated that in 1903 the Force Company spent \$950,000 for advertising an article which sells for 10 and 15 cents. In 1902, \$600,000 was spent to advertise "Uneda Biscuit" in packages which sell for 5 cents. In three months the "Cremo" cigars were advertised

to the amount of almost \$300,000, which sold a very inferior cigar to the extent of one million each day; and scores of other industries, too numerous to mention, illustrate the necessity of good advertising.

The human race are creatures of habit, and, therefore, very susceptible to suggestion. Why do the Eastern people use imported olive oil? More generally because their ancestors have done so before there was a California product, and because the present generation has not been educated to the fact that California olive oil exists at all.

For the same reason thousands of people associate raisins with Thanksgiving and Christmas puddings, and look upon oranges as an expensive luxury and an unnecessary article of diet; but when the reading public is brought to realize the fact that these products are more wholesome and cheaper than any other food, they will be used in great quantities.

Suppose that every time you read your daily paper, each time you rode on the street car or looked at a billboard, you should see something like this:

There were some very foolish people living in a village out East,
Who every day imagined they were having a great feast.
They had meat and chops and oysters served with every meal,
Then they blamed the hydrant water for every pain they'd feel.

But now the physician has bought the groceries,
And all the people keep well,
And the change that has come to this village
Is most incredible to tell.
They are listless and dull no longer
From eating indigestible food;
And yet they do not lack variety,
And everything they eat is good.

It was California fruits that did the work—
Will also do the same for you.
Keep this in mind when buying,
And you will find these words are true:
Breakfast, dinner, and supper—
Every meal you should eat this fruit,
Of infinite variety, yet wholesome,
Each palate will find something to suit.

If properly advertised, there is absolutely no reason for there being an overproduction of anything so universally necessary as the products under discussion. Judicious, systematic, and effective advertising will sell every pound of marketable fruit which your State can produce. Let me illustrate how this is done: The housewife discovers, by seeing your advertisement, that prunes, for instance, are much cheaper and she has been in the habit of preparing, and when she goes to the more wholesome and easier to prepare than a great many things which grocery, she not only asks for prunes, but insists on buying the particular brand which she has seen advertised. When the groceryman

finds that there is a demand for an article he immediately requires his jobber to furnish him that article.

Now, right here comes in the subject of proper packing, for, to keep the public interested in the article advertised, that article must at all times be put up in an attractive package, and with no deterioration in quality.

As a further illustration of the practicability of advertising, I will mention a fact of which you are probably already aware: I find that this year there has already been produced about 116,000,000 pounds of raisins. Now suppose that, by advertising, we should raise the price one cent per pound, the amount of profit would be \$1,160,000; and that we spent about one-half that amount, or \$500,000, in properly advertising this product. That amount of money, if judiciously spent, would enable you to place the article before the great volume of reading public of the United States. After paying for your advertising you will readily see that you will have over \$600,000 clear profit.

The discussion of properly advertising a given product is too broad for us to go into details fully; yet I will say that I have in mind in New York City and Philadelphia a score of good advertising agencies which employ the services of the best men which money can buy, and they are in a position to handle your advertising judiciously and effectively, with no cost to you except for the space which you purchase in the different publications, etc., they receiving their profits from the commissions which the publications allow them in the placing of advertisements.

Now, all of these facts which I have mentioned are not something which have been unheard of heretofore, but go to form a great underlying principle of successful enterprise to-day, which has been tested and proven time and time again.

Now, again: It is only a matter of time when you will advertise as I have suggested, and let me insist that you do so at once. I know what I am talking about, and I am going to convince you that what I have said is true, if I have to tell you once, twice, or even the third time.

And now I wish you to understand that I am a disinterested party except that I am anxious to promote the welfare of your industries, and I will say that upon the adoption of the plans outlined in connection with the reforms which you are planning and working for, such as organizing, transportation facilities, and package postal service, the "Evening Post" of New York, which I represent, is anxious to lend its assistance in any way possible, both in its columns and in its advertising pages.

Let us sum up in a few words: To increase property value and prevent overproduction you must have a maximum price for your products; to secure a maximum price, you must create a maximum demand. A

maximum demand can not be assured without advertising, and to advertise properly you must have organization.

On motion, duly seconded, a vote of thanks was tendered to Mr. Barnhill.

HOW CAN WE PRESERVE THE FERTILITY OF OUR ORCHARDS?

BY A. D. BISHOP, OF ORANGE.

This question is becoming one of vital importance, not only as to how it can be done, but also as to how it can be accomplished at a minimum cost or at such a figure as the income from the orchard would make it possible for us to expend for that purpose.

The fruit-consuming power of the people of the country is almost beyond comprehension and is not fully realized by any of us; but it is not the millionaires who consume our products, it is the wage-earners, the people who are in moderate circumstances. If we find a market for the enormous products of the immediate future they must be sold at a price that will put them within reach of all; but if this is done there will be very little left for the producer, after having paid the present extravagant fixed charges taxed by transportation company, box agency, packer, and selling agent. There is scarcely a product of the earth of whatever class that is not held up by some combination exacting a tribute out of all proportion to the service rendered, for we are all aware of the enormous increase in the cost between the producer and the consumer.

The condition confronting us, then, is the production of our fruits with the least possible cost consistent with good business, and as one of the most essential elements of their production is fertilization, it must be done with the least possible cost consistent with the best results, and this can not be accomplished by the use of commercial fertilizers alone. We must, if possible, keep the soils of our orchards up to the standard of fertility of virgin soils, and this can best be done by following the examples set forth in the economics of nature. Science tells us that there are three principal elements necessary for plant growth and which are most likely to be exhausted: potash, nitrogen, and phosphoric acid. To these I will add a fourth, humus, in the absence of which the others will be only slightly available, and plant growth very meager. Chemical analysis has shown that in an average crop of most of our fruit products we take from the soil from forty to eighty pounds of potash per acre, from ten to twenty pounds of phosphoric acid, and from seventeen to seventy-five pounds of nitrogen; but it has not shown how much the per cent of humus is reduced. Experience has shown that clean cultivation in winter, with irrigation and constant summer culti-

vation, without any artificial means being employed to keep up the supply, soon reduces the supply of humus to a minimum, if it does not exhaust it completely. This is shown by the soil becoming compact and lifeless, by its inability to retain moisture, and by its refusal to absorb water when applied. We frequently see irrigation in operation in orchards where the water running out at the lower end of the furrow is about equal in quantity to that started in at the upper end, and where very frequent irrigations were absolutely necessary. But with a good soil, properly treated, irrigation once in two weeks is amply sufficient. I believe that humus, through its mechanical action on the soil, and its chemical action, through the processes that create it, on the mineral fertilizing elements, is equal in value to any if not all of the others. How, then, can it be supplied? By keeping the surface soil well mixed with decaying vegetable matter; and this can be accomplished only in two ways: by liberal applications of the refuse of stables and stock corrals (and while this is not especially rich in nitrogen it is in nitrifying bacteria), and by the growing and plowing-under of green crops. As the supply of stable manure is very limited for the needs of us all, the latter method is the only available means of securing the necessary amount of soil fertilizer. The Eastern farmer has found that by a rotation of crops he obtains much the best results, and at frequent intervals he grows a crop of one of the leguminous plants. We can not practice rotation with our orchards, but we can grow green crops and plow them under. While any crop will furnish humus, we can, by the selection of proper varieties, seemingly grow nitrogen at the same time. It has long been known that the plowing-in of a crop of clover or other leguminous plant materially enriches the land, as shown in succeeding crops; but it is only recently that science has demonstrated that the legumes have, through the agency of minute bacterial organisms in nodules attached to their root systems, the ability to convert the nitrogen of the air, as well as the soil gases, to their use in building up their structure and, on decomposition, leaving this nitrogen in the soil in a more readily available form for the use of other plants. How frequently we see, under natural conditions, the decumbent leguminous plants interspersed with the more stately, thus illustrating that in the vegetable kingdom, as in the animal, the small plants were intended as food for the larger, and thus we have myriads of roots working on the mineral elements and leaving them decomposed as digested food.

As we can not furnish moisture to grow green-manure plants in summer, we must select varieties that grow well in winter. The bean called cowpea, so much used in the Southern States for this purpose, will not do here, as it is more susceptible to cold and wet than corn; but it has made a fine growth with us in summer with only a scant supply of moisture. The common field pea has been most generally

used for this purpose in our orchards, because the seed was easily obtained, but it is certain to be supplanted by something better. Out of fifteen varieties that I have tried for this special purpose one gives promise of being of exceptional value. This is a variety of *Trigonella*, commonly called fenugreek, a plant similar in many of its characteristics to *Medicago*. Peas in soils deficient in nitrogen make a very poor growth the first year unless inoculated with their specific bacteria by scattering some of the soil taken from a field where peas have previously made a good growth; but fenugreek made an extravagant growth the first year, which gave some ground for the belief that bacteria of bur-clover, or some of the other domesticated legumes, had found a congenial home in the roots of the plant. Planting should commence soon after the first of October, but good results can be obtained from seed sown as late as December first. Sow the seed broadcast, and before it has commenced to sprout prepare the land for irrigation, first by furrowing at right angles to the way you wish to run the water, and then ridging the other, or if this can be done on the contour, so much the better. Then by checking at frequent intervals, we will be prepared to furnish moisture in times when the rainfall is deficient and also to thoroughly soak the ground when ready to plow. The practice of furrowing in the direction in which the water flows is objectionable, since it provides a ready means of conveying the rainfall from the land. The use of a cover crop will be found of great benefit in preventing the erosion of the surface during periods of the heavy rains which sometimes come, even in California.

I have been striving for ten years to grow a volunteer crop. Some years this has been fairly successful, both with bur-clover and melilot—two very valuable plants for this purpose; but they were frequently partially and sometimes entirely suppressed by plants less useful but more tenacious of growth, like some of the brome grasses. I now have a very good volunteer crop of fenugreek growing where it was plowed-under last spring. An objection to this crop is that for the seed to properly mature, the plowing will have to be delayed later in the spring than is desirable. While the seed of fenugreek may be a scarce article at present, means would soon be found to supply it if a demand should be created. We may also expect, from the attention being given to this line of investigation by selection, cross-pollination, etc., the development of a class of plants as nitrogen-gatherers better than any we now have, besides furnishing a growth of herbage for the creation of humus not equaled by anything we have at present, although I have harvested seventeen pounds from one square yard of green plants.

The practice of green-manuring will be found very beneficial against the formation of irrigation hardpan, which is caused by the finer particles from the cultivated surface and the soluble salts from the

water being carried down by the water and deposited on the more compact stratum of undisturbed soil. This beneficial action is due to this hardpan being pierced by innumerable fibrous roots and the chemical action of carbonic acid generated in their decomposition.

If, then, we can at once grow nitrogen and humus, there remains to be supplied only the two other principal elements—potash and phosphoric acid. Potash can best be supplied in the form of sulphate, applying from seventy to one hundred pounds per acre immediately before plowing. This will materially aid in the decomposition of the green crop of herbage and also supply nourishment to the tree at a time when most needed—during its growing period. For the other element, apply superphosphate at the first irrigation in summer—from five hundred to eight hundred pounds per acre. It must always be borne in mind that a considerable part of the total percentage of phosphoric acid as shown by analysis will never be available for the use of the trees. I am also of the opinion that lime, either as sulphate or in its caustic form, can be applied with profit, especially for nut crops.

Finally, keep up the supply of potash, phosphoric acid, nitrogen, and humus, but first of all humus.

FERTILIZATION.

By S. M. WOODBRIDGE, OF LOS ANGELES.

The knowledge of the world has been immensely augmented in the last half century, and it is cause for regret that wisdom has not increased proportionately.

Our knowledge of pirates has enabled us to clear them from the high seas, but our wisdom is not such as to keep a corresponding set of robbers from the land, even within our own borders—witness the Ship-building Trust and the U. S. Steel Corporation.

Our knowledge in the matter of fertilization for many years has been complete, but our wisdom has not been sufficient to enable us to take advantage of the knowledge attained. Science has, decades ago, settled the fact that of the fourteen or fifteen elements which go to make up organic matter in plant growth there are only three expensive elements—viz, nitrogen, phosphoric acid, and potash—in which any soil is likely to be deficient. The changes which writers on the subject have attempted to run in on these three elements, and the complications with other matters that have been made with these three simples, are in some cases amusing, but often serious, as they land the student in the Slough of Despond. For example, the mixture of this subject with treatment of soils and soil analyses.

The treatment of any given soil is a subject entirely different and apart from the subject of fertilization, although they are intimately

connected, and for success, dependent upon each other, just as fertilization and irrigation are independent, yet dependent for success upon each other.

In regard to the three elements, the only *definite* way of ascertaining which and how many of them should be used on any given soil is to put the question to the soil and get the answer in the crop. This is done by the test-plot system. It is accomplished by making a number of plots and applying the elements singly, doubly, and all three together, viz:

- Plot 1. Nitrogen.
- Plot 2. Phosphoric acid.
- Plot 3. Potash.
- Plot 4. Nitrogen and phosphoric acid.
- Plot 5. Nitrogen and potash.
- Plot 6. Phosphoric acid and potash.
- Plot 7. Nitrogen, phosphoric acid, and potash.
- Plot 8. Nothing.

By tending these plots alike and harvesting the crops from each separately and comparing the results in quantity and quality is the only rational way to determine which is the best and most economical way of fertilizing.

In the absence of test plots, the only rational way to fertilize is to replace the three simples in the ratio that any crop will remove them, due consideration being given to the natural advantages of the soil as evidenced by experience. To illustrate: When you see a young orange orchard with vigorous growth and large and perhaps coarse oranges, one knows that nitrogen is in excess in the soil and that, therefore, the nitrogen can be cut down in the fertilizer to be applied. Remember that in putting back on the soil what the crop takes off you will be maintaining the integrity of your soils, and that at the end of ten, or twenty, or thirty years your soils will be as rich as in their virgin state. Any one deviating from this rule (*i. e.*, in getting fertilization mixed up with the treatment of your soils, and with the abstruse and impracticable soil analyses) will find himself in trouble, like the boy who was being taught the points of the compass: "Now, Johnny," said the teacher, "face the north. Right. What is on your right hand?" "The east." "And what is on your left?" "The west." "And what is behind you?" "That patch on my pants. I told ma you would see it." And so people who attempt to deal with soil analyses will find that, instead of having the glorious south behind them to nourish productive and paying crops, they will have nothing but a patch on their pants.

Some thirty years ago it was thought that any chemist could analyze a soil and tell in what it was deficient and so supply the needs of

a crop, but science and practice soon decided that such was not the case. There are two good reasons for this:

First—Chemical science has not advanced far enough to be able to determine the availability of plant food in a soil; and,

Second—It is impracticable. Soils vary, even within a few feet of each other. The soil that is in front of your house will vary from that behind the house in analysis, and no two chemists analyzing the same soil by different schemes will agree in their results.

I see from this little work distributed at this Convention that there are about 12,000,000 acres of improved farm and ranch lands in the State. If these acres would have to be analyzed every year, it would take more chemists to analyze them than there are in the United States.

Last summer I attended the Farmers' Institute school at Long Beach. There was a professor there from five hundred miles away to instruct the attendance in this matter of fertilization. There was also a rancher there from some sixty miles distant, who asked the question, "What is the proper fertilizer for tomatoes?" Instead of answering the question, the professor asked, "What kind of soil are you growing them on?" The answer was, "Decomposed granite soil in the foothills." The professor said, "Well, before I could answer the question, I would have to analyze the soil." That might have been a satisfactory answer to some people, but I fail to see how the rancher or his crop was benefited in the least.

In regard to the proper treatment of your soils, so as to make the plant foods applied of the greatest value, it is very difficult to say much that is generic, as it is largely a local question, which each farmer must determine for his own particular land. Generically speaking, all lands need to have the supply of humus maintained. We find, in the south, that from four to seven tons of stable manure, or its equivalent, per acre, is sufficient, and this is applied for the purpose of lightening up the soil, making it more receptive and retentive of the water, and this is caused by the decomposition of the humus in the soil. We find that twenty or twenty-five tons per acre will decompose in the same space of time as one ton; hence, it seems necessary to apply a moderate amount annually.

I have used the term "stable manure or its equivalent." We, in the south, are growing green crops to a large extent with success, and plowing them under in January or February, where practical. Peas, bur-clover, and natural grasses are all good, and should be plowed-under some weeks before the trees are due to bloom, as plowing during the blooming season is very apt to hinder the fruit from setting or to cause it to drop thereafter.

Straw or old hay is also being largely used as a source of humus,

with very satisfactory results. It is worth from four to five times as much per ton as stable or corral manure.

VICE-PRESIDENT McINTOSH. Members of the Convention, I am gratified to be able to announce to you that we have by this paper cleared up the entire program.

SECRETARY ISAAC. Mr. Kearney's resolution relative to the appointment of a committee of fifteen was adopted, and President Cooper, before he was called home, informed me that he would make the appointments later, when he had more time to consider the matter.

VICE-PRESIDENT McINTOSH. I presume the appointments will be announced through the press.

SECRETARY ISAAC. They will be announced through the press.

VICE-PRESIDENT McINTOSH. I requested President Cooper to do this on account of his long acquaintance with the people of California who are identified with the work along the lines pertaining to agricultural and horticultural pursuits.

MR. FAULKNER. May I ask a question in regard to the use of the three elements most easily exhausted from the soil—nitrogen, phosphoric acid, and potash? May I ask whether it is proper to supply each one of these three elements at different times of the year, as some authorities contend, or to supply them all at one time?

PROF. WOODBRIDGE. I have never known an authority to claim that you could at one time put on your nitrogen, at another time your phosphoric acid, and at another time your potash. The soil is built up homogeneously, so to speak. In building it up all the elements go into it simultaneously. Any different process would be like trying to build a brick house by laying down three or four bricks, some sand on top of that, some lime on top of that, and some water on top of that, the result being that you would not have a very substantial wall. The soil elements referred to are applied all together, perhaps with the exception of nitrogen. Nitrogen excites a large flow of sap and makes the tree grow rank. Apply one hundred and fifty pounds of nitrate of soda on an acre of grapevines at the right time of the year and it will destroy any crop of grapes you would have had by causing the sap to flow so freely that the vines would run into wood growth and leaf growth. So with tomatoes. The only case wherein we find it of advantage to apply any of the elements singly is the application of nitrogen in the spring of the year, which makes the sap flow when the fruit is setting, as it will make a succulent stem and therefore sets the fruit; but it is dangerous to use too much of it, because only a rank growth of wood and leaf will result.

DISCUSSION ON OVERPRODUCTION OF FRUIT PRODUCTS.

MR. KEARNEY. Mr. Chairman, before the proceedings close, I would like to say a few words with reference to some arguments that have been made before this Convention concerning overproduction. I wish to emphasize the impression which I have that our difficulties in marketing our crops do not lie in reducing the quantity of our products, but in studying the ways and means of distributing our products and reaching the market properly. I think Mr. Barnhill in his paper has helped us out a good deal by his suggestions and the information he has given us concerning the way in which some goods, that were not of the highest excellence, had been sold in large quantities. If you can take a product which of itself does not command respect and esteem and approval and by judicious advertising get the public to buy it freely and in very large quantities, how much more successful should we hope to be when we present a commodity which will benefit every buyer to the greatest extent. Who will urge the proposition that the consumption of fruit will injure any one? On the contrary, we have the support of the testimony of the entire medical profession and of all thinking and observing people to the effect that the consumption of fruit is of the greatest benefit. We in California are meat (beef) eaters far more than we ought to be. We need education. It is in our power, as fruit-growers, to educate ourselves and our neighbors, the whole community, as to the benefits to be derived from consuming fruit. Mr. Barnhill has pointed out one way, that is, by liberal advertising. It is a practical, business way. It has been tested for many years by the most successful merchants in the world. Any one who has ever traveled through England has seen the walls in all directions plastered with advertisements. We in America advertise largely, in every possible way. You can think of many successful merchants who are doing it, and they make fortunes for themselves by doing it. Isn't that a lesson to us? We have products to sell. We want our business to prosper. Why should we not follow in their footsteps? I had, as president of the Raisin-Growers' Association, some years ago, a problem to solve in the matter of disposing of a surplus of raisins. The preceding board of directors had on hand 1,500 carloads of raisins after the close of the season—the election of directors took place in April as you all know, and our raisins have been a Christmas, New Year's, and Thanksgiving product; we expect to sell most of our crop before Christmas, but in the April following we had on hand unsold 1,500 carloads, out of about 3,400 carloads. The growers put in a new board of directors and elected me on the board, and we had to face that problem. I said to the packers: You are interested in seeding raisins. We will help you to build up your seeding business if you will help us. We want you to

put out all of these raisins as seeded raisins. We want to fix a price upon every package, and that price shall be 10 cents. We want our raisins to go into the market at a low price, and not at 25 cents a pound, as they have heretofore. We want that paster to go on every package. We will say on each package, to ease the way: "Cut price, 10 cents, to advertise seeded raisins." That will let the retailer down easy. He had been charging 15, 20, and 25 cents a pound for the same raisins, and some explanation of the low price was necessary. When we offered those raisins to the trade we found our greatest opposition in Boston. The merchants there said they were not going to handle any raisins with the price on them, that it was their business to get any price they saw fit. We did not change the proposition. We sought out other dealers who would buy them, and those jobbers found retailers who would buy them, and they put them in their windows, a great lot of them: 10 cents for seeded raisins, 10 cents a pound. The neighboring dealer who would not buy them saw his customers going in to buy those seeded raisins. Very soon he wanted some, and the other man wanted some, and the jobbers all had to come into it; they had to have those raisins, and those "stickers" remained on all the packages. That is one of the most important lessons that I have learned in this fruit business. If the growers all over the State can organize, can control the way in which our fruit shall go out and control the right to put a price upon it, if we will do that we will solve this overproduction problem right there. We do not wish to make enemies of the trade. I have always since I have had anything to do with the Raisin-Growers' Association favored dealing with the trade and using it as a means of distribution. I have never been in favor of the producers or the Association establishing their own selling agencies, and I have come into conflict with many co-operative men on that ground. I do not wish to do anything in that way until we are so solidly combined that we can stand that fight; but we can take this step forward, we can establish our own packing-houses in every district throughout the Pacific Coast, pack our products and retain the power to put the price on them, on every package, every pound of prunes, of peaches, of apricots. If the growers will get together and do that you will not for many years to come hear of any overproduction.

MR. JUDD. It seems to me that the question of overproduction is largely local, inasmuch as, so far as my knowledge goes, every locality in the State has overproduction in some one thing, not from the fact that it has not a market value, but from the fact that something else has a greater market value. I have heard several state here that they had dug up their trees. That is true. The impression might be that they dug them up because they had ceased to be profitable. That might be true, too. I dug up thirty-five acres of orchard. Why did I

dig them up? If you will all explain why you dug up your trees we will see it is not from the fact of overproduction, but from the fact that there is something else you can produce which will bring greater returns than what you were producing. I dug up cherries, pears, plums, prunes, apricots, and peaches, and went to raising apples, simply because I found that apples would bring me \$200 or \$275 an acre when the others would only pay me \$120 or \$130. That is the reason. It seems to me that this matter of overproduction and markets was not touched upon as fully as it should have been. Now, I notice that the baking-powder people, and the H. O. mush people, and the manufacturers of all these other food products have agents in every town. They come into a store and they fix up a nice stand, and when you come in you are invited to partake of all kinds of delicacies, gotten up in the best manner. The store in which they are exhibiting these articles handles the goods and there is a set price upon them, 10 cents if you please, for seeded raisins, or whatever the goods may be, and the merchants in these towns do not object to handling the goods at the set price. It seems to me that the same plan could be used in distributing raisins, and prunes and other dried fruits. They have got to catch all that comes their way, because the other fellow is doing something in that direction. This overproduction, to my mind, is only local and spasmodic. We kind of "let go." We don't reach out for the markets, because we think we have them; we sleep on our rights. You do not take advantage of your opportunities and push the market, because you had it last year; and that is probably the cause of all this roar of overproduction. It is lack of "push" that is hurting you. The trouble with us in our section of the country is that we have not got enough stuff to push. If you who are suffering from lack of markets will purchase some of our lands and plant them out to orchards we will receive you with open arms, because we have not enough growers. We get \$1.15 a box for apples now and we were only getting 40 cents a box eight years ago, and we have 2,000,000 trees growing now while we had not at that time 100,000. Now, I believe the same proposition is applicable to all the fruit products of this State—push the business and you will have the market and keep it. Get the products to the mouths of the people, and do it in the way the yeast-powder people and others do.

MR. WHITE. Mr. Chairman, not having been present at the time Mr. Kearney made his remarks, I can hardly answer anything he has said or offer counter-arguments. I have already stated to this Convention my views upon overproduction. While I still believe I was correct in what I said, I am willing to admit that improvements may be made in the manner and method of marketing and in the extension of our markets. Unless the Chair especially requests it, I would not care to adduce any arguments or attempt to answer something when I do not know what I am answering.

VICE-PRESIDENT McINTOSH. Well, Mr. White, one point was in regard to a better and more systematic plan of distribution, a plan to be adopted by growers to prevent the middlemen from profiting by extortionate practices as between themselves and consumers, and Mr. Kearney used the illustration of the "sticker" on packages of seeded raisins. He has recapitulated as to that method, and stated to this Convention that that simple plan enabled the directors of the Raisin-Growers' Association at the time he was a member of the board of directors to dispose of a large amount of raisins on hand after the Christmas and New Year's trade, at the time of the annual election in April. To my mind it is one of the most convincing features of that entire proposition; but since you agree that there may be better methods, you may admit the virtue of the "sticker" proposition to help dispose of "hold-overs."

MR. WHITE. Mr. Chairman, now that I have been enlightened as to one of the points that has been brought up, I will say that the information which our board of directors has is that the putting of a "sticker," as they call it, on the outside of each package of seeded raisins did not enable the Association to dispose of any more raisins than had been disposed of prior to the time the "sticker" was put on; that, in fact, it was a drawback to the sale of seeded raisins. I was not a member of the board of directors during the year that plan was adopted, and that is the only year since the Association was organized that I have not been a director thereof. That year Mr. Kearney was a director and the president of the Association. He had full sway. That is the only year in the history of the Association that we have had a short crop. In 1891 we only had 74,000,000 pounds of raisins, whereas this year, though I have heretofore stated the amount to be only 110,000,000 pounds, I have since learned that there is a crop of from 115,000,000 to 118,000,000 pounds. I stated the other day that if we did not produce more than 100,000,000 or 110,000,000 pounds of raisins I thought they could be marketed; also, that I thought it was better to discourage the further planting of raisin vines until we improved our markets or until we could devise a scheme whereby we can dispose of our product at remunerative prices. I said that it was more profitable for us to produce 100,000,000 pounds of raisins and sell them at a price that would net the grower 4 cents a pound than it would be to produce 200,000,000 pounds of raisins and sell them at 2 cents a pound net to the grower, and I stay by it. I still think I am correct on that proposition.

MR. KEARNEY. The gentleman says that he was informed that the application of the "sticker" was of no benefit in the marketing of the raisins, but that in fact it was a detriment. He therefore does not know it of his own knowledge, but goes on information. I presume his

information came from certain packers and others interested adversely. I ask whether this is not so?

MR. WHITE. I will answer Mr. Kearney. My information was from the trade generally. They gave as a reason for the statement that the retail dealer did not like to be dictated to as to what price he should sell the seeded raisins from California; that if he saw fit to charge 12½ cents for a package, the customary price, he did not like to have the California producer say to him that he must sell them for 10 cents, and consequently he said he would not sell them at all. Now, I said the other day, Mr. Kearney, that if the trade could be educated up to it, when they become accustomed to it, so that we can get the producer and consumer closer together—I will admit that if we can introduce this proposition of having the price placed upon every package of raisins that we send out from Fresno, so that that package shall not be sold for more than 10 cents—when they become accustomed to it and the purchasers of those raisins become accustomed to the fact that they can go to their retail grocer and buy a package of raisins for 10 cents that perhaps it will be an improvement; but I said in my remarks the other day that they were not yet accustomed to it, and I say as a reason why that plan was not a greater success—I did not say it was a failure—that why it was not a greater success was because the trade did not like it. I think those are my exact words as stated then.

MR. KEARNEY. One other question to complete that point. I believe you said that the crop that year was a very small one and that this year it is a very large one. I believe that was the statement you made?

MR. WHITE. Yes, sir.

MR. KEARNEY. As I remember, from that small crop, in April—long after the raisin season was over—we had 1,500 carloads of raisins unsold. I think it is understood by gentlemen familiar with raisin-selling that the bulk of the crop is usually sold prior to Christmas time. Now in April, out of the small crop, we had 1,500 carloads of raisins unsold. We adopted the “sticker” and we sold all but 300 or 400 carloads before the next crop came in.

MR. WHITE. There are raisins carried over every year. There were raisins carried over from the year I refer to, 1891, when we only had 74,000,000 pounds. I was informed to-day that there were 400 or 500 carloads carried over that year, and I think that I can prove that the very year which my friend Mr. Kearney refers to, 1891, there were at least 500 carloads of raisins carried over into the crop of 1892.

MR. KEARNEY. I admitted that there were 300 or 400 carloads; in my statement I said that we sold all but 300 or 400 carloads out of 1,500 in that year after the season was over. I claim that the “sticker” sold the “hold-overs.”

DISCUSSION ON TRANSPORTATION.

MR. STEPHENS. In a very few words I desire to make an explanation as to the report of the Committee on Transportation. It has no bearing whatever upon the raisin proposition, because raisins are not transported as green fruits are transported. Your product is transported at fifty per cent of what it costs to move ours.

We are all actuated by the same motives and the same desires and we are all striving to attain the same ends. We are not here as alarmists, and on this question of transportation and refrigeration I have said that, with proper marketing methods, I believe the deciduous fruit products of this State can be increased threefold, and I still maintain that; but before we increase the crop threefold let us find the means of distributing it and disposing of it at a profit. So far as Fresno is concerned, and, to a great degree, so far as the apple interests and the dried fruit interests are concerned, what I shall say does not apply, and we are not at loggerheads. I have written as many articles and have been the cause of promoting as much immigration to this State as any man in it, and I am anxious to continue along the same lines if you will find some way of disposing of our products at a profit. Last year there were 58,000 trees in one holding dug up simply because they did not pay, and the land was rented for \$12 an acre to Japanese and Chinamen. If the land would pay better at \$12 an acre rent you must concede that there is not much profit in deciduous fruit-growing. I have a communication from the manager of that place, that there were 26,000 packages, as I recall it now, marketed from that one place at a heavy loss. The varieties were many, and the trees were taken out and the land rented as I say, and it is some of the best land in the State. I want, gentlemen, all of you to join together and find some means by and through which we can dispose of all the fruit products of California at a profit. When you do that you will not have to issue your magnificent pamphlets, because the State would be like the Klondike, you couldn't keep the people away from it. If you will make all the fruit-growers prosperous they will do more to advertise the State than all the literature and all the lecturers you can send out of the State in your interest.

GENERAL CHIPMAN. Mr. Chairman, will you indulge me just one minute on this proposition?

VICE-PRESIDENT McINTOSH. Certainly.

GENERAL CHIPMAN. Gentlemen, the shipment of green deciduous fruits cuts a small figure in the fruit industry of California. The trouble about this report is that it apparently is applicable to the entire industry. What Mr. Stephens is seeking is right, and that is a better

service for the shipment of deciduous fruits across the continent. The freight rate is not too large. We are paying a less rate on those shipments East than is being paid on peaches that go from Georgia in competition with ours. The difficulty is not with the grower. It lies with the transportation company in making this arrangement for the transporting of our products. That is all there is about it. There is something wrong with regard to that arrangement, but it will be righted, and in order to conserve the business the companies will be forced to that course. There are now a large number of deciduous green fruit shipments that are paying no profit. You are a grower, like myself. I grow pears, but nobody can induce me to ship pears and take the risk. I sell my pears f. o. b. at my farm. When dealers in the East find that they can not have green pears and other deciduous green fruits shipped there and sold on these high commissions and we take all the risk, they will come here and buy them, just as they do our dried fruits. I think we will do harm to the State by putting out a document of this sweeping nature. It apparently applies to the entire fruit industry, while of the green deciduous fruit shipments there are only some 6,000 or 7,000 cars as against say 60,000 cars of fruit in all other forms, and we should not discourage the planting of fruit trees and the further growth of the industry in this State.

VICE-PRESIDENT McINTOSH. Gentlemen of the Convention, the Chair desires at this time to state that when this Convention adjourns it will do so without date. The date of the next meeting will have to be fixed by President Cooper.

THE THANKS OF THE CONVENTION.

MR. STEPHENS. Mr. Chairman, I move a vote of thanks to the Fresno "Morning Republican" for supplying daily one hundred copies of the "Republican" to delegates to this Convention; also a vote of thanks to the press of Fresno for full and fair reports of the proceedings of this Convention; also a vote of thanks to the Chamber of Commerce of the city of Fresno for its successful efforts to supply the wants of the members and delegates to this Convention.

Motion duly seconded and carried.

MR. STEPHENS. Now, Mr. Chairman and delegates, I propose that a vote of thanks be tendered to our worthy Vice-Chairman, our temporary presiding officer, for the very able and impartial manner in which he has discharged the duties of that responsible position. I think it is due, because he certainly has ruled impartially; he has endeavored to give all an equal opportunity to discuss every question properly before this Convention for consideration, and therefore I take great pleasure, gentlemen, in offering this resolution, and I move that

a rising vote of the delegates of this Convention be given in the affirmative of this motion.

VICE-PRESIDENT STABLER. Gentlemen, those in favor of the motion will signify it by rising.

Carried unanimously.

MR. McINTOSH. I return thanks to the Convention for its extremely courteous and emphatic manner of thanking me.

RESOLUTION RELATIVE TO THE FRUIT-GROWING INDUSTRY OF CALIFORNIA.

GENERAL CHIPMAN. Mr. Chairman, before we adjourn I would like to offer the following resolution expressing the general feeling of the members of this Convention:

Resolved, That it is the sense of the California fruit-growers, in convention assembled, that the fruit-growing industry of California is in a generally satisfactory and prosperous condition.

Motion seconded.

MR. STEPHENS. I desire to say, Mr. Chairman, that, as I have already stated, in a general sense, so far as raisins are concerned, so far as dried fruits are concerned, this resolution is all right; but I am not willing to vote for such a resolution, not willing it should pass without a protest, under the circumstances, until these reliefs have come which it is said are coming. The organization referred to by Mr. Judd can not come to California and buy fruit, it can not receive from anybody here fruit consignments, except by and with the confirmation of the Armour Car Company alone. No man, General Chipman or any one else, would dare to enter into competition with it. You can't do it. We want that power taken away from it. We want the Southern Pacific Company to remove that incubus which hangs, like a pall, over this great and glorious State. General Chipman has said that the proportion which the green fruit shipments bear to the whole of the fruit shipments is small. That is true, but if we could dispose of three or four times as much green fruit as is now being disposed of you would relieve the pressure of the dried fruit market, you would not be compelled to resort to the drying of your fruits as you are now.

VICE-PRESIDENT McINTOSH. Excuse me, Mr. Stephens. The Chair will certainly have to rule as regards this resolution that it can not be segregated for the purposes of discussion. To get the proposition down to a single product, and one that is comparatively small, is certainly taking advantage of the man who introduced the resolution. If in your judgment the resolution as a whole is erroneous, it is your privilege to controvert it.

MR. STEPHENS. I wish to argue against it from this standpoint,

that, because of that inclusion, it would be like placing me in a car with a smallpox patient, and I don't propose to be transported in a car that contains a smallpox patient. And here is another thing. A resolution is offered here when almost every fruit-grower in the State has gone home from this Convention.

Cries of "Question!"

VICE-PRESIDENT McINTOSH. Let us have the resolution read again, Mr. Secretary, please.

Secretary Isaac reads resolution offered by General Chipman.

VICE-PRESIDENT McINTOSH. You see there is some qualification there, Mr. Stephens. "Generally" covers the whole proposition. Those who are in favor of adopting the resolution as a part of the records of this Convention signify it by saying aye; contrary minded, no.

MR. STEPHENS. No.

VICE-PRESIDENT McINTOSH. It is carried.

MR. STEPHENS. Hold on. I want a division on this.

A rising vote is taken on the adoption of the resolution, all the members voting in the affirmative with the exception of Mr. Stephens and Mr. Cutter, who voted in the negative.

VICE-PRESIDENT McINTOSH. Russ, you look lonesome. The motion is carried, upon a division. It is so ordered.

On motion, the Convention adjourned *sine die*.

ELLWOOD COOPER,
Chairman.

JOHN ISAAC,
Secretary.

FIRST BIENNIAL REPORT

OF THE

Commissioner of Horticulture

OF THE

STATE OF CALIFORNIA

FOR 1903-1904.

ELLWOOD COOPER, Commissioner,



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT STATE PRINTING.

1905.

CALIFORNIA STATE COMMISSION OF HORTICULTURE.

ELLWOOD COOPER	Commissioner	Santa Barbara.
ED. M. EHRHORN	Deputy	Mountain View.
JOHN ISAAC	Clerk	San Francisco.
E. K. CARNES	Assistant Deputy	Riverside.
GERTRUDE BIRD	Stenographer	Sacramento.

OFFICE :

ROOM 41, STATE CAPITOL, SACRAMENTO.

BRANCH OFFICE, ROOM 11, FERRY BUILDING, SAN FRANCISCO.

OFFICE STATE COMMISSIONER OF HORTICULTURE,
STATE CAPITOL,
SACRAMENTO, CAL., December 31, 1904.

*To His Excellency, GEORGE C. PARDEE, Governor, and the Honorable the
Senate and Assembly of California:*

I have the honor to submit herewith the first biennial report of my office, showing the operations of the Commission of Horticulture for the years 1903 and 1904.

Respectfully submitted.

ELLWOOD COOPER,
Commissioner.

Attest:

JOHN ISAAC, Clerk.

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REPORT OF THE COMMISSIONER OF HORTICULTURE.

INTRODUCTION.

By an Act of the Legislature approved March 25, 1903, the State Board of Horticulture, which was first organized on March 4, 1881, as a branch of the State Viticultural Commission, went out of existence, and a new horticultural law, providing for a single commissioner, was passed.

Under Act of the Legislature, approved March 4, 1881, the powers of the Board of State Viticultural Commissioners were enlarged in their scope to take in horticultural matters in addition to those bearing upon viticulture. In accordance with this, the first meeting of the Board of State Horticultural Commissioners was held in San Francisco on April 5, 1881. The appointment of this board was made to better facilitate the carrying out of Section 8 of "An Act to define and enlarge the duties and powers of the Board of State Viticultural Commissioners," etc., approved March 4, 1881, which section reads as follows:

SEC. 8. The Board of State Viticultural Commissioners shall also appoint an officer, who shall be especially qualified by practical experience in horticulture for the duties of his office, to perform similar duties respecting the protection of fruit and fruit trees, as provided for in this Act in reference to grapevines, with like powers; and the salary and traveling expenses of such officer shall be fixed by the said board at the same amounts provided for in the case of the Chief Executive Viticultural Officer; and the said board shall have power to establish such quarantine rules and regulations as are required for the protection of fruit and fruit trees from the spread of insect pests.

Pursuant to this section, the Board of State Viticultural Commissioners, at a meeting held on March 12, 1881, adopted the following resolution:

Resolved, That before taking any definite action in relation to horticulture, there shall be organized, under the auspices of this board, an Advisory Board of Horticulture, to consist of eleven members, to be selected and appointed as follows: Each district commissioner shall nominate one member to represent the horticultural interests of his viticultural district, and each commissioner for the State at large shall nominate one member for the State at large, and the executive committee of the State Horticultural Society shall be invited to nominate two members for the State at large. The members of said

Advisory Board of Horticulture shall be selected among citizens of this State especially qualified, by practical experience and study, in horticultural pursuits. The nominations shall be made to the president of this board, who shall immediately notify the persons selected, and request them to convene in this city, at the office of this board, on the fifth of April next, for the purpose of permanent organization and consultation. Said Advisory Board shall be requested to cooperate with this board, and to make such recommendations relating to the horticultural interests of the State, and the appointment of a horticultural officer, as they may think proper. Said Advisory Board shall have the privilege of using the general meeting-room at the offices of this board, when suitable accommodations shall be provided for their meetings, and the secretary of this board shall keep a record of their proceedings, and issue all notices of their regular and special meetings, which shall be held at their offices at such times as shall not conflict with the work of this board, in accordance with the will of said Advisory Board; provided, however, that they shall hold not less than four regular quarterly meetings. In case of any vacancy in said Advisory Board, caused by the failure of the executive committee of the State Horticultural Society to nominate, within thirty days after being requested to do the same, such vacancy shall be filled by the vote of a majority of the members, nominated by members of this board.

The nominations made by the President of the Board of State Viticultural Commissioners were as follows: A. Cadwell, Commissioner for the Sonoma District; W. W. Smith, Commissioner for the Napa District; M. T. Brewer, Commissioner for the Sacramento District; W. B. West, Commissioner for the San Joaquin District; Felix Gillet, Commissioner for the El Dorado District; Albert S. White, Commissioner for the Los Angeles District; S. F. Chapin, Commissioner for the San Francisco District; Charles H. Dwinelle, Commissioner for the State at Large; Matthew Cooke, Commissioner for the State at Large; Charles H. Shinn, Commissioner for the State at Large; Ellwood Cooper, Commissioner for the State at Large.

The horticultural interests of the State at this time were in their most vigorous condition and growing rapidly, and it was soon found that what had been a mere adjunct to the Viticultural Commission was rapidly outgrowing its parent in importance, and that its work was restricted in consequence of its connection. Therefore, an Act was prepared and introduced in the twenty-sixth session of the State Legislature, providing for the establishment of a State Board of Horticulture, consisting of nine members, seven of whom were to be selected from the seven horticultural districts into which the State was divided, and two were to represent the State at large. This Act was approved and became a law on March 13, 1883, and under it we operated until the Legislature, in its wisdom, passed the following Act in 1903:

AN ACT TO CREATE A STATE COMMISSION OF HORTICULTURE.

[Approved March 25, 1903.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The office of State Commissioner of Horticulture of California is hereby created. It shall be the duty of the Governor, within forty days after the passage of this Act, to appoint a citizen and resident of this State to hold said office of State Com-

missioner of Horticulture, who must at the date of his appointment be a skilled horticulturist and entomologist. The term of office shall be for four years, and until a successor is appointed and qualified. The Governor may remove such Commissioner from office at any time, upon filing with the Secretary of State a certificate of removal signed by the Governor. In case of a vacancy in said office by death, resignation, removal from office, or other cause, the Governor shall fill the vacancy for the unexpired term. The salary of said Commissioner shall be two hundred and fifty dollars per month, and he shall be allowed in addition a sum not to exceed five hundred dollars yearly for traveling and incidental expenses necessary in the discharge of his duties herein provided for. Such Commissioner may appoint a clerk at a salary of one thousand five hundred dollars per year, who shall perform the duties required of him by such Commissioner. In appointing such Commissioner and his successor or successors, it shall be the duty of the Governor to disregard political affiliations, and be guided in his selection entirely by the professional and moral qualifications of the person so selected for the performance of the duties of said office. The office of said Commissioner shall be kept open every day except holidays, and shall be in charge of the clerk during the absence of such Commissioner. The main office of such Commissioner shall be at the City of Sacramento. The Secretary of State shall furnish and set aside in the capitol a room or rooms suitable for offices for said Commissioner, and if the Secretary of State shall make and file an affidavit with the said Commissioner stating that it is not possible for him, as such Secretary of State, to provide and set aside an office for said Commissioner in the capitol, or in any State building under his control, because there is no such office room or rooms available, then, and after the making and delivery of such affidavit to such Commissioner, the said Commissioner may rent rooms convenient and suitable for his offices under this Act, at a rental not to exceed five hundred dollars per year. Said Commissioner may also keep and maintain an office in the City and County of San Francisco at a yearly rental not to exceed the sum of five hundred dollars, and may appoint a Deputy Commissioner who shall be an expert entomologist and horticulturist, to have charge of said office under said Commissioner, and to perform any and all duties which said Commissioner may require of him under this Act, and shall fix the monthly compensation of such deputy at two hundred dollars per month. Such deputy shall hold his position during the pleasure of such Commissioner, and may be removed from his office or position at any time by said Commissioner filing with the Secretary of State a certificate signed by said Commissioner so removing such deputy. Said Commissioner may also appoint, by and with the approval of the Governor, such temporary deputies from time to time as may be required for quarantine purposes under this Act, and such temporary deputies shall receive such compensation per diem as may be specified in the writing so approving such appointment. If there be not sufficient furniture and office appliances turned over to such Commissioner by the State Board of Horticulture heretofore existing, to furnish and equip properly the office or offices for such Commissioner at Sacramento and San Francisco aforesaid, the said Commissioner may, by and with the approval of the Governor, purchase for the use of his said office or offices, such furniture and appliances as may be necessary therefor, and from time to time, at an expense not to exceed a sum to be mentioned in such approval, which expense, together with all other expenses authorized by this Act, is hereby allowed for the purposes specified.

SEC. 2. Upon taking office under this Act such Commissioner shall be entitled to receive and have turned over to him as such Commissioner all the books, records, and property in the possession, charge, custody or control of the State Board of Horticulture heretofore existing, and all such property shall be delivered to such Commissioner upon demand. Such Commissioner shall be deemed for such purposes the successor of said board.

SEC. 3. Such Commissioner shall collect books, pamphlets, and periodicals and other documents containing information relating to horticulture, and shall preserve the same; collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; correspond with horticultural societies, colleges and schools, and with the County Boards of Horticulture existing or that may exist in this State, and with all other persons necessary to secure the best results to horticulture in this State. He shall require reports from County Boards of Horticulture

in this State, and may print the same or any part thereof as he may select, either in the form of bulletins or in his annual report, or both, as he shall deem proper. He shall issue and cause to be printed and distributed to County Boards of Horticulture in this State, and to all other persons whom he may deem proper, bulletins or statements containing all the information best adapted to promote the interest and protect the business and development of horticulture in this State. Such Commissioner shall be deemed to be the State horticultural quarantine officer mentioned in chapter seventy-six of the laws of eighteen hundred and ninety-nine, for the purpose of that Act, and shall be empowered to perform the duties which under that Act are to be performed by the State horticultural quarantine officer; *provided*, that any inspection therein authorized, when made by such Commissioner, must be with the approval of the Governor, and as provided by this Act.

SEC. 4. Said Commissioner may, by and with the approval of the Governor, establish, maintain, and enforce such quarantine regulations as may be deemed necessary to protect the nurseries, trees, shrubs, plants, vines, cuttings, grafts, cions, buds, fruit-pits, fruit, vegetables, or other articles of horticulture, against contagion or infection by injurious disease, insects or pests, by establishing such quarantine at the boundaries of this State or elsewhere within the State, and he may make and enforce, with the approval of the Governor, any and all such rules and regulations as may be deemed necessary to prevent any infected stock, tree, shrub, plant, vine, cutting, graft, cion, bud, fruit-pit, fruit, vegetable, or other article of horticulture, from passing over any quarantine line established and proclaimed pursuant to this Act, and all such articles shall, during the maintenance of such quarantine, be inspected by such Commissioner or by a deputy appointed in writing by said Commissioner with the approval of the Governor, and he or the deputy so conducting such inspection shall not permit any such article to pass over such a quarantine line during such quarantine, except upon a certificate of inspection signed by such Commissioner or in his name by such a deputy who has made such inspection, unless such article has been immediately prior to such passage inspected by an officer or agent of the United States entitled to inspect the same, and such officer or agent has granted permission for such passage. All approvals by the Governor given or made pursuant to this Act shall be in writing and signed by the Governor in duplicate, and one copy thereof shall be filed in the office of the Secretary of State, and the other in the office of said Commissioner before such approval shall take effect.

SEC. 5. Upon information received by such Commissioner of the existence of any infectious disease, insect or pest, dangerous to any such article, or to the interest of horticulture within this State, or that there is a probability of the introduction of any such infectious disease, insect or pest into this State or across the boundaries thereof, he shall proceed to thoroughly investigate the same, and may, by and with the approval of the Governor, establish, maintain and enforce quarantine as hereinbefore provided, with such regulations as may be necessary to circumscribe and exterminate or eradicate such infectious diseases, insects or pests, and prevent the extension thereof, and is hereby authorized to enter upon any grounds or premises, and inspect any stock, tree, shrub, plant, vine, cutting, graft, cion, bud, fruit-pit, fruit, vegetable, or other article of horticulture, or implement thereof, or box or package pertaining thereto, or connected therewith, or that has been used in packing, shipping or handling the same, and to open any such package, and generally to do, with the least injury possible under the conditions to property or business, all acts and things necessary to carry out the provisions of this Act.

SEC. 6. Upon the discovery of any such infectious disease, insects or pests, such Commissioner shall immediately report the same to all County Boards of Horticulture, together with a statement as to the best known means or method for circumscribing, exterminating or eradicating the same, and shall state therein specifically what treatment or method should be applied in each case, as the matter may require, with a detailed statement or prescription as to the method of making or procuring, and of applying any preparation or treatment so recommended therefor, and the times and duration for such treatment, and if chemicals or articles be required other than those usually obtainable at any town, the place or places where they are most readily to be obtained; and upon the receipt of such statement by any County Board of Horticulture

or any member thereof, it shall be the duty of such County Board of Horticulture to distribute such statement in printed form to every person owning or having charge or possession of any orchard, nursery stock, tree, shrub, or article of horticulture within their county, where it is supposed by said County Board there is any danger to the interests of horticulture, and such a statement must be served with or be a part of the notice to be given to the owner or owners, or person or persons, in possession of any orchard, nursery, tree, shrub, or article of horticulture, referred to, provided for, and required to be served in and by section two of chapter one hundred and eighty-three of the laws of eighteen hundred and ninety-seven, or any amendments which have been or may be made thereto.

SEC. 7. Whenever it shall become necessary to establish quarantine under this Act, if there be any authorities or officers of the United States having authority to act in such matter, or any part thereof, the said State Commissioner of Horticulture shall notify such authority or officers of the United States, and cooperate as far as possible with such authorities or officers of the United States wheresoever the jurisdiction of the United States extends and is being exercised, and shall obtain, whenever desirable and possible, the assent of the proper authority or officers of the United States to the establishment or change of quarantine lines, so as to most effectively and speedily accomplish the purposes of this Act. The said Commissioner shall at once notify the Governor of all quarantine lines established under or pursuant to this Act, and if the Governor approve or shall have approved of the same or any portion thereof, the Governor shall issue his proclamation proclaiming the boundaries of such quarantine, and the nature thereof, and the orders, rules or regulations prescribed for the maintenance and enforcement of the same, and shall publish such proclamation in such manner as he may deem expedient to give proper notice thereof.

SEC. 8. The said State Commissioner shall be ex officio a member of all County Boards of Horticulture existing or that may be created or exist in this State pursuant to law, whenever he is present and acting with said County Board within the county, where such County Board exists, but when he is not so present in such a county, acting with such County Board, then the said County Board shall have all the power and authority conferred on it by law, and may exercise such power by the action of the members of such County Board or a majority thereof. The reports which County Boards of Horticulture are required by law to make, or which they may desire to make, shall, after the passage of this Act, be made to the State Commissioner of Horticulture.

SEC. 9. It shall be the duty of the Superintendent of State Printing to print and deliver to the State Commissioner of Horticulture, upon the written request of said Commissioner, all such bulletins, orders, rules, regulations, statements, reports and other printed matter, as the said Commissioner may deem necessary to have and use for carrying out the purposes of this Act, and it shall be the duty of the Secretary of State to cause to be prepared and furnished to such State Commissioner all stationery, paper, blank forms, envelopes, and writing material needful and convenient for use in the office of such Commissioner.

SEC. 10. It shall be the duty of said State Commissioner to report in the month of January in each even-numbered year to the Governor, and in each odd-numbered year to the Legislature of this State, such matters as he may deem expedient or as may be required either by the Governor or Legislature, and to include a statement of all the persons employed, and of moneys expended under this Act, by itemized statement thereof.

SEC. 11. Any person willfully refusing to comply with orders lawfully made under and pursuant to this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not to exceed five hundred dollars.

SEC. 12. All moneys paid under this Act shall be paid by the State Treasurer from moneys appropriated for the support of the State Commissioner of Horticulture, and expenses other than the salary of the Commissioner, the compensation of his clerk and Deputy Commissioner, as allowed and provided by this Act, must be certified by the said Commissioner and be approved by the State Board of Examiners before being audited or paid. Any moneys remaining of any appropriation heretofore made or that may be appropriated for the use or support of the State Board of Horticulture are

hereby appropriated to the support of the State Commission of Horticulture, and are directed to be applied to the payment of claims and expenses under this Act.

SEC. 13. The sum of four thousand dollars is hereby appropriated for the use and support and to pay the expenses of the State Commission of Horticulture for the fiscal years commencing July first, nineteen hundred and three, and July first, nineteen hundred and four, under this Act.

SEC. 14. Chapter sixty-three of the laws of eighteen hundred and eighty-three, chapter seven of the laws of eighteen hundred and eighty-five, chapter eighty-six of the laws of eighteen hundred and eighty-nine, and chapter one hundred and ninety-four of the laws of eighteen hundred and ninety-one, are hereby repealed.

SEC. 15. This Act shall take effect immediately.

REPORTS.

Of the Commissioner of Horticulture for 1903.

Of the Commissioner of Horticulture for 1904.

On Utah Conditions.

On Oregon Conditions.

Of the Deputy Horticultural Commissioner.

REPORT OF THE COMMISSIONER OF HORTICULTURE, FOR 1903.

OFFICE OF COMMISSIONER OF HORTICULTURE,
STATE CAPITOL, SACRAMENTO, CAL., January 30, 1904.

To His Excellency, GEORGE C. PARDEE, Governor:

SIR: I have the honor to submit to you herewith my report showing the operations of this department during the year 1903, together with a report of its financial condition for the six months ending with December 31, 1903.

For many years past, the work of the Horticultural Quarantine Officer of the late State Board of Horticulture, at San Francisco, was greatly hampered owing to the cramped and inadequate quarters which he occupied in the upper floor of the Chief Wharfinger's building. Here the work was confined to one small room, which was greatly overcrowded and subject to extremes of heat and cold, rendering the propagation of parasitic insects, which formed a great and valuable part of the work of this department, difficult and unsatisfactory. Upon my appointment as State Horticultural Commissioner, arrangements were made for securing more convenient and available quarters. To this end, a room was assigned us in the new Ferry Building, where we now have sufficient space for the proper carrying on of our work. The new quarters are well lighted, warm, and sufficiently large to allow of work among the breeding-cases in which the beneficial insects are propagated. Large windows facing the west give abundant sunlight, so necessary for the propagation of the beneficial insects. The room assigned to us was divided into three, and a large part of it divided off with a glass partition. This forms the insectary, and here, with plenty of light, warmth, and room—three important requisites—we are now enabled to do excellent work along these lines. Another part was partitioned off for a private office, in which are kept the library, private correspondence, etc., while the third part was left for a public or reception office, which is always open to visitors. It is here that we have our collection and cabinet of specimens. I take pleasure in reporting that in this important branch of our work we are well equipped for service.

The quarantine work is one of the most important branches of our labors, and is steadily growing in volume. With the increasing impor-

tance of San Francisco as a port of entry, the volume of shipping increases, and consequently the work of the department is enlarged. It is now no infrequent matter for three or even four foreign steamers to arrive in one day. The duties have increased to such an extent that it was not possible for one man to attend to them all, and it became necessary that we have an assistant in order the more efficiently to look out for imported fruits, plants, etc., and to guard against the introduction of insects and diseases dangerous to horticulture, and with which we are not at present afflicted; also to help in the work of caring for, feeding, and distributing beneficial insects. In the height of the breeding season, the work of attending to the beneficial insects is very pressing and requires expert service almost day and night. It was formerly little trouble to secure abundant feed for our parasitic insects, but with the continuous distribution, spread, and propagation of these, the work of overcoming the destructive pests has been so thorough that we are now put to a great deal of trouble in securing the necessary scale insects for feeding and propagating our beneficial parasites. It is often the case that our assistant is compelled to visit remote places in order to discover the necessary insects required for feeding the beneficial ones. This work entails considerable expense, and the demands upon us in this direction are daily increasing, as applications are made for beneficial insects not only from all parts of our own State, but also from nearly every other State in the Union, and from many foreign countries. In this great work California has been practically the pioneer, and it is with a feeling of pride that we are able to point to the success we have achieved therein, and also to the fact that the world is following in our footsteps and working to suppress noxious insects and pests with their natural enemies. So thorough has been this work that to-day in California we have very few serious pests for which we have not an effective enemy. There is not a scale insect which has not its check, internal or external, and while some are not as effective as could be wished, very many are so thorough in their work that their host scales may be removed from the list of California pests.

Letters received daily and in great numbers from every part of the State, speak highly of the parasites and give us great encouragement in this branch of the work. Satisfaction with this branch is universal, and from all reports it is evident that we have succeeded in overcoming very many of the worst pests with which the fruit-grower had to contend, and that it is only a question of time when fighting pests with artificial means and with the costly methods now in vogue will become a thing of the past, and the enormous outlay now involved for machinery, materials, and labor will be saved to the fruit-grower.

The work of the quarantine department is not confined to the city of San Francisco. In addition to inspecting for noxious insects all vessels

which arrive at the port, and propagating and distributing beneficial insects, the Deputy Horticultural Officer is frequently required to visit outside counties in the discharge of his duties. Very many, in fact most, of our fruit-growing counties have their Boards of County Horticultural Commissioners. In several instances these have been appointed during the past year, and it has been necessary to visit them and give instructions in regard to their duties and in the proper methods of inspecting and fumigating infested stock coming into their respective counties. In addition to this, instructions are given for fighting such pests as are already established.

I have found the duties of the Sacramento office steadily increasing. Upon entering upon my term of office I found there were several counties in which there were no Horticultural Commissioners. Correspondence has been entered into with the Boards of Supervisors of all such counties, and in some instances personal visits had to be made; but I am pleased to report success in all cases.

We have endeavored to keep in constant touch and harmonious relations with all the fruit interests of the State, and are able to report the same as being generally in a fairly good condition. In some branches there have been conflicting interests, but strong efforts are being made to harmonize these, and in other cases difficulties have been adjusted. Growers, generally, recognize the imperative need of working together, and to this end there are very many strong organizations among the fruit-growers of California. It has been the policy of this department to encourage this condition, as without harmonious co-operation in the handling of the products, ruin would inevitably result in many branches of fruit-growing.

An important branch of our work has been the establishment of a plant quarantine at the port of San Diego. Through an understanding had with the collector of that port and with the resident Horticultural Commissioner, we are enabled to quarantine any disease- or insect-infested fruits or plants that may be offered for entry at that port. This effectually closes San Diego as a point of entry for any pests that might otherwise threaten us from that source.

Fruit-growers in the northern counties lodged complaints with this office to the effect that Butte County, owing to the failure of the Board of Supervisors to appoint an efficient Board of Horticultural Commissioners, was leaving an open way for the introduction of serious pests and diseases into our State. The matter was taken up with the Supervisors, and I am pleased to state that when the matter was presented to them in its proper light, they were willing to comply with the law, and we now have a good working Board of Horticultural Commissioners in that county.

It has been my wish and persistent effort to have the fruit interests

in close relation with this office, and in this I am pleased to report that I have found all willing and anxious to co-operate with me in my efforts.

A feature of the work in this office during the past season has been the reception and distribution of reports from our consuls in those countries producing and shipping fruits that may come in competition with our own. Through the courtesy of the Secretary of State, at Washington, D. C., and by an arrangement made with the Commercial Museum of San Francisco, we have been enabled to receive regular reports as to the condition of such fruits in Europe and elsewhere. This has added very greatly to the work of the office, and in some cases we have sent out two of these in a week, mailing from two hundred and fifty to four hundred copies, usually selecting such growers as would be most benefited by their reception. In these cases the most expeditious work was necessary, as no delay could be permitted in getting these reports into the hands of the growers. To expedite this work we have introduced an Edison oscillating mimeograph and addressing machine, and are now in good shape to handle the reports during the coming season.

Work connected with the holding of fruit-growers' conventions has been very much heavier this year than usual, first on account of having held two (in May at Los Angeles, and in December at Fresno), and also on account of our endeavor to give them a wider scope in the work. We are pleased to report that both of these conventions were eminently successful and were attended by large numbers of the leading fruit-growers of the State, very many of whom took an active part in the deliberations. A large edition of the report of the Los Angeles convention, the twenty-eighth, was printed and distributed, while the report of the Fresno convention is now ready for the printer and will soon be in the hands of the fruit-growers of the State.

Since the abolition of the State Board of Viticulture, there have been no viticultural conventions held in the State, and the viticulturists have each year taken more interest in the work of the fruit-growers' conventions, until the discussion of grape-growing, raisin and wine making, and the marketing of vineyard products, now forms a most important part of the matter considered at our conventions, in which orchardists and vineyardists are equally represented. This has greatly widened the scope of our work, while adding somewhat to our labors.

At the request of the World's Fair Commissioners, we have prepared an exhibit for display at the St. Louis Exposition. This has required considerable time and the outlay of some money. But we realize the necessity of laying before the world, on that occasion, the knowledge of the great work that is being done in the line of horticulture in our State, and especially in our peculiar work of fighting insect pests with their natural enemies.

While I appreciate the fact that the strictest economy is necessary, I also deeply realize that justice to California's greatest industry will, sooner or later, require a largely increased service, in order to more thoroughly and effectively protect and advance this great and growing source of revenue. Very many experiments should be made, a more perfect system of quarantine be established, and a thorough search be made the world over, or at least in promising sections, for new or more effective enemies of our injurious pests.

Following are the expenditures of the Commission of Horticulture from July 1, 1903, to January 1, 1904:

Books and papers.....	\$20 67
Express	25 82
Extra help.....	73 50
Freight and cartage	19 60
Janitors	120 00
Miscellaneous	38 95
Microscopic supplies, chemicals, etc.	71 70
Addressing machine, and accessories	68 38
Office and mimeograph supplies.....	21 88
Reporting vessels.....	85 00
Repairing and furnishing.....	76 15
Salary of San Francisco Deputy Inspector.....	386 65
Salary of stenographer.....	300 00
Traveling expenses of Deputy Inspector (San Francisco).....	2 10
Traveling expenses of Deputy Commissioner (San Francisco).....	148 85
Traveling expenses of Clerk.....	177 80
Traveling expenses of Commissioner.....	169 50
Telephones and telegrams	91 36
Total	<u>\$1,897 91</u>

I am pleased to add that I have met with the most kindly treatment and a most hearty sympathy with my labors from all sources and from all classes; nothing has occurred to mar the harmony of my work, and there have been no complications that have not been easily and harmoniously adjusted.

In conclusion, I would say that the employés under my direction have shown great energy and efficiency in their respective departments, in which each has been perfect, and I can speak of one and all only with the greatest praise.

I submit to you this brief report, and, believe me, with the highest consideration,

Your obedient servant,

ELLWOOD COOPER,
State Commissioner of Horticulture.

REPORT OF THE COMMISSIONER OF HORTICULTURE FOR 1904.

*To the Honorable Senate and Assembly of the State of California in
Legislature assembled :*

GENTLEMEN: In accordance with Section 10 of the law under which this Commission was created, and which provides that "it shall be the duty of said State Commissioner to report in the month of January in each even-numbered year to the Governor, and in each odd-numbered year to the Legislature of this State, such matters as he may deem expedient or as may be required either by the Governor or Legislature, and to include a statement of all the persons employed, and of moneys expended under this Act, by itemized statement thereof," I have the honor to present the following as my annual report:

The law provides for one Deputy State Horticultural Commissioner, who is also the State Horticultural Quarantine Officer. The work of this office has been directed to preventing the entrance into our State of any new tree or fruit pests or diseases from abroad, and, to this end, all importations are carefully inspected. If any new pest is discovered, the stock upon which it is found is destroyed or refused entrance. If a pest or disease prevalent in our State and susceptible of eradication is found, the stock is properly treated, the pest destroyed, and the stock is then passed. If no pest or disease is found, the stock is passed at once. In this work we have received the cordial assistance of the railroad companies, the express companies, the post-office department, the various shipping agencies, and especially the custom-house authorities, all of whom have aided us to the extent of their power.

In the prosecution of this work we are frequently called to different parts of the State—to those sections where no County Horticultural Commission exists, and in which, under the law, the work devolves upon this office.

With new shipping and transportation lines coming into the State, work in this direction is rapidly increasing in volume, and it is impossible for one man to do it all. I have therefore been compelled to appoint an assistant at San Francisco and to provide for his compensation out of the appropriation made for the support of this depart-

ment. The work here should be still further enlarged, but with the funds at my disposal this is impossible. The demands upon this branch are steadily increasing, and it is of the most vital importance to our fruit-growers that no plants, or other form of vegetation, should be admitted within our State until they have been properly inspected and passed on as clean. With the many orchard pests of the East finding entrance through the Orient, the very existence of our most important industry depends upon thorough and efficient work in this direction.

The next most important work of this Commission and of its predecessor, the State Board of Horticulture, has been the discovery and introduction of the natural enemies of those pests already prevalent here. It is a fact that our worst pests are introduced species. Having been introduced without their natural checks, and having nothing to stay their spread, they have increased in destructive quantities, until, in self-protection, we have been forced to fight them with artificial means—a method at once enormously costly and ineffective, for while we may succeed by endless labor, year after year, in somewhat checking their ravages, we can never hope, by artificial means, to eradicate them, or even to reduce them below the danger limit. We have learned that insects in their natural habitat are pests only to a limited degree, and that wherever an insect is native there will be found some natural check which prevents its undue increase and keeps it below the danger limit.

It has ever been the effort of this department to discover the original home of our various pests and to secure and introduce their natural checks, and so well have we succeeded that we have parasites for most of our worst scale pests and also for many other of our insect enemies. One of the last and most effective workers in our interests along these lines is the now well-known *Scutellista cyanea*, which, in the past three years, has practically subdued the black scale, formerly one of the worst pests of our fruit-growers.

At the present time, the most serious of all the fruit pests of the State, as it probably is of the greater part of the United States, is the codling-moth, which does so much damage to our apple crop. The cost of fighting this pest is enormous in the outlay of material and labor. In order to save any portion of their crop, apple-growers have to spray continually through the summer; but in many sections, even where the work was faithfully done, the results have hardly justified the labor. Unless the best of material is used, and at the proper season, the labor expended may be entirely thrown away.

We know that the codling-moth was imported into the United States from Europe, and from all that we can learn it is not a serious pest there. No spraying and but little other work is ever done there to keep it under control, and yet European orchards have a very small percent-

age of wormy apples. That there is some natural enemy to the codling-moth there is no doubt, and we have undertaken the work of searching it out and introducing it for the benefit of the apple-growers of California.

In following out this line of work, Mr. John Isaac, of our department, knowing that Mr. Leonard Coates was visiting the apple-growing sections of England, communicated with him, requesting him to investigate this matter and ascertain the prevalence of the codling-moth there, the extent of damage suffered from its ravages, and the measures, if any, taken to check it. Following is Mr. Coates's answer, which will be found of interest, and which tends to corroborate what has heretofore been known, that the codling-moth is not a serious pest in its native land, and that there are some natural checks which keep it under control:

OAKLANDS, STOKEINTEIGNHEAD, NEAR TEIGNMOUTH, ENGLAND,
September 8, 1904.

MY DEAR MR. ISAAC: I have been looking into the matter of codling-moth in English apple orchards since receiving your letter, and can only come to the conclusion that the codling-moth must have in these orchards some parasitic enemy which serves to keep it in check; or there must be a larger number of birds that prey upon it than in America. Birds of the wren family are very numerous—may they not devour many in the pupa form? Swallows fly among the trees until long after dusk and through the several hours of the twilight—may they not consume many moths?

There is no general system of spraying, and in the old apple districts—where I now am—in Devonshire and in Herefordshire, where I was staying some time ago, little, if anything, seems to be done.

One large Kentish grower, recently deceased, has put his theory into print, as well as into practice. He fights codling-moth almost exclusively by placing greasy bands around the trunk, high up, freshening them the first week in May, because "the maggot has been breeding under the bark of the tree (without spinning a web or making a cocoon) since the day it left the fallen apple or tree." * * * "The warm May sun brings them from their winter quarters, and, with an irresistible power, they ascend the tree. In a few days, if not arrested then, they change into a chrysalis, remaining in this state until June, when they are moths once again."

You see his point (allowing for difference in time for warm weather to begin) is to catch the worm at the time when it crawls upward from the lower part of the trunk, where it has been in temporary hiding.

Apart from all that, the fact remains that in these old Devonshire orchards—and you know what they are and have been for hundreds of years—I can find scarcely a wormy apple; they are in a state of nature, whose natural entomological and ornithological equilibrium, so to speak, has never been disturbed.

In these orchards the land is never plowed. Sheep—and such sheep!—get fat on the lush feed; the trees are never pruned and the fruit is never thinned.

I said before that spraying in these districts is unknown. Given a reasonable amount of pruning and good thinning in years when fruit sets heavily, and any one can make money in old Devon. As it is, buyers are plentiful, offering good prices for those trees on which the fruit is of fair size. But most of the trees are a perfect mass of little apples, no good for anything but cider.

Shall be glad to hear from you when you have time to write.

Yours sincerely,

LEONARD COATES.

I am pleased to state that we have secured an interest in the services of Mr. George Compere in conjunction with the West Australian Govern-

ment, and that he is at the present time making a special study of the codling-moth and its parasites. He has found two different parasites working upon the pest in the parts of Europe which he has visited, and has secured and forwarded to this department a large number of these beneficial insects, which have arrived in good condition. They are now being bred in our insectary in San Francisco, and we hope that, by the coming season, we shall have them in sufficient numbers to establish them in the apple districts of California.

Notice reached this office during the past season that several injurious insects not prevalent in our State were in existence in Utah and Oregon, both close neighbors of California, and from which sections large quantities of nursery stock are imported into our State. I instructed Mr. Isaac, of this department, to make a thorough investigation in both cases and to report to me. His report on this matter will be found elsewhere.

During the past year Mr. Craw, who has for a number of years acted as Chief Horticultural Quarantine Officer of the State Board of Horticulture, and of the State Commission of Horticulture since its establishment, received a very flattering offer from the Hawaiian Government to transfer his services to that territory. As we were unable to make an equal offer, he was constrained to accept it and sever his relations with this Commission. His resignation, given below, was accepted and went into effect on the last day of July, 1904. I appointed Mr. Edward M. Ehrhorn, of Mountain View, as his successor in office. Following is Mr. Craw's letter of resignation:

SAN FRANCISCO, July 19, 1904.

HON. ELLWOOD COOPER, *Commissioner of Horticulture*:

DEAR SIR: I herewith beg to inform you that I have accepted the position of Quarantine Officer offered me by the Board of Agriculture and Forestry of Hawaii and the Hawaiian Sugar Planters' Association, and hereby tender you my resignation as Deputy Horticultural Commissioner, to take effect the end of July, 1904.

In doing this, I can not allow the opportunity to pass of thanking you personally, also the Horticultural Commissioners and inspectors, together with the United States customs officers and dock officials, for the support and assistance rendered me in the discharge of my duties.

Respectfully yours,

ALEXANDER CRAW.

Owing to the prevalence of the Morelos orange-maggot in Mexico, where a very large percentage of the oranges and sweet limes are infested, we have placed a quarantine upon these fruits in California and none of them are allowed to enter our State. This has been a purely protective measure, for, from reports received, a very large amount of the fruit of our sister republic is in such shape that it is unmarketable, owing to the prevalence of maggots in the pulp. Sometimes as many as twelve or fifteen of these disgusting insects will be found in a single specimen, and should this insect find its way into our orange sections it would be as

serious a pest as is the codling-moth in our apple-growing sections. This action on our part has been drawn to the attention of the Mexican Government, and a voluminous correspondence bearing thereon has passed between this department, the Governor's office, the State Department at Washington, and the Government of Mexico. Communications received bearing on this matter are presented elsewhere.

At the request of the Louisiana Purchase Exposition Commissioners, we made a small exhibit of beneficial insects at St. Louis, illustrating the California method of fighting pests. This was labeled "Bug vs. Bug," and attracted much attention. We have received a great deal of correspondence from Eastern parties bearing upon this subject, and making inquiries into our method of securing, breeding, and distributing beneficial insects, and very many other States and countries are now profiting by California's experience in this direction. Elsewhere, under the title of "Bug vs. Bug," we give a full list of the insects on exhibition there, with a description of the work they do in California.

This exhibit will be returned to us, and it is my intention to install it at the Lewis and Clark Centennial at Portland during the coming summer. I do not think we can too widely make known the knowledge of the good work that is being done by parasites in our California orchards.

We have enlarged our work in the line of distributing consular reports during the past season, and have made arrangements for the reception of reports from our consuls in all the fruit-growing sections of the world, bearing on such fruits as come into competition with those of California. Very many of these reports have been received by us during the past summer and have promptly been copied and mailed to the fruit-growers interested therein. To accomplish this work we have to use a mimeograph and addressing machine, and now have a very large list of names of the fruit-growers of the States to whom we are sending these and other publications of interest. This has added very largely to the work of our Sacramento office.

The prevalence of various insect pests has been reported at our office from different parts of the State. In some parts these have appeared in large numbers and have done much damage, but the swarms in which they appear have been local and their destructive work confined to limited areas. Elsewhere, under the title of "Insects of the Year," we give a review of the prevailing insects and the damage done by them.

Since the organization of this Commission we have held two very large Fruit-Growers' Conventions, the thirtieth having been held in San José on December 6 to 9, 1904. Although this was the Thirtieth Fruit-Growers' Convention, it was the largest ever held in the State, and I am pleased to note that our conventions are annually increasing in popularity and that good work is being accomplished by them. At the Twenty-ninth Convention a motion was made and carried that a com-

mittee of fifteen be appointed to draft ways and means for a combination of the fruit-growers of the State for their own interests—that they might enlarge their markets and receive better compensation for their labors. This subject was handled at the Thirtieth Convention, and out of it we hope that better markets and better prices will result to the growers of our State.

The Committee of Fifteen, so appointed, made the following report to me, outlining their work:

The Committee of Fifteen, ordered appointed by the Twenty-ninth Annual State Fruit-Growers' Convention, to devise and put into effect a plan or plans to promote co-operation among producers of all classes of cured fruit throughout the Pacific Coast, have unanimously adopted the following resolution as a basis for action:

Resolved, That it is the sense of this committee that the fruit-growers of the State, wherever practicable, organize local associations for the preparation of fruit for market, and that these several associations then connect themselves with some selling agency to make sale of their crop at the best market rate, at such times and for such prices as the agency acting in conjunction with associate organizations may deem best. In case no such selling agency is available or satisfactory, we recommend that they proceed to establish one by delegate representative from each such local association.

Also, that we further recommend that all selling agencies composed of organized growers unite by delegate membership to form a central selling and purchasing agency by which the highest advantages in buying and selling may be secured, without, however, relinquishing any brand, trademarks, or other advantage peculiar to each, but eliminating to the greatest possible extent injurious competition with each other in the market, and in every practicable manner extending the consumption of California cured fruit.

Also, that we disclaim any purpose to antagonize any interest by such recommendations, being fully aware that a large percentage of the business will remain to be done by established organizations. But we believe that when a considerable portion of the growers thus become organized, it will be possible to find a common basis of agreement with such interests by which market values may be sustained and regulated better than at present.

Also, that we further recommend that such centralized agency, at the earliest practicable moment, develop a plan for efficiently advertising California cured fruits, and placing them with the consumers at prices which shall provide for a fair average profit to the grower, wholesaler and retailer.

We further recommend the formation of a committee to procure and make available statistics in relation to the fruit products of the Pacific Coast and competing countries.

The following resolution was also unanimously passed:

Resolved, That a committee of three, with Mr. H. P. Stabler as chairman, be appointed to outline and put into operation a plan for increasing the consumption of the cured fruit of the State.

The chairman appointed on the committee with Mr. Stabler, Arthur R. Briggs and A. L. McCray.

The members of the Committee of Fifteen present were: A. R. Sprague, Sacramento, chairman; F. H. Baab, San José; F. G. Rodeck, Campbell; Arthur R. Briggs, San Francisco; H. P. Stabler, Yuba City; A. D. Bishop, Orange; W. P. Weber, Santa Paula; Thos. Jacob, Tulare; A. L. McCray, Fresno, secretary; B. F. Walton, Yuba City, who was elected to fill a vacancy on the committee.

The committee spent two days in earnest deliberations, and while at first wide differences of opinion were expressed, the members came to unanimous agreement in support of the plan above outlined.

The fruit conditions of the State during the past year have not been favorable. Heavy rains, with prevalent high winds during the blooming period, washed a great deal of pollen from the blossoms and prevented their fertilization. As a result, many varieties of fruit yielded very light crops, while few came up to the normal. Peaches have been

exceedingly light in the greater part of the State; apricots in most places below normal; apples light; cherries fair to medium; and pears, except where the orchards were injured by the pear blight, were good. The orange crop both in southern and northern California has been unusually heavy, and grapes the largest crop ever produced. Further details of the fruit conditions of California, together with the imports and exports, will be found under the title of "Review of the Fruit Seasons."

I am pleased to call attention to the reports of the various County Horticultural Commissioners, which appear elsewhere, and to state that we find these gentlemen well informed in the line of their duties and conscientious in their performance. The County Horticultural Commissioners are a great auxiliary to us in the work of this department, for we frequently call upon them for assistance or information, and have invariably received ready response. Their reports show the condition of fruit in the various counties, the presence of insect pests and diseases, the means taken to eradicate them, and suggestions for the betterment of their work. These make a valuable addition to the present report, which should be read with attention.

I append the financial report of my office for the fifty-fourth and fifty-fifth fiscal years. This includes the expenditures of the State Board of Horticulture, which ceased to exist on March 25, 1903. From March 25, 1903, to April 27, 1903, the date of my appointment, there was an interregnum, but acting under the instructions of His Excellency, Governor George C. Pardee, the officers of the State Board of Horticulture continued their labors until the new Commissioner was qualified. The expenses incurred during this interim are also given, each under its appropriate head. The expenses of the State Board of Horticulture cover the period from July 1, 1902, to March 25, 1903, the interim from March 25, 1903, to April 27, 1903, and the Commission of Horticulture from the latter date to June 30, 1904.

EXPENDITURES DURING FIFTY-FOURTH FISCAL YEAR.

Expenses of State Board of Horticulture.

Cartage	\$6 99	
Cuts and photos	51 75	
Extra help	64 20	
Express	45 73	
Furniture and repairing	95 35	
Fruit-Growers' Conventions	367 55	
Janitors	135 00	
Library	9 25	
Postage	313 30	
Miscellaneous	70 40	
Consular reports	50 00	
Reporting vessels	105 00	
Salaries of Special Agents	1,492 00	
Traveling expenses of Special Agents	238 60	
Traveling expenses of Secretary	17 95	
Traveling expenses of Commissioners	200 20	
Traveling expenses of Quarantine Officer	155 55	
Telephones and telegrams	91 29	
		<u>\$3,510 11</u>

Expenses during the Interim.

Express	\$3 85	
Janitors	15 00	
Library	50	
Postage	1 00	
Miscellaneous	2 10	
Reporting vessels	10 00	
Salary of Special Agents	114 00	
Traveling expenses of Special Agents	2 35	
Salary of stenographer	50 00	
Salary of Secretary	192 50	
Salary of Quarantine Officer	175 00	
Traveling expenses of Quarantine Officer	33 85	
Telephones and telegrams	9 05	
		<u>\$609 20</u>

Expenses of Commission of Horticulture.

Cartage	\$33 86	
Extra help	39 50	
Express	29 45	
Fruit-Growers' Convention	161 90	
Furnishing San Francisco office	227 90	
Furniture and repairing	161 18	
Janitors	37 50	
Library	66 25	
Postage	933 63	
Typewriter (Sacramento office)	100 00	
Mimeograph and supplies	57 13	
Microscope and accessories	41 45	
Signs for San Francisco and Sacramento offices	47 00	
Miscellaneous	80 78	
Reporting vessels	40 00	
Consular reports	25 00	
Salary of Special Agents	6 00	
Traveling expenses of Special Agents	123 90	
Traveling expenses of Commissioner	78 15	
Salary of stenographer	106 67	
Traveling expenses of Deputy Commissioner	11 60	
Telephones and telegrams	30 68	
		<u>\$2,439 53</u>
Total expense, fifty-fourth fiscal year		\$6,558 84

Appropriation	\$5,000 00
Balance from fifty-third fiscal year	1,558 84
Total appropriation, fifty-fourth fiscal year	\$6,558 84
Total expenditures, fifty-fourth fiscal year	6,558 84

**EXPENDITURES OF COMMISSION OF HORTICULTURE FOR THE FIFTY-FIFTH
FISCAL YEAR.**

Books, papers, and periodicals	\$65 55
Engravings, sketches, photos, etc.	230 90
Extra help	58 00
Express	72 42
Freight and cartage	35 80
Fruit-Growers' Convention	136 00
Furniture and repairing	263 12
Miscellaneous	98 53
Microscopic supplies and chemicals	102 05
Parasite food, mailing tubes, etc.	71 20
Reporting vessels	175 00
St. Louis exhibit	103 27
Salary of expert	334 03
Salary of Janitors, San Francisco and Sacramento offices	240 00
Salary of Deputy, San Francisco office	986 65
Traveling expenses of San Francisco Deputy	76 15
Salary of stenographer	600 00
Traveling expenses of Commissioner	420 12
Traveling expenses of Clerk	250 20
Traveling expenses of Deputy Commissioner	211 70
Telephones and telegrams	202 52
Total	\$4,733 21
Appropriation, fifty-fifth fiscal year	\$7,000 00
Expenditures, fifty-fifth fiscal year	4,733 21
Balance unexpended	\$2,266 79

Respectfully submitted.

ELLWOOD COOPER,
State Commissioner of Horticulture.

CONDITION OF ORCHARDS AND NURSERY STOCK IN UTAH AND OREGON.

REPORT ON UTAH CONDITIONS.

SACRAMENTO, CAL., July 29, 1904.

To HON. ELLWOOD COOPER, *State Commissioner of Horticulture*:

SIR: In accordance with your instructions, I have investigated the condition of nursery stock and orchards in Utah, with the view to discovering pests existing there and not found in our State, and which are liable to be imported on nursery stock.

I found no indication of any such diseases as peach yellows or rosette ; nor, so far as I could ascertain, has the plum curculio found its way so far to the west. The Eastern peach-root borer (*Sannina exitiosa*), however, is quite common and is liable to be imported on nursery stock received from that State.

Another very serious pest which has not yet been reported in California exists there on the elm trees. This is the elm scale (*Gossyparia ulmi*). This scale was first found in the United States in 1884, since which time it has been gradually reaching to the West, until it has quite recently been reported from Nevada. In Salt Lake it is one of the most serious pests of the shade trees, hardly an elm tree being free from its attacks, and many of them being fairly covered with the insects. Of course, trees so attacked suffer severely, and many of them are killed through the action of the pest. This scale attacks all varieties of elm and is also found on the alders, but I believe that, so far as known, these are its only host plants. As the elm is one of the favorite shade trees of California, and is grown very extensively through a large part of the State, some endeavor should be made to prevent the introduction of this scale into our territory.

Very many of the pests common in California, I also found more injurious in Utah. The codling-moth and woolly aphis are exceedingly bad on the apple and pear trees. Very many of these trees are old, neglected, and furnish ideal breeding-places for these insects. The San José scale is very injurious in some sections, although it is reported as being on the decrease. Pear blight is found in many of the orchards in the northern part of the State, and the remedies applied are the same as those in vogue in our own State, namely, cutting back the infected portions of the tree and burning the portions cut out.

There is a very capable Horticultural Commission in existence in Utah. The State is divided into four horticultural districts, each having one representative on the board. There is also a provision for county horticultural commissioners, very much like those provided for by our California horticultural law.

The State Board of Horticulture has adopted a set of rules, formulas, and regulations formulated after those adopted by the late State Board of Horticulture of California. These provide for the inspection of orchards, the treatment of infested trees, and especially for the dipping and fumigation of all nursery stock which may be found infested.

I find that some considerable shipments of nursery stock have been made from Utah nurseries into our State, especially into the eastern counties, and I would recommend that the county horticultural commissioners of those counties be instructed to take special pains in examining, for peach-root borers, all such stock as may come into their counties, and wherever any indications of such pests are found that the trees containing them be condemned and destroyed.

I would also suggest that no elm trees be admitted and that all nursery stock coming from Utah be fumigated with hydrocyanic acid gas before it is passed. I think this precaution is necessary in view of the fact that the elm scale is found there and is not existing in our State, and that it is liable to be introduced on any nursery stock that may have been grown in an infested district.

Respectfully submitted.

JOHN ISAAC.

REPORT ON OREGON CONDITIONS.

SACRAMENTO, CAL., September 28, 1904.

To HON. ELLWOOD COOPER, *State Commissioner of Horticulture*:

SIR: Acting under your instructions, I have made an investigation into orchard and nursery conditions in the State of Oregon, and report as follows:

I found a great deal of growing interest being manifested in fruit-raising in the Willamette Valley and other portions of Oregon, the favorite fruits being apples, prunes, and cherries, in the order named. Some attention is also paid to peaches, pears, and the smaller fruits. The apple does especially well, and there is a vast area in the State of Oregon adapted to its cultivation. The prune also does well, the favorite variety heretofore having been the Italian; but as in many sections it has proved an unreliable bearer, the Petit d'Agen is rapidly supplanting it in public favor.

All fruit cured in Oregon is dried by artificial means, and it is neces-

sary to have large and expensive evaporators in order to prepare the prunes and other fruit for the market. This is due to the uncertainties of the drying season, during which time rains are liable to occur and foggy and cloudy weather is prevalent. In this respect, California has a great advantage over her sister State, as we can cure our fruit at much less cost than is possible there. Otherwise, Oregon might become a very serious competitor with California in prune production.

In many parts of the State experiments are now being made with walnuts, which in some sections appear to do well, but in others have been so far a very unreliable crop. It is probable that the experiments now being carried on in the districts in which the walnuts prove profitable will be continued, and we may have to face Oregon as a competitor in this branch of horticulture.

With a view to ascertaining the quality of nursery stock shipped into our State from Oregon, I have visited the principal nurseries of that State, the greater part of which are located near the city of Salem. From a cursory view, I find the stock grown there is generally in good condition, making a thrifty growth and appearing to be free from insect pests or diseases. A great deal of care is exercised on the part of nurserymen in the selection and cultivation of their stock, and so far as that grown in Oregon is concerned, we have little to fear in the way of introduction of new insect pests from this source. The only one which promises to be at all serious is the Eastern peach-root borer (*Sannina exitiosa*), which has been introduced on Eastern stock and may possibly be found on peach, plum, cherry, and other stock grafted on plum or peach roots. The principal nursery stock grown is apple, cherry, pear, and plum. Very little peach stock is raised, the larger part of the peach stock introduced into California from Oregon, as nearly as I have ascertained, being imported Eastern stock.

The State of Oregon has a Board of Horticulture, organized somewhat on the plan of the late State Board of Horticulture of California. It consists of six members, one of whom represents the State at large, and the others represent each of five horticultural districts into which the State is divided. The board has authority to establish quarantine rules and regulations for the purpose of excluding outside pests or diseases, and as the State is a very large one, the districts are necessarily large and the quarantine is lax. It is therefore possible to bring a great deal of Eastern stock into the State without its passing a proper examination. It is in this direction that danger lies, for it is possible for unscrupulous nurserymen or tree agents to bring stock from infested Eastern districts through Oregon into California and introduce it as Oregon-grown stock. There is, of course, no danger of this being done by reliable nurserymen, but the danger still exists that irresponsible tree agents might be guilty of this act. The peach industry of California is a very important

branch of our horticultural interests, and we have carefully guarded against the importation of stock from Eastern districts in which the "peach yellows," "peach rosette," and "little peaches" are prevalent. As there is nothing to indicate the presence of any of these diseases on nursery stock, it has been found absolutely necessary to prohibit the importation of stock from sections in which these diseases exist. If reckless or unscrupulous agents procured stock from such sections, passed it through the State of Oregon, and introduced it into California as Oregon-grown stock, the danger is obvious, and measures should be taken to prevent its entering into our State.

In my interviews with Oregon nurserymen, I found that they are very reasonable and willing to submit to any rules and regulations that may be established in California so long as they are based upon justice, but an idea exists in the minds of some that our laws were framed to bar out outside nurserymen in the interests of California nurserymen. This idea I effaced to the best of my ability, and then found the nurserymen willing to admit the justice of our precautions and inclined to submit to our rules without further protest. I urged upon them the fact that our laws were not passed for the punishment of any class of men, nor to prevent them from doing business with us, but wholly for our own protection; and while our laws and regulations would not bear heavily upon those who were willing to do right by us, they were absolutely necessary to prevent irresponsible parties from introducing serious diseases into our fruit sections.

I also found an objection on the part of some of the nurserymen to the manner in which our laws are enforced. Some of our commissioners are lax in their methods and pass stock after a mere cursory examination, while others are more stringent and examine all stock thoroughly before it is allowed to pass. This difference in the action of our inspectors gives some cause for complaint, and leaves the impression that some shippers are being persecuted by the zealous work of our more efficient officers. The laxity of inspection on the part of others also gives opportunity for the passage of stock without proper examination.

At the time of the coming Fruit-Growers' Convention, the Horticultural Commissioners of the State of California will hold their annual meeting, and I would suggest that on that occasion the subject of a uniform and systematic method of examining all imported stock be considered. The adoption of such a method of examining imported nursery stock would give our State additional security, and would at the same time remove the objection of shippers that they were not being fairly dealt with in some of the counties, while others were lax in their treatment. I would also recommend that importers of stock from districts outside of the State, especially such stock as is liable to be infected with contagious diseases of orchard trees, shall be required to make a

statement as to where such trees were grown. Such statement might be accompanied by an affidavit, if necessary. This would remove the danger to be apprehended from irresponsible importers introducing, through a neighboring State, trees from infected districts in the East, and would give us an additional safeguard against the introduction of such diseases. As these rules would bear equally upon all importers, they would remove the objection made by some that they are being persecuted and are discriminated against for the benefit of our local nurserymen.

I have also heard complaints from nurserymen in our own State of the inequality of the rules established in different counties relative to the inspection and quarantining of nursery stock, and these complaints are as well founded as those made by outside nurserymen. It is therefore incumbent, for the benefit of our fruit-growers as well as with a view to administering justice to both our local nurserymen and shippers of nursery stock, that our Horticultural Commissioners should establish some uniform system of quarantine and inspection.

Respectfully submitted.

JOHN ISAAC.

REPORTS OF DEPUTY COMMISSIONER OF HORTICULTURE.

SAN FRANCISCO, CAL., January 29, 1904.

To HON. ELLWOOD COOPER, *State Commissioner of Horticulture, Sacramento, Cal.:*

DEAR SIR: I herewith present a synopsis of my report from and including May 2, 1903, to December 31, 1903.

During the above period we found plants or fruit upon 128 steamships and sailing vessels from foreign countries, including our island possessions. The importations consisted of 290 cases of trees and plants, and 173 loose lots in the possession of passengers or crew. These latter would consist of from one to ten plants in each lot. Forty-seven cases of trees and plants arrived in San Francisco via Eastern ports from Europe. As a rule, plants from Europe are freer from insect pests and disease than those from Japan, China, the South Sea Islands, or Mexican ports.

Imports of fruit consisted of 13,222 cases, principally semi-tropic fruits, not including bananas. No oranges or sweet limes are, as usual, permitted to enter from Mexico, on account of the "Mexican orange-maggot," and all such fruit from that country found in the possession of passengers on incoming vessels is promptly destroyed. It is usually in the fall months that we find Mexican oranges containing maggots; but on August 12th, the steamship "City of Panama" arrived from Panama via Mexican ports, and we found oranges containing well-developed maggots. On November 19th, Mr. Michael C. Diebold, secretary of the Mexican Consul at San Francisco, called in regard to the refusal of the Southern Pacific Company to accept two carloads of Mexican oranges for California. Mr. Diebold was requested by his government to ascertain under what law we prohibited the entry of such fruit from Mexico. I gave him copies of our bulletin, "Horticultural Statutes of California," and called his attention to Section 4 of our Horticultural Quarantine Law, on page 14. This law, as you are aware, was materially strengthened by the amendment passed by the Legislature last session, which was immediately signed by Governor Pardee.

Mr. Wm. Sproule, General Freight Traffic Manager of the Southern Pacific Company, informed me that they will not give rates upon oranges from Mexico for points in California.

We captured another mongoose; this time from India, via Newcastle, N. S. W., on the ship "St. Francis." We made short work of it with hydrocyanic acid gas.

We are still receiving good reports of the wonderful work of the black scale internal parasite, *Scutellista cyanea*. In the Los Angeles Times of January 3, 1904, Mr. J. W. Jeffrey, Horticultural Commissioner, has the following:

Prolific Insects.—An idea may be formed of the prolific nature of the *Scutellista* from the fact that as many as five hundred full-grown flies are found in one breeding jar of a morning, in the office of the Horticultural Commission of Los Angeles County. I estimate that from 30,000 to 35,000 flies have been distributed throughout the county since the 15th day of last August. This army of insect friends is busy every day, and we have hopes that it will finally extirpate the most destructive scale enemy the farmers have to contend against. I have seen an orchard within the week that seems to have hundreds of thousands of *Scutellista* busily engaged in absorbing the juice of the eggs of the scale. The orchard was not colonized, but the insects came from a distance and have gone through another grove still more remote from the nearest artificial colony.

When we consider that the first colony of this valuable South African insect was sent from this office to Los Angeles on June 9, 1902, and the amount of work it has accomplished in eighteen months, it would seem to indicate that we have at last secured the true enemy of that troublesome pest, the black scale (*Lecanium oleæ*). It is but twenty-four months since we commenced the propagation of *Scutellista cyanea* from three females received from Prof. Charles P. Lounsbury of Cape Town, and in this short time extensive orchards in Los Angeles, Orange, San Diego, and other counties, have been freed from black scale. For the past four months we have been badly hampered in their indoor propagation by our inability to secure suitable trees infested with scale.

From the great variety of fruit and other trees attacked by the black scale, the damage done such trees, and the cost of annually spraying or fumigating to keep the pest partly under control, I believe that one million dollars will be a reasonable estimate of the value of this parasite to California.

This is another instance of the wisdom of California's policy of introducing and fostering beneficial insects. My paper, read before the State fruit-growers at the Fresno convention, December 8 to 11, 1903, gave an extended account of beneficial insects, and what they have done for the horticulturists of California.

Under your instructions I have visited San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, Santa Barbara, Alameda, Santa Clara, Fresno, Sutter, Butte, Yolo, and Mendocino counties, and made special reports to you.

Respectfully submitted.

ALEXANDER CRAW,
Deputy Commissioner of Horticulture.

SAN FRANCISCO, CAL., December 30, 1904.

To HON. ELLWOOD COOPER, *State Commissioner of Horticulture* :

DEAR SIR: I herewith hand you a synopsis of the work of the Quarantine Division, covering the period which extends from January 1, 1904, to July 1, 1904.

During this time plants, trees, and fruit have been found upon one hundred and ten steamers and sailing vessels from foreign countries and from the Hawaiian and Philippine Islands. The receipts consisted of 7,815 cases, boxes, and crates of miscellaneous fruit, exclusive of bananas and vegetables. There were 281 cases and 205 loose lots of plants, the latter in the possession of passengers and crews. Thirty-five cases of plants have arrived from Europe by rail. All the above were carefully examined, and when found even slightly infested with insects or diseases not already existing in the State, they were destroyed, and in other cases were fumigated with hydrocyanic acid gas before they were permitted to pass.

We occasionally find oranges and sweet limes from the maggot-infested districts of Mexico in the baggage of passengers from that country, but no shipments have arrived among the freight, as shippers have learned by past experience that all such will be immediately seized and destroyed upon arrival. However, during the time covered by this report, twenty-four lots of these oranges have been seized from passengers, and burned. The employés of vessels plying between San Francisco and Mexican ports rarely attempt to bring oranges, as they have come to have a strong regard for our horticultural laws.

On January 16th there arrived at this port in the cargo of the "America Maru," from Japan, a shipment of fifty flowering peach trees, which upon examination were found to be infested with *Aulacaspis* (*Diaspis*) *pentagona*. They were immediately seized and the entire shipment, box and all, was burned. This is a very serious pest and one that is not permitted to land under any circumstances.

On February 14th, the "China" arrived from Hong Kong and Chinese and Japanese ports and we found in the possession of passengers ten hand plants (sago palm, dwarf peach, azaleas, and flowering plum), all of which were infested with serious pests and the entire lot was seized and destroyed. This one instance illustrates the danger to be apprehended from the introduction of plants from foreign countries, without proper inspection.

On March 19th, the "Nevadan," from Honolulu, arrived with a shipment of twelve cases of pineapples infested with *Pseudococcus citri* and *Diaspis bromeliæ*. This shipment arrived in bad condition and, upon being notified that the fruit would have to be fumigated, the importers refused to accept it, so the entire shipment was destroyed.

On May 27th, the "Siberia," from Japan, arrived with a package of

bamboo plants marked "P. T. E.," which, upon examination, were found to be infested with *Antonina crawi*, a species of fungus and a Chinese borer. The infested plants were immediately destroyed.

On June 6th the steamer "Ventura" arrived from Australia, and among the passengers was a lady who had in her possession a lot of plants consisting of camellias, Kentia palms, daphnes, and a small fern. The entire lot was found to be infested and was dropped over the side of the wharf, together with the pots and earth.

The most prevalent scale we meet with is the *Diaspis pentagona* and, as it is a very serious pest, it is never permitted to land. Judging from the number of infested plants that arrive and the great diversity of its food plants, it certainly must be very plentiful throughout China and Japan and would cause us no end of trouble and expense, were it to gain a foothold in this State. By experimenting upon it we find that any of our sprays, even when applied five or six times the usual strength, fail to kill the eggs, and the only remedy would be a very heavy dose of hydrocyanic acid gas in such strength that it would be dangerous to apply it to many of our trees or plants, consequently we never permit a single specimen to land, but destroy the plants upon which it is found.

The plants, etc., brought from Europe seem to be much cleaner than those from the Orient; while those from Mexico are usually found to be so badly infested that few are permitted to land. The most prevalent pest in the scale family from Mexico is *Chrysomphalus (Aspidiotus) biformis*, mostly on cocoanut palms, which are promptly destroyed.

From Australia we find plants infested with *Chionaspis citri*, *Ceroplastes rusci*, *Eriococcus araucaria*, *Parlatoria*, and species of *Aspidiotus*.

From Mexico come *Parlatoria*, *Ceroplastes*, *Asterolecanium*, and many species of *Aspidiotus*.

From Germany, *Aspidiotus*, *Chionaspis*, and *Lecaniums*.

From China and Japan we find the largest variety of pests. On biotas, tortrix moths that feed on the foliage; dwarf pines with "basket worms" (*Thyridopteryx*); borers in bamboo; *Diaspis pentagona*, the white circular scale that infests many deciduous trees and a large variety of ornamental plants; many species of aphids, apple moth, *Aspidiotus*, *Parlatoria*, *Lecaniums*, *Pseudococcus*, *Leucaspis*, *Chionaspis*, and *Diaspis*, also black aleyrodes. In fact, it is somewhat unusual to find a shipment of plants from these countries in which we do not discover many that are infested, and as a general precaution we fumigate all cases that arrive before they are inspected, to prevent the escape of anything during the necessary handling.

The presence of fruit flies (family *Trypetidæ*) in many countries, and the recent discovery of several new species, have caused us to pay special attention to this class of fruit-destroyers, and absolutely no fruit from countries where this terrible pest is known to exist is per-

mitted to land and no time is lost in destroying all such, as this pest is a hundred times more to be dreaded than any of the other forms of injurious insects. Both the male and the female of this species are provided with wings, and we know of no artificial means that can be used against them with any success; even inclosing the trees in a tent made from netting proves but a slight barrier against their onslaught. At this port every precaution has been taken to keep them out, but it will require the closest attention and most drastic measures if we are to remain free from their attacks.

With the great increase in ocean traffic in general, the work of this division is increasing so rapidly that our limited force has all it can possibly do to keep abreast thereof, and we can not devote as much time to this branch of the work as it really demands.

The work of propagating and distributing beneficial insects, which is conducted in connection with the regular quarantine work, has taxed this division to its utmost in order to supply the applications that have been received for colonies of parasites and insect enemies of the various pests now existing within the State. The wonderful work in the orchards of this State of the *Scutellista cyanea*, the South African internal parasite of the black scale (*Saissetia oleæ*), has surpassed our most sanguine expectations. With only three female flies for a start to stock the entire State, the great results that have been accomplished in two years are almost beyond belief. The most flattering reports have been received from nearly every section of the State where these insects have been liberated, some stating that they had accomplished more than was expected from them. The greatest difficulty experienced has been in the matter of procuring suitable material for the work of propagation, which is carried on in our office. Our propagating room is quite small, and much of the space has to be used for the propagation of the many other species we keep constantly on hand. Another source of trouble we have to contend with is the matter of food for the parasites, as they are voracious feeders. Each species requires a different food, and many of these food pests have become so scarce that it is with great difficulty we can procure sufficient material to carry on the work of propagation; on many occasions it became necessary to go quite a distance into the country to even get a small supply of food. Our limited space will not permit us to propagate our own food plants. Were this possible, we could facilitate matters materially, as most of our time is required along the water front in the inspection of the steamers that arrive from foreign ports.

A year ago the value of the *Scutellista cyanea* to the citrus industry alone was placed at \$1,000,000. Then this insect was not one quarter as well established as at the present writing. What its value is to-day can only be guessed at, as its work is second only to that of the *Vedalia cardinalis*, the Australian enemy of the cottony cushion scale.

Colonies of beneficial insects have been sent, by special request, to Italy, Cuba, Mexico, West Indies, England, and West Australia; and in the United States, to Louisiana, Colorado, and Illinois. The following table will give a good idea of the volume of beneficial and parasitic insects which have been sent out from the office during the last fiscal year:

Variety	No. of Colonies.	Average in Each Colony.	Total Insects.
<i>Scutellista cyanea</i>	680	20	13,600
<i>Comys fusca</i>	430	45	18,550
<i>Vedalia cardinalis</i>	182	15	2,730
<i>Rhizobius ventralis</i>	21	25	525
<i>Novius koebelei</i> ..	14	15	210
<i>Cryptolæmus montrouzieri</i>	16	15	240
Miscellaneous parasites.....	25	20	500
	1,368		36,355

All the above work has caused our correspondence to largely increase, especially since the good work of the *Scutellista cyanea* became known. Coupled with this is the general correspondence pertaining to quarantine work and horticultural and entomological subjects.

In regard to the quarantine work proper, the following table will show the work of this department during the last fiscal year as compared with the work done in the fiscal year 1902-03. According to a report of the commercial organizations of San Francisco, the volume of business in 1903-04 as compared with 1902-03 shows an increase of nearly one million tons in the merchandise which passed over the wharves on the water front, including large shipments of fruit and nursery stock. This also shows a material increase in the line in which this department is so vitally interested.

Year ending June 30.	Vessels Inspected.	Cases of Plants.	Loose Lots of Plants.	Packages of Fruits.
1903.....	119	161	125	8,825
1904.....	220	615	366	19,889
Increase	101	454	241	11,064

Respectfully submitted.

EDW. M. EHRHORN,
Deputy Commissioner.

CORRESPONDENCE

ON THE

MEXICAN ORANGE-MAGGOT.

THE MORELOS ORANGE-MAGGOT.

The discovery of the Morelos orange-maggot (*Trypeta ludens*) in several small shipments of Mexican oranges arriving in San Francisco, and the information received to the effect that this pest is spreading into all the orange sections of our sister republic, led to the establishment of a strict quarantine against Mexican oranges. In view of the great importance of the citrus industry in our State, involving thousands of acres in orchards, and an investment of millions of dollars, this quarantine was an absolute necessity. We are now producing from 25,000 to 35,000 carloads of citrus fruits annually, and the orange-maggot is unknown in our State. Should it once obtain a foothold here, our greatest and most profitable horticultural industry would be ruined. It is in the interest of our State and for the protection of our orange-growers that this embargo against Mexican oranges and sweet limes has been laid. In this beneficent work we have been willingly and effectively aided by the Southern Pacific Railroad Company, which refuses to bring such fruit into our State over its lines. Many of the Mexican growers misunderstand our motives in this matter, and assume to believe that it is an attempt on our part to prevent Mexican fruit from being sold in our market. This misapprehension has led to a voluminous correspondence between the Mexican Government and our State Department and between the latter and the Executive Department of California. Following is such correspondence:

[Copy.]

SAN FRANCISCO, November 19, 1903.

WM. SPROULE, ESQ.,

Gen'l Freight and Traffic Mgr., S. P. Co., San Francisco, Calif.:

DEAR SIR: The Secretary of the Consulate General of Mexico, Mr. Michael C. Diebold, called to-day in relation to the importation of Mexican oranges and the refusal of the S. P. Co. to accept two cars of oranges from Mexico for California.

We gave him copies of the State horticultural law, and pointed out the danger of importing oranges from that country and the effect it would have on the production and transportation of one of the principal products of our State.

Thanking your company, on behalf of the orange-growers of California, for the protection extended to their industry, I am,

Yours very truly,

(Signed:) ELLWOOD COOPER,
Commissioner.

Per C.

[Copy.]

Subject: Exclusion of Mexican Oranges from California.

OFFICE SOUTHERN PACIFIC COMPANY, November 20, 1903.

MR. ELLWOOD COOPER,

State Commissioner of Horticulture, Ferry Building, San Francisco:

DEAR SIR: I thank you for your favor of the 19th inst.

As a matter of transportation we would like to carry Mexican oranges to California, but our greater interest is in maintenance of the standard of the California orange, and we are not willing to let any immediate profit count as against the safety of the California orange orchards.

We have pointed out to the railroad officials in Mexico that if Mexican oranges reach the California boundary line they are very apt to be either turned back or destroyed under the California horticultural laws, and have cautioned our people to like effect for the purpose of preventing disaster to the Mexican orange shipper and difficulties for the California authorities.

Are we correct in this position as to the action of the State authorities with respect to such oranges reaching the State boundary? What would you do if we brought them?

Yours truly,

(Signed:) WM. SPROULE.

[Copy.]

SAN FRANCISCO, November 23, 1903.

WM. SPROULE, ESQ.,

General Freight Traffic Mgr. S. P. Co., City:

DEAR MR. SPROULE: Your favor of the 20th inst. (179-3) to hand. The reason for the enactment of the law excluding Mexican oranges from California is because the oranges of that country are infested with a very destructive pest, known as the "Mexican orange-maggot" (*Trypeta ludens*). This insect is supposed to be indigenous to the State of Morelos, Mexico. Upon the advent of the railroads into that country, and quick transportation, the maggots of this pest have been carried all over Mexico, until to-day possibly only the orange groves of Lower California are free from it.

Should such a pest be introduced into this State the consumption of our oranges would decrease and the profit in growing, handling, and the transportation of same would be practically destroyed.

In reply to your question, "What would you do if we brought them?" As this pest is not found in California, we would be governed by Section 4 of our Horticultural Quarantine Laws, a marked copy of which we send you under separate cover. Thanking you for your prompt attention, I am,

Respectfully yours,

(Signed:) ELLWOOD COOPER.

Per C.

DEPARTMENT OF STATE, WASHINGTON, February 4, 1904.

His Excellency the Governor of California, Sacramento, California:

SIR: I have the honor to inclose herewith, for your consideration, a copy of a note from the Mexican Ambassador, calling attention to the measures taken by the authorities of the State of California to prevent the entrance into this country of the caterpillar, so called, known as the "Morelos," and requesting, in view of the injury to the business of exporting oranges from Mexico, that the restriction placed on such business in consequence of said measures, be removed.

I have the honor to be, sir,

Your obedient servant,

(Signed:) J. B. LOOMIS,

Acting Secretary.

Enclosures: From Mexican Ambassador, No. 499, January 21, 1904, with two enclosures.

[Translation.]

No. 499.

EMBASSY OF MEXICO, TO THE UNITED STATES OF AMERICA,
WASHINGTON, January 21, 1904.

MOST EXCELLENT SIR: I have the honor to forward to you, by special direction of my Government, the enclosed copy of a note that has been just addressed to me by the Department of Foreign Relations of Mexico, together with a copy, also enclosed, of a dispatch of the Consul of the Republic of San Diego to the same department, from which you will please notice the difficulties opposed by the authorities to the importation of Mexican oranges.

I trust that the Government of the United States, which is so decidedly favorable to the furtherance of the friendly and cordial relations that are daily growing broader and closer between Mexico and the United States, will receive as well founded the complaint of the Mexican growers and endeavor to remove, if practicable, the present restrictions that are so detrimental to Mexican fruit exporters.

Accept, Excellency, etc ,

M. DE AZPIROZ.

Enclosure: as above.

[Translation.]

OFFICE OF THE
SECRETARY OF STATE AND OF THE DEPARTMENT OF FOREIGN RELATIONS,
MEXICO, January 9, 1904.

The office of the Secretary of the Treasury officially writes me the following note, No. 6545 and date of December 28, last:

"Your postal note No. 1592 of the 2d instant, with which you are pleased to quote the report submitted by the Consul-General of Mexico in San Francisco, California, in regard to measures enforced in said State, for reasons therein stated, to forbid the introduction of Mexican oranges into said State, has been received.

"In reply I have the honor to say that, as shown in the report here referred to, the measures in question seem to tend rather to prohibit the importation of Mexican oranges than to avert the propagation of the pest mentioned, and are no doubt dictated by the competition the Mexican orange is apt to set up with the California fruit, owing to the former being earlier than the latter, and probably of a higher grade; these measures, therefore, do not appear to be warranted, and this Department is of the opinion that, in order to bring an end to this condition of things, which works injury to orange-growers of this country, it would be very advisable to take up the matter diplomatically with the Government of the United States, and to authorize and suitably instruct our Ambassador at Washington to that effect."

I transcribe the foregoing to you for proper action with reference to the report submitted by the Consul-General of Mexico, at San Francisco, on the 24th day of November last, and no doubt communicated to you by the said officer, and I append a copy of the dispatch written to this Department on the subject by the Consul at San Diego, California, under date of the 29th of October of last year.

I renew to you my distinguished consideration.

(Signed:) MARISCAL.

The Ambassador of Mexico,
Washington.

[Translation.]

No. 39. Prohibition of Mexican oranges and lemons.
OFFICE OF THE SECRETARY OF STATE, AND OF THE DEPARTMENT OF FOREIGN RELATIONS,
CONSULATE OF THE MEXICAN UNITED STATES AT SAN DIEGO, CALIFORNIA.

SAN DIEGO, CALIFORNIA, October 29, 1903.

The "San Diego Union," of this date, publishes the text of a letter sent to the Collector of Maritime Customs by the Commissioner of Horticulture of this State, in which he positively orders him not to allow, except under certain conditions, the landing of

oranges and lemons from Mexican ports, which fruit he declares to be generally infested with a caterpillar known as the "Morelos."

I have ascertained at the custom house of this port that these instructions exist and that they are disposed to carry them out if the occasion arises.

Although fruit rarely comes to this port from San José del arbo, I hasten to bring the matter to your high knowledge for such action as may be expedient; in my opinion these precautionary measures and the quarantines declared against Mexico cattle are nothing more than schemes of the monopolists of this country to keep out of the American markets foreign goods likely to compete with theirs in respect to prices.

I have the honor to forward herewith the clipping of the "Union" above referred to, with a translation.

I renew to you the assurances of my most respectful consideration.

(Signed:) A. V. LOMELI.

The Undersecretary in charge of the Department of Foreign Relations, Mexico, D. F.

A true copy: Mexico, Jan. 9, 1904. José Algara, Undersecretary.

[Copy.]

No. 442.

DEPARTMENT OF STATE, WASHINGTON, February 5, 1904.

EXCELLENCY: I have the honor to acknowledge the receipt of your note No. 499, of the 21st ultimo, calling attention to the measures taken by the authorities of the State of California to prevent the entrance into this country of the caterpillar, so called, known as the "Morelos," and requesting, in view of the injury to the business of exporting oranges from Mexico, that the restrictions placed on such business in consequence of said measures, be removed.

In reply, I have the honor to inform you that copies of your note and of its inclosures were sent to the Secretary of Agriculture for his consideration and appropriate action. In a letter dated the 2d instant, the Secretary of Agriculture says:

"The Morelos orange fruit worm is a maggot which seems to be rather generally distributed throughout Mexico. It is a dangerous enemy to oranges, attacking the fruit. The fly lays her eggs upon the green fruit and the resulting maggots burrow through the pulp and eventually cause the rotting and destruction of the orange. This insect has not as yet obtained a foothold in the United States. The yearly importation of Mexican oranges into southern California, however, constitutes a constant source of danger"; and he adds that there seems to be nothing that the Department of Agriculture can do in the premises; that the Federal Government has no quarantine regulations against this insect; that the matter is one for the authorities of the State of California to deal with; and that the constitutionality of the California State law on the subject has been upheld by the courts.

In consequence of the views thus expressed by the Secretary of Agriculture, copies of your note and of its inclosures have been this day sent to the Governor of California for his consideration.

Accept, Excellency, the renewed assurance of my highest consideration.

FRANCIS B. LOOMIS, Acting Secretary.

To His Excellency, Señor Don Manuel de Azpiroz, etc.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
February 11, 1904.

HON ELLWOOD COOPER, *Santa Barbara, Cal.:*

DEAR SIR: I send herewith a letter from the Acting Secretary of State at Washington and also a copy of a note from the Mexican Ambassador, accompanying which latter is a communication from the Mexican Consul at San Diego. The subject-matter is one in which I know that you are interested, and I would be glad to have you report to me regarding the action taken by your department, and to have you give the reasons for the same, in order that I may reply to the complaint made by the Mexican authorities.

Very truly yours,

(Signed:) GEO. C. PARDEE, Governor.

SANTA BARBARA, February 16, 1904.

To His Excellency, DR. GEORGE C. PARDEE, Governor of California:

SIR: I received your letter of the 11th, transmitting to my department certain communications concerning the quarantine regulations practiced in this State.

First—A letter issued by the Mexican Consulate at San Diego, addressed to the Secretary of State of the Republic of Mexico, dated October 29, 1903.

Second—A letter from the Department of State, Mexico, dated January 9th, to the Ambassador at Washington.

Third—A letter from the Mexican Embassy to the Honorable Secretary of State of the United States, dated January 21st.

Fourth—A letter from the Department of State, addressed to your Excellency, dated February 4th.

All of the communications have had my careful consideration.

In answer to the first communication I will state that I had instructed the Collector of the Port at San Diego, as also the county horticultural officer, not to permit the landing of oranges or sweet limes from Mexico at that port, on account of the danger of introducing what is known as the "Morelos orange-maggot" (*Trypeta ludens*), or if landed to destroy. The statement as to lemons is a mistake. The "Morelos orange-fly" has not been known to attack either the lemon or lime. Similar orders have been given to the custom officers at the port of San Francisco.

Mexican oranges or sweet limes can not be landed and sold in the San Francisco market.

Deciduous fruits from Australia are prohibited on account of the danger of introducing the Australian fruit-fly. All melons of every kind from the Hawaiian Islands are also prohibited on account of the melon-maggot.

As to the ravages of the Australian fruit-fly and melon-maggot we have advised our sister states, Oregon and Washington, to pursue the same course.

Regarding the quarantine of Mexican cattle, this does not come within the province of my department.

These fruit-flies are beyond any question the most serious fruit pests known up to the present time.

I beg to call your attention to Section 3 of the amended Act passed by the Legislature February 16, 1903. I herewith attach a printed copy of said Act.

There is no way known by which the "Morelos orange-maggot" can be disinfected. The larva enters the fruit, through the rind, into the pulp by a hole not much larger than would be made by a common sewing-needle. Sometimes this hole is completely closed up after the entrance of the larva, so that an observer could not detect the opening.

The larva lives on the pulp, and grows to mature size. The orange collapses and falls to the ground. Then the larva seeks a hiding place and goes into the chrysalis state, and from this is hatched the perfect insect to continue the terrible work.

I have examined numerous fruits, and have found maggots where no entrance could be detected; hence the impossibility of any examination to protect our orchards, save that of cutting open every individual fruit.

We have had reports from several of the coast ports in Mexico, also from cities of the interior, and from personal knowledge feel that it would not be safe to allow any oranges or sweet limes from that country to go into consumption in California.

The fears of our orange-growers are well stated in a copy of a letter, also attached. This letter reflects the sentiment of all our orange-growers. We have frequent communications of this character.

To openly permit the introduction of the "Morelos orange-fly" might cost millions to our orange-growers, while it could not benefit the industry in Mexico.

California offers nothing as a market for this fruit, as with our numerous varieties and local differences in climate we have ripe oranges every month in the year.

No neighbor could wish to introduce into a friendly state an enemy so destructive, and especially one for which there is no known remedy.

I have heretofore on several occasions warned our people against this danger, and appealed to the Legislature for funds to investigate this orange pest. It is my purpose,

when funds are furnished, to send a competent investigator to study, and secure a remedy; therefore I shall strive to encourage the most friendly relations with Mexico and will ask that government to give every assistance possible in the investigation.

From the tenor of the correspondence it is inferred that our rigid quarantine is rather to prevent competition than to avoid a dangerous pest. We shipped last year out of the State 25,000 carloads of citrus fruits. The production is increasing so that the only competition that can affect us is what we have to meet in the Eastern markets.

I am satisfied that these honorable gentlemen of our sister republic have been misinformed, or that they have no conception of the grave danger of the spread of this pest, otherwise such a motive would not have been charged.

I have the honor to be

Your obedient servant,

ELLWOOD COOPER,
Commissioner of Horticulture.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
February 25, 1904.

SIR: I have the honor to submit herewith a copy of a communication received from Hon. Ellwood Cooper, State Commissioner of Horticulture, with reference to the complaint made by the Mexican Ambassador in his note of January 21, 1904, concerning the policy of the State of California in excluding Mexican citrus fruits.

I desire to say that, to the best of my knowledge and belief, the statements made by the Horticultural Commissioner respecting the danger to be apprehended from a free introduction of Mexican oranges are true, and not exaggerated. It is the belief of all orange-growers in California that the so-called Mexican orange-maggot is one of the most destructive insect pests ever known, and that, should it gain lodgment in our orange orchards, an industry which amounts to millions annually would be seriously injured, if not entirely destroyed.

I am, sir,

Your obedient servant,

GEO. C. PARDEE,
Governor of California.

*The Secretary of State,
Washington, D. C.*

MARCH 3, 1904.

SIR: I have the honor to submit herewith copies of certain correspondence between the State Horticultural Commissioner, Hon. Ellwood Cooper, and the General Freight Traffic Manager of the Southern Pacific Company, relative to the importation of Mexican oranges into California. I beg to request that you will submit this correspondence to the Mexican Ambassador, and ask that the same be considered in connection with the report by Mr. Cooper on the same subject, which was recently forwarded to you.

I have the honor to be, sir,

Your obedient servant,

GEO. C. PARDEE,
Governor of California.

*The Secretary of State,
Washington, D. C.*

Enclosures: 4.

DEPARTMENT OF STATE, WASHINGTON, March 10, 1904.

The Honorable, Governor of California:

SIR: I have the honor to acknowledge the receipt of your letters of the 25th ultimo and the 3d instant, showing the reasons for the policy of the State of California in excluding Mexican citrus fruits.

In reply, I have the honor to inform you that copies of your letters and of their enclosures have been sent to the Mexican Ambassador for the information of his Government.

Thanking you for the full and prompt information communicated with your letters.
I have the honor to be, sir,

Your obedient servant,

(Signed :) JOHN HAY.

DEPARTMENT OF STATE, WASHINGTON, September 6, 1904.

His Excellency, the Governor of California, Sacramento:

SIR: Referring to your letters of February 5th and March 3d last, I have the honor to enclose herewith for your consideration a copy of a note from the Mexican Ambassador, conveying an invitation from his Government to the authorities of California to send a commissioner who, jointly with one appointed by that Government, will visit the orchards in the State of Sonora and investigate the pest that attacks the orange and sweet lime.

I have the honor to be, sir,

Your obedient servant,

ALVEY A. ADEE,

Acting Secretary.

Enclosure: From Mexican Ambassador, No. 25, Aug. 23, 1904.

[Translation. No. 25.]

EMBASSY OF MEXICO, TO THE UNITED STATES OF AMERICA,
ALLENHURST, N. J., August 23, 1904.

Honorable Mr. Assistant Secretary:

Your department, in its note No. 450 of the 10th of March last, sent me copies of various communications setting forth the grounds on which the authorities of Texas (California) prevent the importation of oranges and sweet limes from Mexico into that State.

This correspondence was forwarded to me by my Government and, after earnest consideration, was made the subject of an opinion of the Ministry of Fomento, which has been communicated to me by the Department of Foreign Relations and is to the effect that an invitation be extended to the authorities of California to send a Commissioner who, jointly with one appointed by my Government, will visit the orchards in the State of Sonora, and investigate the pest that attacks the above-mentioned fruits in the parts of my country where it exists, in accordance with the proposition made by Mr. Ellwood Cooper, Commissioner of Horticulture, to the Governor of California in his official letter of the 16th of February of this year, which formed part, and a very important part, of the correspondence above referred to.

My Government, looking upon Mr. Ellwood Cooper's motion as one that affords an easily executed expedient whose object would be of great importance to the growers of citric fruits in both countries, has approved the opinion of the Ministry of Fomento and has directed me to ask that the Government of Texas (California) be advised through your department that my Government invites it to send a commissioner as above indicated to the end of seeking a remedy against the orange pest which Mr. Ellwood Cooper proposes to find, with the co-operation of the Mexican Government.

I have the honor to communicate the foregoing to you with the request that you make it known to the Governor of California to the desired ends.

I reiterate, etc.,

M. DE ASPIROZ.

SACRAMENTO, CAL., October 17, 1904.

To His Excellency, DR. GEORGE C. PARDEE, Governor of California :

DEAR SIR: I have before me the correspondence you have submitted concerning the investigation of the orange fruit-fly (*Trypeta ludens*), commonly known as the Morelos orange-maggot.

The letter from the Department of State dated September 6, 1904, addressed to your Excellency, enclosing translation No. 25, Embassy of Mexico to the Department of State, Washington, dated August 23, 1904.

This letter from the Embassy extends an invitation to California to send a commissioner to join a representative from the Mexican government to investigate the insect pest as above mentioned, looking toward the discovery of a parasite, or other methods that will destroy, and keep in check, this serious enemy to the orange and the sweet lime. This correspondence is in the line of a suggestion made by me in a former correspondence regarding the ravages of this terrible pest.

I see no reason why such an expedition should not be consummated. It will give me great pleasure to do anything that is within my power to relieve our sister republic from the destructive enemy, and it may be of equal importance to the orange industry of our own State.

Therefore, if it is agreeable to the views of your Excellency and within the scope of the law creating the Horticultural Commission, I will arrange to have a competent expert to go on this mission about the end of February next. The proper time to make the investigation will be the date above mentioned, as the fly does not begin the deposit of eggs until the oranges are well colored.

I will also state that it is not only the province of Sonora, but many parts of Mexico that will have to be visited, as the pest is known to be generally distributed in other provinces.

Have the goodness to request the appointment of a commissioner by the Mexican government, and that I be informed, so that I can communicate the time and place where the commissioners shall meet.

I have the honor to be,

Your obedient servant,

ELLWOOD COOPER,
Commissioner of Horticulture.

EXECUTIVE DEPARTMENT, SACRAMENTO, October 26, 1904.

SIR: I have the honor to report that, after receiving your communication of September 6th, with which was enclosed a copy of a note from the Mexican Ambassador conveying an invitation from his Government to the authorities of California to send a commissioner to the State of Sonora, Mexico, to investigate the orange pest, I communicated with the State Horticultural Commissioner of California, and have now received from that official a letter bearing the date of October 17th, a copy of which is enclosed herewith.

I beg that you will communicate to the Mexican Ambassador the information that the authorities of this State will gladly adopt the suggestion made by the Government of Mexico to have a joint investigation of the orange and lime pest on the lines which have been suggested. The details of this investigation will be arranged by the State Commissioner of Horticulture of California, in co-operation with the Mexican authorities.

I have the honor to be, sir,

Your obedient servant,

GEORGE C. PARDEE,
Governor of California.

*The Secretary of State,
Washington, D. C.*

Enclosure: 1.

REVIEW OF THE FRUIT
SEASONS.

REVIEW OF THE FRUIT SEASONS.

SEASON OF 1903.

The season of 1903, while falling below general expectations in the total quantity of fruit produced and handled, was nevertheless a fairly good one, and shipments of most varieties exceeded those of former years.

The **cherry** crop fell below normal, but was of good quality. Shipments of fresh fruits for the season opened, practically, with a carload from Vacaville on May 9th. Some small shipments had been made prior to that date, but this was the first commercial shipment. The cherry crop of this year ripened gradually, and shipments continued without loss to the end of the season.

Apricots were a fairly good crop, the earlier varieties turning out heavily. The quality, however, was below average, as shot-hole fungus was very prevalent in many of the apricot sections and much of the fruit was badly spotted.

Peaches were a very fair crop. The early varieties were somewhat below the normal output, but the later varieties were a full average crop. As a rule the orchards were in good condition and the fruit of excellent quality. Prices received were generally fair and shipments in excess of former years.

Prunes.—Owing to the lack of rainfall throughout the principal prune sections of the State, it was generally predicted that the prune crop would be a very light one. But while some of the leading prune sections fell below normal in their output, there were sufficient new orchards coming on in other portions of the State to very nearly compensate for this shortage, and the crop was very nearly a normal one. The low prices which have prevailed for this fruit, however, interfered with its sale, and shipments of fresh prunes and plums fell below those of former years. Late plums brought a better price and the shipments were heavier.

Pears were a very good crop, but owing to the pear blight in many of the principal pear sections of the San Joaquin Valley, the crop fell somewhat below the usual output. Shipments were also lighter than usual, but prices were very fair.

The **apple** crop was a good one in all sections of the State. Heavy shipments were made, especially from the Pajaro Valley, and prices as

a rule were satisfactory. As persistent spraying was carried on against the codling-moth in this section, the fruit was of better quality and there was a less percentage of wormy apples.

Olives yielded very heavily and a very large pack of both pickled fruit and oil was put up. In the southern counties especially the olive crop was one of the largest ever produced. Prices as a rule were fair to good, and the olive-growers had a successful season.

Grapes of all kinds—wine, raisin, and table—turned out very heavily, and the raisin pack was the largest ever put up in the State. Prices, however, ruled so low that there was very little profit in raisins for the growers, and large quantities of raisin grapes were sent to the wineries. This had the effect of depressing the price of wine grapes which brought the growers much less than was expected. Table grapes were very good and a very profitable crop. Shipments of these were continued late in the season and brought the shippers very good returns.

Nuts.—On the whole, while there was some disappointment, the season of 1903 was an average one for the producers of California. The almond crop was a very good one, but the walnuts were not up to the average. The walnut blight affected large numbers of trees in the principal walnut sections, and large quantities of nuts were either rendered worthless or very greatly reduced in value; and while there was a fairly good output of walnuts, the quality was far below average and prices were seriously affected in consequence.

SEASON OF 1904.

The season of 1904 has been a disappointment. It was expected early in the season that there would be a very large fruit crop, as the trees had set very thickly with fruit buds and blossomed freely; but it was soon observed that the fruit had not set, the blossoms dropped, and very many of the trees were bare. This was especially true of peaches, apricots, plums, and prunes. At the time of the opening of the blossoms the greater part of the State was visited by very heavy rains and severe winds, which destroyed the pollen in the blossoms and prevented fertilization. As a result the greater part of the blossoms were infertile and dropped without forming fruit.

Cherries fell somewhat below normal in quantity, but the crop was spotted and varied in different sections. In Alameda and Santa Clara counties, the principal cherry-producing counties of the State, the crop fell very much below the usual output. In other parts the crop ranged from fair to good; but taking the State at large, it has been a light crop. Shipments were fairly good, and prices received have been better than usual. The quantity used by the canneries has fallen very much below the average year.

Apricots are reported in very much the same condition generally. The crop has been a light one, although in some sections it has turned out well. In Ventura County, where it is a very important crop, it gave fairly good returns, although not coming up to the general quantity. In some sections of southern California, the apricot crop is reported good; but such sections were the exception, and on the whole it has been a light crop. There was an active demand for this fruit at the canneries and good prices were offered.

Pears.—While falling below the usual output, the pear crop of the State has been fairly good, much better than other classes of fruit. In the counties around the bay, pears have been light, but in Sacramento County, where it is one of the principal fruit crops, and in other counties of the Sacramento Valley, pears have turned out fairly well, and the crop on the whole has been a comparatively good one. Pear blight has practically destroyed this crop in the upper San Joaquin Valley, and has gained a foothold in Sacramento County and in the Sacramento Valley. This has somewhat reduced the output for the present year and may seriously interfere with it hereafter. General reports of the pear crop as compared with other fruit crops of the State indicate a very good yield. Prices have been better than usual and the demand good.

Peaches, more than any other fruit, suffered from the very heavy rains during the blossoming season, as they were in full blossom at the time the rain came. This crop has been an exceedingly light one; in fact, we have had the lightest peach crop known since California became a producer of this fruit. In many sections it was a total failure, in most others it was very light, and in few counties was there even a fair crop. Prices have ranged very high, and canneries have paid as high as \$60 to \$65 per ton for canning purposes.

Prunes have yielded much better than was anticipated early in the season, and they reach very nearly the normal output. This fruit suffered somewhat from the severe weather of the early spring, and the crop is therefore lighter than it would have been; but prunes are grown all over the State and there is generally a good crop in some portion of it. New orchards are also coming into bearing continually, so that the total output usually reaches the normal even under adverse conditions. In the principal prune section, in Santa Clara and surrounding counties, the crop fell somewhat below the normal, but even here it turned out better than was expected when the fruit began to set. There has been little demand for dried prunes, the market is demoralized, and prices are so low as to leave very little margin of profit for the growers' outlay of labor.

Apples, especially in the coast counties, have been a very light crop and in some counties a total failure. In the Pajaro Valley, the prin-

incipal apple section of the State, the yield has been very far below normal and the quality inferior. Strenuous work has been done in this district against the codling-moth, with fairly good results; but this year the crop was so light that many growers became discouraged and gave up the work, and as a result there was a great deal of wormy fruit and the quality fell very much below the average. At Lompoc, Santa Barbara County, the second important apple section, conditions were somewhat better, but not in any respect up to the normal. Reports from the apple sections in the mountains are somewhat better and the crop in these parts has been a fairly good one, but even here not reaching the usual average in either output or quality. Shipments have been correspondingly light and prices unsatisfactory.

Citrus Fruits.—The yield of citrus fruits has been nearly up to normal, although falling somewhat below early expectations. Shipments have been very heavy, but losses early in the season demoralized the growers and large quantities of fruit were lost or left to rot on the ground. Later shipments brought better returns. The fruit generally has been of excellent quality and the orchards are reported in good condition.

Olives, which in southern California yielded an extraordinarily heavy crop in 1903, yielded a correspondingly light one the present year. This is due probably to overbearing the preceding year and the habit of the trees in seeking a comparative rest from the other year. In northern counties conditions have been somewhat better, and while a light crop is reported, in some sections it has turned out fairly well.

Figs.—More attention is being paid to this fruit than ever before. The success attained in the production of the genuine Smyrna fig by the introduction of the fig wasp has given an impetus to fig planting, and a very large acreage is being put out to figs in the San Joaquin and Sacramento valleys. The output has been heavier this year than ever before and the crop has been a good one.

Grapes blossomed very freely early in the season and set very heavy. The crop of all varieties was unusually heavy, but late rains coming at the time the fruit was ripening, very seriously injured the crop and the total output was greatly affected thereby. Much of the damaged fruit found its way to the wineries and very much of it was rejected. Notwithstanding, the pack of raisins has been exceedingly heavy and the wineries have reported having put up their usual pack, while shipments of table grapes were heavy, especially in the early part of the season. The shipments of table grapes were cut short by early rains and stopped a full month earlier than usual. Prices for both wine and

raisin grapes have reached a very low ebb, but table grapes are still commanding a fair price in the market.

Almonds.—The almond crop was almost a failure. In the principal almond sections there were very few nuts on the trees, and in no part of the State was there a normal crop. This was due to early climatic conditions, which affected the fruit at the time of its forming.

Walnuts have yielded better than usual and very much better than was expected. The walnut blight, which has done very much damage in southern California during the past few years, did but little damage the present season, and reports from Santa Barbara, Ventura, Los Angeles, and Orange counties, in which the principal walnut orchards are found, all indicate that the growers have had fairly good crops of good fruit and prices have been unusually high. The walnut crops this year have been better than any other class of fruit crops.

Small fruits have generally turned out well. The crop of blackberries, especially in Sonoma County, where the fruit is very largely raised, was very heavy. Strawberries have yielded well and all other small fruits have come fully up to the normal. Prices generally have been good and the demand lively. Owing to the shortage of other fruits, small fruits have been in more active demand this season than usual.

MOVEMENTS OF FRUITS.

Fresh Deciduous Fruits.—Shipments of fresh fruits out of the State during the year 1903 exceed those of 1902 by 377 cars. This increase was due to several causes: the small peach crop in the East, a good crop in our own State, and the efforts made by the California Fruit Distributors to widen the market. The past year, however, shows a heavy decrease, due to the shortness of our fruit crop, and the more active home demand for canning purposes.

Shipments of Deciduous Fruits for the Past Five Years.

In carloads.

Variety.	1900.	1901.	1902.	1903.	1904.
Cherries	235	198½	245¾	211	209
Apricots	157	177½	221¾	231¼	97
Peaches	1,374	1,892½	1,777	1,816¾	559
Plums	1,106¼	977¼	1,480¼	1,129½	1,053
Pears	2,099¾	1,535¼	2,005	1,694	2,186
Grapes	765	944	1,010¾	1,717¾	1,451
Apples	256	540¾	335½	456¼	-----
Mixed	25½	39¼	20	148½	71
Totals	6,018½	6,205	7,096	7,405	5,626

Itemized Fresh Deciduous Fruit Shipments.

From north of Tehachapi only. In carloads. To December 1.

Destination.	1899.	1900.	1901.	1902.	1903.	1904.
New York.....	1,694	1,527	1,482	1,476	1,680	1,202
Chicago.....	1,060	1,101	1,273	1,298	1,256	924
Boston.....	710	649	639	746	846	493
Philadelphia.....	339	212	257	295	384	206
Minneapolis.....	247	302	275	417	203	210
Omaha.....	194	240	205	165	129	45
St Paul.....	125	131	108	267	217	127
Montreal.....	128	126	128	102	107	94
Denver.....	269	233	246	104	109	45
Kansas City.....	165	129	85	101	109	42
New Orleans.....	126	136	118	165	241	131
St. Louis.....	115	79	64	94	142	146
Milwaukee.....	60	68	62	68	41	40
Pittsburg.....	137	144	167	276	297	150
Cleveland.....	83	63	58	101	106	63
Cincinnati.....	89	35	29	51	64	30
Baltimore.....	67	34	23	63	84	56
Buffalo.....	34	10	32	28	25	12
Export.....	176	270	165	237	218	131
Minor points.....	1,051	946	1,043	1,083	1,411	1,474
Totals.....	6,869	6,435	6,459	7,136	7,670	5,626

Varieties of Fruit Shipped.

In carloads.

Variety.	1899.	1900.	1901.	1902.	1903.	1904.
Pears.....	1,684	2,115	1,535	2,011	1,719	2,186
Peaches.....	2,625	1,561	1,901	1,777	1,857	559
Grapes.....	847	825	966	1,033	1,804	1,451
Plums and Prunes.....	885	1,158	936	1,473	1,145	1,053
Cherries.....	85	238	110	245	211	209
Apricots.....	90	152	201	222	241	97
Apples.....	490	512	739	359	671	43
Quinces.....	19	10	13	10	19	18
Nectarines.....	2	-----	2	2	2	4
Figs.....	-----	-----	-----	2	-----	6
Persimmons.....	1	3	2	2	1	-----
Mixed.....	24	27	23	-----	-----	-----
Cars not reported.....	117	34	31	-----	-----	-----
Totals.....	6,869	6,435	6,459	7,136	7,670	5,626

Citrus Fruits.—The movement of citrus fruits for the season of 1902–03 was the heaviest in the history of that industry in California, totaling 23,871 carloads. From the time the first shipments of this class of fruit commenced out of our State, there has been a steady increase in the volume of exports, and this volume will be limited only by the demand. In the earlier history of orange production, stories of fabulous returns from orchards, many of which were true at that time, gave an extraordinary impetus to this branch of horticulture in our State, and new orchards are annually coming into bearing to increase the output. There has been a very material decline in profits from orange-growing

during the past few years, but, nevertheless, there is little if any diminution of new planting and a large new acreage is set to oranges each season. This is not confined to the southern counties, but as it has been demonstrated that much land in the northern counties is suited to this class of fruit, that in these sections it ripens much earlier and can be marketed to much better advantage on that account, a very strong impetus has been given to this class of fruits in these sections. Tulare County, especially, is making a rapid advance in the growing of citrus fruits, and some very large orchards have been set out here in the past few years. A second promising citrus center in northern California is in Butte County, while smaller districts along the foothill regions of the San Joaquin and Sacramento valleys are going into this line on a larger or smaller scale, and all adding to the total output.

The crop of 1902-03 was little if any below general expectations and was nearly all disposed of at fair prices to the growers. The crop of 1903-04, however, fell below early estimates, which ranged from 30,000 to 35,000 carloads, the latter being a very extravagant estimate. The fruit did not mature well, however; much dropped before it was mature, which lessened the total; while heavy losses on early shipments, with small demand and low prices through the greater part of the season, caused a heavy reduction in the total shipments, which, while in excess of any previous season, have fallen below what they otherwise would have been. Some of the earlier shipments were exceedingly unfortunate. In passing across the continent they were delayed and caught in severe cold weather. Whole carloads were frozen and worthless when they reached the market. Some of this fruit was offered for sale, and was one of several causes for the poor market later in the season. The following table shows the output of citrus fruits in carloads and boxes for a period of ten years:

California Citrus Fruit Shipments.

Season.	Carloads.	Boxes.	Season.	Carloads.	Boxes.
1893-94	5,022	1,687,500	1899-00	18,400	6,624,000
1894-95	7,575	2,545,200	1900-01	24,900	8,964,000
1895-96	6,915	2,323,500	1901-02	19,180	6,904,800
1896-97	7,350	2,469,600	1902-03	23,871	8,693,560
1897-98	15,400	5,174,400	1903-04	29,399	10,701,201
1898-99	10,875	3,654,000			

Another factor which militated against California in the citrus fruit market this season was the fact that Florida is now recovering from the severe freeze of 1896, which has removed her as a competitor for many years, and she is once again in the market with a large volume of fruit.

With all our increased output of citrus fruits, however, foreign importations continue, and these for comparison are shown in the following table from 1895-96:

Receipts of Foreign Oranges and Lemons.

Season.	ORANGES.		LEMONS.	
	Pounds.	Value.	Pounds.	Value.
1895-96		\$2,694,131		\$5,040,344
1896-97		2,324,907		4,043,822
1897-98		886,722		2,848,130
1898-99		1,097,596		4,398,004
1899-00	68,618,818	1,087,041	160,197,966	3,666,881
1900-01	50,332,914	716,457	148,515,614	3,516,850
1901-02	52,742,476	784,640	164,182,952	3,327,781
1902-03	56,873,070	818,780	152,004,203	3,079,221
1903-04	35,893,260	525,468	171,923,221	3,659,598

It would appear that with our annual importation of foreign lemons in excess of three and a half million dollars, there should yet be a market for California lemons.

Prunes.—The prune crop of 1903 and also that of 1904 have very largely exceeded early estimates, although falling below normal in both years. Light rainfall, lowering the water-table, left many trees in the orchards of the Santa Clara prune section with their roots dry, and, as a result, many died, while others gave a small crop of inferior fruit. It was largely upon Santa Clara conditions that the estimate was made, but other prune sections of the State largely compensated for the shortage here, and the result has been a fair, though not normal, crop for both years. In many sections the fruit was of inferior quality and prices have ranged discouragingly low. This disorganized condition of the prune-growers is largely responsible for the depressed condition of the market and the low prices which are being received. The principal varieties used for curing are Prune d'Agen (commonly known as the California French prune), Robe de Sergent, Imperial Epineuse, German and Silver prune. An average of about two and a half pounds of green fruit is required to make one pound of cured fruit. Prunes are graded by machinery, and the regular commercial sizes are 30-40's, 40-50's, 50-60's, 60-70's, 70-80's, 80-90's, 90-100's, 100-110's, 110-120's, being the number of fruits to the pound. The fruit, after being treated and graded, is packed in boxes holding 25 and 50 pounds, and in white cotton sacks holding from 85 to 90 pounds each.

The comparative output of prunes by pounds for the ten years past is shown in the following table:

Prune Yield of California.

	Pounds.		Pounds.
1895	64,750,000	1900	174,000,000
1896	55,200,000	1901	81,600,000
1897	97,780,000	1902	197,000,000
1898	90,420,000	1903	165,000,000
1899	114,227,000	1904	(estimated) 150,000,000

With our continually increasing output of prunes it became necessary to find a wider market, and while there is undoubtedly a large home demand that can be cultivated, we have been pushing our products into foreign countries and selling our fruit in direct competition with French and German prunes in their own country. A peculiar feature of this traffic is that great quantities of California prunes have been purchased in France, re-processed there, returned to the United States, and after paying the import duty here, sold at an advance price as French prunes. A letter from our Consul at Bordeaux, Albion Tourgee, published elsewhere in this report, gives full particulars of this business. While this is not creditable to our consumers, who are willing to pay an extra price for a supposed foreign article, on account of its being foreign, it speaks highly for our California product when it is purchased to supply the leading prune market of the world and sold as its best product. A large percentage of the foreign prunes imported into the United States, as shown in the following tables, are, therefore, of California production:

Quantity and Value of Exports of Prunes.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1897-98	15,940,701	\$1,021,888	1901-02	23,358,849	\$1,404,422
1898-99	5,615,565	380,847	1902-03	66,385,215	3,512,587
1899-00	25,922,371	1,646,332	1903-04	73,146,214	3,410,497
1900-01	10,021,564	589,113			

Quantity and Value of Foreign Prunes Imported.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1890-91	34,281,322	\$2,054,486	1897-98	303,992	\$39,660
1891-92	10,869,797	437,271	1898-99	600,360	63,574
1892-93	26,414,112	1,162,318	1899-00	443,457	47,700
1893-94	9,908,122	416,342	1900-01	745,974	62,880
1894-95	14,352,057	527,625	1901-02	522,478	44,077
1895-96	483,658	68,862	1902-03	633,819	63,218
1896-97	710,020	73,303	1903-04	494,105	46,976

It will be noted from a comparison of the above tables that our exports of prunes are steadily increasing, and that imports are correspondingly decreasing, so that we are practically supplying our home demand so far as prunes are concerned, besides filling a large demand in foreign markets.

Our sister States of the Pacific have gone very extensively into prune-growing, and the output of Oregon, Washington, and Idaho is an important factor. California, however, enjoys a great advantage over these sections as a producer of prunes, from the fact that our fruit is all dried in the sun, the hot days of the autumn months being sufficient to cure them, while there is comparatively little danger to be feared from rains at such times. In the cooler and more humid sections of the north, artificial curing is necessary, greatly adding to the cost of the finished product.

Raisins.—The raisin crop both of 1903 and 1904 has been good, and especially that of the past year, when it was one of the largest ever produced in the State. The low price of raisins in 1903 drove a large part of the crop to the wineries, where better prices could be procured; but a material lowering in the price of wine grapes in 1904 has compelled the curing of the larger part of the crop. Heavy and unseasonal rains fell in the midst of the drying season, damaging a large part of the fruit on the trays and also injuring fruit remaining on the vines. In spite of this, the pack has still been a very large one. In many vineyards phylloxera and the Anaheim disease have made great headway. The history of the raisin crop for the past ten years is given in the following table:

California Raisin Pack.

Pounds.		Pounds.	
1895	91,360,000	1900	94,325,000
1896	68,250,600	1901	74,000,000
1897	93,704,000	1902	108,800,000
1898	80,631,000	1903	120,000,000
1899	71,568,000	1904	(estimated) 90,000,000

The importations and exports have been as follows :

Quantity and Value of Raisins Exported.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1897-98	3,109,639	\$167,062	1901-02	2,323,274	\$149,216
1898-99	4,659,807	242,620	1902-03	4,280,028	284,530
1899-00	2,415,456	139,689	1903-04	4,020,428	281,402
1900-01	3,530,164	218,715			

Quantity and Value of Raisins Imported.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1894-95	15,921,278	\$651,420	1899-00	10,309,498	\$531,124
1895-96	10,826,094	460,200	1900-01	3,860,876	297,631
1896-97	12,650,598	567,039	1901-02	6,683,545	399,973
1897-98	6,593,833	381,889	1902-03	6,715,675	476,844
1898-99	4,933,201	282,400	1903-04	1,867,617	355,542

Figs.—A great impetus has been given to this branch of horticulture in California by the successful introduction and establishment of the fig wasp (*Blastophaga grossorum*) from Smyrna. Really, a new horticultural industry, and an exceedingly promising one, has sprung up. For very many years efforts had been made, unsuccessfully, to produce the choice fig of southern Europe and Asia, but not until the establishment of this little wasp did we succeed. Figs of an inferior quality were grown, but the imported fig still held the market by its superiority. Now, at last, however, we are producing the genuine Smyrna fig, and in commercial quantities, and a great impetus has been given to fig-growing in the State. There has been a very large area of new orchards set out in the past two years, especially in the San Joaquin and Sacramento valleys, where soil and climatic conditions seem perfectly suited for the production of this fruit.

In a paper on the Fig Insect, Dr. L. O. Howard, Chief Entomol-

ogist of the United States Department of Agriculture, alludes to the future possibilities of the fig as follows:

The Smyrna fig stands in the same relation to other varieties of figs as the Washington Navel orange stands to ordinary varieties of oranges, and its superiority as a dried product over all other varieties which develop without caprification can no longer be questioned. The annual output of Smyrna figs is estimated to be from 12,000 to 15,000 tons, and these figs sell at wholesale in the New York market at from 10 to 20 cents per pound, while the best grade of California figs, as hitherto raised without the assistance of the *Blastophaga*, does not bring more than 75 cents for a 10-pound box, and when the Smyrna figs arrive it is difficult to sell California figs at any price. The successful production of the Symrna practically awakens a new industry for the United States.

In 1894 we imported 13,440,604 pounds of Smyrna figs, the valuation of which was \$698,894. After the adoption of the tariff law of 1897, which fixed an import duty of 2 cents per pound, shipments to this country decreased, and the importations for 1898 amounted to 7,992,544 pounds, the valuation of which was \$382,784. The following year the importations increased to some extent, and the price was higher. In that year we imported 8,535,967 pounds and the valuation was \$504,800. It seems very probable that in the near future these importations will practically be stopped, as our whole country will be supplied with home-grown dried figs. The transportation charges from California, before the construction of a trans-isthmian canal, will keep the prices high in the Eastern States, but it is safe to say that with the better character of the product the total consumption of dried figs will increase. But this feature by no means comprises all the possibilities of the industry. America will compete with the Mediterranean countries in the open markets of the world. The character of the product, even of this first year's crop, shows it to be superior to the Oriental product, both from chemical analysis and from expert opinion. Experience gained this year assures a much better result next year, not necessarily in the quality of the fruit itself, but in methods of drying and packing, and of producing an attractive product for the market. Cleanliness in packing, prevention of the disgusting worms, so often found in the imported Smyrna figs, and other similar points will be carefully attended to by American packers. At present, there are, by no means, enough trees growing in California to bring about this result; but the right varieties will be planted by the thousand during the coming year, and in four or five years will be producing substantial crops.

In spite of the fact that, until recent years, we have not produced the choice fig of commerce, and our pack has consisted largely of the California Black and White Adriatic, fig production has not been a small factor in the total output of California fruits, as the following table will show:

California Cured Fig Output.

			Pounds.
1891.....	360,000	1898.....	4,780,000
1892.....	500,000	1899.....	5,800,000
1893.....	900,000	1900.....	6,000,000
1894.....	1,540,000	1901.....	6,500,000
1895.....	2,750,000	1902.....	7,250,000
1896.....	2,160,000	1903.....	6,000,000
1897.....	3,250,000	1904.....	5,500,000

That there is a market for all the figs that California will be able to produce for some time yet, and that there is no immediate danger of overproduction of this fruit, are shown from the following table of imports of foreign figs, which for the fiscal year ending June 30, 1903, was 16,482,142 pounds, and for the past fiscal year was 13,178,061 pounds. There is evidently a very large field yet unfilled in our home market for our domestic product.

Quantity and Value of Figs Imported.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1894-95	11,855,890	\$587,420	1899-00	8,812,487	513,895
1895-96	11,900,710	639,512	1900-01	9,933,871	458,513
1896-97	8,940,762	535,380	1901-02	11,087,131	487,733
1897-98	9,628,426	509,002	1902-03	16,482,142	775,917
1898-99	7,284,058	356,762	1903-04	13,178,061	660,360

Apples.—The apple crop of 1903 was a very good one, and owing to the shortage in the Eastern crop commanded good prices. The past season, however, has been a very unfortunate one. The crop has generally been light, the fruit inferior, and growers have not received satisfactory prices. Shipments for 1904 have consequently fallen off.

California has made such a world-wide reputation with her oranges and other citrus fruits, her raisins, her prunes, and other fruits, that apples have been given a back place, and few, even among Californians, know how important this branch of fruit production has become in the last few years, and it is generally supposed that California can produce every fruit except apples. Yet from one end of the State to the other there are sections in which apples of excellent quality are produced, and in many sections, as Watsonville and Lompoc, the production and shipment of this fruit form the great industry of the inhabitants.

J. A. Filcher, Commissioner to the St. Louis Exposition, gives the following information to the "Apple Specialist" on the subject, which covers the ground:

The large output of the other deciduous fruits from California leaves the impression on those who have not studied the subject that California is not much of an apple State. This is not true. Recent years have demonstrated that the area adapted to the growth of a superior apple is very extensive, and to-day the best kinds of apple are being produced throughout the entire State, from the famous apple district of Julian in San Diego County on the south to the famous mountain apple region of Siskiyou on the north. It is demonstrated that at certain altitudes all along the western slope of the Sierra the apple does exceptionally well. The slopes of the Coast Range are also adapted to the apple, and in the valleys along the coast where the summer atmosphere is tempered by the breezes from the ocean, the apple thrives and bears abundantly.

Among the most important apple districts as at present developed, you may mention Julian in San Diego County, Antelope valley in Los Angeles County, the sloping hillside in Santa Barbara, and incidentally San Luis Obispo County, the higher foothills of El Dorado, Placer, Shasta, and Siskiyou counties. Near the coast the Watsonville district takes the lead and is to-day turning out more apples than any similar area perhaps in the United States. The shipments last year from 1,000,000 trees, a little more than half of which are bearing, amounted to 1,600 carloads of 640 boxes each. Next to Watsonville as a coast apple district comes Sonoma, and next to Sonoma come Mendocino and Humboldt counties. Incidentally, summer apples are grown throughout the valleys of the State, and winter apples all along the coast and in the higher altitudes.

The present exports of California apples to Europe average over 300,000 boxes per annum. This is a small item compared to the total apple output for the United States, but an important one as a State item, and is regarded as very important by those who understand the industries on the coast and realize that the possibilities of California for the production of a superior apple are beyond computation.

About three carloads of California apples have been displayed at the St. Louis Exposition and their keeping qualities have been demonstrated to be very superior.

The following table shows the exports of California apples since the season of 1899-1900:

Exports of California Apples.
(In boxes.)

New York to—	1899-00.	1900-01.	1901-02.	1902-03.	1903-04.
Liverpool.....	58,922	61,602	109,715	69,020	107,260
London.....	70,724	107,752	153,653	126,730	188,643
Glasgow.....	13,118	22,415	20,449	11,722	24,302
Hull.....	4,826	7,000	9,681	4,627	-----
Hamburg.....	1,925	1,325	2,929	488	23,486
Various.....	-----	-----	-----	-----	45,284
Totals	149,515	200,094	296,427	212,587	388,975

Walnuts.—The walnut crop of 1903 was below normal and a very large percentage of the nuts of inferior quality. This was due to the prevalence of walnut blight, which had made destructive headway in many of the more important walnut sections of southern California. The past season, however, the blight has not been so prevalent and there has been a much larger crop of nuts and these have been of superior quality. There has been a very active demand for California walnuts this season, and prices have been very satisfactory. The following table shows the steady growth which this branch of the fruit industry has made during the past ten years:

California Walnut Production.

	Pounds.		Pounds.
1895.....	6,770,000	1900.....	16,340,000
1896.....	12,400,000	1901.....	13,800,000
1897.....	9,620,000	1902.....	17,140,000
1898.....	12,200,000	1903.....	11,000,000
1899.....	15,800,000	1904.....	(estimated) 14,000,000

Almonds.—The crop of 1903 was a good one in most sections and of excellent quality; but that of 1904 was almost a failure, a few isolated trees only producing a full crop, while in the large almond sections there were few nuts. This condition was undoubtedly due to climatic conditions early in the spring, when the almond, like the peach, and other deciduous fruits, suffered from the heavy rains at blooming time.

Almond and Walnut Production, by Carloads.

	Almonds.	Walnuts.		Almonds.	Walnuts.
1898.....	45	565	1902.....	327	857
1899.....	232	558	1903.....	320	550
1900.....	274	543	1904.....(estimated)	80	750
1901.....	150	690			

Value of Imported Nuts.

Fiscal Year.	Almonds.	All Other.	Totals.
1894-95	\$810,439 00	\$1,202,405 00	\$2,012,844 00
1895-96	763,594 00	1,311,570 00	2,075,164 00
1896-97	880,263 00	1,319,898 00	2,200,161 00
1897-98	659,659 00	1,578,279 00	2,237,938 00
1898-99	1,222,587 00	1,504,955 00	2,727,542 00
1899-00	949,083 00	2,029,751 00	2,978,834 00
1900-01	946,138 00	2,322,463 00	3,268,592 00
1901-02	1,240,886 00	2,803,333 00	4,044,219 00
1902-03	1,337,717 00	3,528,681 00	4,866,398 00
1903-04	1,246,474 00	3,252,840 00	4,499,314 00

Dried Fruits.—The dried fruit pack of the State reached its highest mark in 1902, when the total was 114,000,000 pounds. This was exclusive of prunes and raisins, and included only the varieties given in the table below. The pack of 1903 was also a heavy one, but that of 1904 has fallen much below, due largely to the short crop of many deciduous fruits and the extra demand from the canneries:

Table of the Dried Fruit Output.

	Pounds.		Pounds.
1891	40,210,000	1898	37,400,000
1892	38,200,000	1899	68,500,000
1893	40,840,000	1900	94,580,000
1894	81,720,000	1901	69,225,000
1895	57,960,000	1902	114,000,000
1896	42,775,000	1903	71,315,000
1897	79,110,000	1904	(estimated) 51,260,000

California Dried Fruit Output, by Varieties.

(In Pounds.)

Varieties.	1899.	1900.	1901.	1902.	1903.	1904. (Estimated.)
Peaches	34,800,000	34,340,000	29,500,000	50,400,000	32,150,000	22,500,000
Apricots	11,600,000	28,080,000	15,750,000	37,500,000	21,000,000	15,000,000
Apples	5,900,000	6,360,000	6,450,000	9,750,000	3,600,000	2,200,000
Figs	5,800,000	6,000,000	6,500,000	7,200,000	6,000,000	5,000,000
Pears	5,760,000	14,550,000	6,575,000	5,250,000	4,650,000	3,500,000
Plums	3,360,000	3,900,000	3,450,000	2,550,000	2,870,000	2,300,000
Nectarines	840,000	870,000	650,000	900,000	635,000	420,000
Grapes	440,000	480,000	350,000	450,000	410,000	340,000
Totals	68,500,000	94,580,000	69,225,000	114,000,000	71,315,000	51,260,000

Canned Fruit.—Owing to the shortage in the deciduous fruit crop during the past season, the pack of canned fruit fell below normal, but that of 1903 was the heaviest in ten years.

California Canned Fruit Pack.

	Cases.		Cases.
1890	1,495,300	1898	2,085,166
1891	1,571,200	1899	3,003,171
1892	1,602,370	1900	2,775,896
1893	1,001,640	1901	2,677,072
1894	1,528,815	1902	2,252,790
1895	1,639,807	1903	2,733,504
1896	1,602,446	1904	(estimated) 2,800,000
1897	1,942,982		

California Fruit and Vegetable Pack, by Varieties.

Variety.	(In Cases.)	1901.	1902.	1903.
Apples	-----	15,972	6,683	5,023
Apricots	-----	294,896	236,071	648,716
Blackberries	-----	21,750	16,661	35,556
Cherries—Royal Ann	-----	28,178	119,227	103,894
Cherries—Black	-----	12,136	26,566	30,506
Cherries—White	-----	11,441	43,419	63,392
Currants	-----	794	219	95
Figs	-----	-----	1,388	1,000
Gooseberries	-----	1,371	536	-----
Grapes	-----	41,364	31,052	52,621
Loganberries	-----	-----	194	4,307
Nectarines	-----	509	755	341
Pears	-----	458,305	302,962	423,831
Peaches—Free	-----	559,500	353,036	339,375
Peaches—Cling	-----	801,788	624,528	559,777
Plums	-----	137,091	150,447	125,567
Quinces	-----	749	2,402	115
Raspberries	-----	3,555	2,975	6,505
Strawberries	-----	15,782	6,205	15,320
Total table fruits	-----	2,405,181	1,925,326	2,415,941
Pie fruit, 2½ lb. cases	-----	31,817	77,889	49,582
Pie fruit, gallon cases	-----	200,492	203,596	231,496
Jams and jellies	-----	39,582	45,979	36,485
Total fruits	-----	2,677,072	2,252,790	2,733,504
Tomatoes, 2½ lb. cases	-----	704,795	750,810	835,394
Tomatoes, gallon cases	-----	43,645	76,242	122,901
Peas	-----	102,089	57,710	70,487
Asparagus	-----	187,592	227,126	256,220
Beans and other vegetables	-----	37,937	39,380	58,572
Total fruits and vegetables	-----	3,753,130	3,404,058	4,077,078

Olives.—California is the only State in the Union in which this fruit has attained commercial importance, and here it has expanded very largely in the past ten years. It has been widely affirmed that the olive could be profitably grown where other fruits would not flourish, and that it would grow, produce, and make good returns under any conditions of neglect. This has resulted in large plantings on worthless lands and many failures, for while under certain conditions the olive exhibits great tenacity of life, and will live and bear some fruit under the most adverse conditions, to get profitable returns it requires a good soil and as good treatment as any fruit that grows. The crop of this fruit for 1903 was a very large one, but that of 1904 has been correspondingly light, especially in the principal olive sections of southern California. A very large part of the fruit is now used for pickling and there is a growing demand for it in this form, which is steadily increasing as the taste for this fruit spreads and the superiority of our product becomes known. The demand for olive oil is not increasing in the same ratio, nor so fast as it should. This is unfortunately due to the fact that cheap and spurious imitations of the genuine article are placed upon the market, and even our most reputable dealers handle imitations, which they sell as genuine. Pure olive oil can never be produced at the same price as cotton-seed or nut oil, and while these latter can

masquerade as olive oil and be accepted as such by the consumer, there will be but little advance in the manufacture of the pure article in our State. At the same time, the imports of olive oil are heavy, but a very large percentage of this is either of very inferior quality or altogether spurious. Below is a statement of the receipts of foreign oil for the past ten years:

Imports of Olive Oil.					
Fiscal Year.	Gallons.	Value.	Fiscal Year.	Gallons.	Value.
1893-94	757,478	\$909,894	1899-00	967,702	\$1,170,871
1894-95	775,046	952,405	1900-01	983,059	1,266,293
1895-96	942,598	1,107,049	1901-02	1,339,097	1,579,409
1896-97	928,567	1,134,077	1902-03	1,494,132	1,736,648
1897-98	736,877	923,800	1903-04	1,713,590	1,875,825
1898-99	930,042	1,090,254			

Quantity and Value of Fruits and Nuts Imported into United States during Fiscal Years 1903 and 1904, ending June 30th.

	1903.		1904.	
	Pounds.	Value.	Pounds.	Value.
Oranges.....	1,677,291	\$36,929 00	918,717	\$19,350 00
Lemons.....	25,900,280	523,953 00	26,819	557,373 00
Figs.....	11,785	635 00	12,378	694 00
Currants.....	430,232	10,082 00	1,033,278	26,480 00
Dates.....	1,778	60 00	144,946	3,151 00
Raisins.....	16,725	1,113 00	63,995	4,587 00
Plums and prunes.....	25,250	997 00	6,233	189 00
Almonds.....	542,882	84,713 00	991,548	84,280 00

Shipment of Fruit Out of State by Rail in 1903.

Showing terminal points of shipment. Tons of 2,000 pounds.

Place of Shipment.	Green Decid'us	Citrus.	Dried.	Raisins.	Nuts.	Canned.	All Kinds
<i>Northern California.</i>							
San Francisco.....	299.9	226.9	9,623.6	63.4	381.9	13,185.9	23,781.6
Oakland.....	1,302.1	.1	1,205.3	-----	202.6	6,931.2	9,641.3
San José.....	18,474.3	.2	52,137.5	-----	466.8	10,156.4	81,235.2
Stockton.....	12,745.5	16,986.4	24,491.5	25,496.3	545.9	8,849.7	89,115.3
Sacramento.....	62,270.8	1,538.6	21,989.9	984.5	1,474.4	12,624.2	100,882.4
Marysville.....	2,668.8	3,713.4	10,583.2	363.3	528.5	5,107.2	22,964.4
Fresno.....	877.1	-----	3,347.8	6,788.1	-----	115.5	11,128.5
Interior points not des'gnat'd	836.1	-----	5,214.6	3,830.1	49.4	623.2	10,553.4
Total tons.....	99,474.6	22,465.6	128,593.4	37,525.7	3,649.5	57,593.3	349,302.1
Total carloads, ten tons ea.	9,947.5	2,246.5	12,859.3	3,752.6	365.0	5,759.3	34,930.2
<i>Southern California.</i>							
Los Angeles.....	1,091.1	172,774.6	7,287.6	566.0	4,518.5	8,175.3	194,413.1
Orange County.....	-----	12,207.0	244.7	-----	1,048.8	166.9	13,667.4
Riverside County.....	-----	43,451.8	234.4	30.7	-----	176.6	43,893.5
San Bernardino County.....	92.5	38,365.3	2,248.8	424.3	10.1	253.5	41,394.5
San Diego County.....	77.3	10,359.1	232.3	590.3	31.7	-----	11,290.7
Total tons.....	1,260.9	277,157.8	10,247.8	1,611.3	5,609.1	8,772.3	304,659.2
Total carloads, ten tons ea	126.1	27,715.8	1,024.8	161.1	560.9	877.2	30,465.9
Total carloads by rail, north and south.....	10,073.6	29,962.3	13,884.1	3,913.7	925.9	6,636.5	65,396.1
Total carloads by sea from San Francisco.....	346.3	-----	1,069.0	82.6	11.9	2,783.9	4,293.7
Total carloads from State by rail and sea.....	10,419.9	29,962.3	14,953.1	3,996.3	937.8	9,420.4	69,689.8

Shipment of Fruit from San Francisco by Sea in 1903.

Tons of 2,000 pounds.

Place of Shipment.	Fruit.	Dried.	Prunes.	Raisins.	Nuts.	Canned.	All Kinds
San Francisco.....	3,463.2	1,952.0	8,737.9	826.4	118.8	27,839.2	42,937.5
Total tons.....	3,463.2	1,952.0	8,737.9	826.4	118.8	27,839.2	42,937.5
Total carloads, ten tons each	346.3	195.2	873.8	82.6	11.9	2,783.9	4,293.7

GENERAL SUMMARY AND COMPARATIVE TABLES OF SHIPMENTS OUT OF STATE, BY RAIL AND BY SEA, OF FRUITS, WINE, BRANDY, AND VEGETABLES FOR TEN CONSECUTIVE YEARS. TONS OF 2,000 POUNDS.

Kinds.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.
Green deciduous.....	90,692.2	66,254.8	57,638.3	72,350.2	69,732.2	96,943.6	91,176.5	93,673.7	100,390.9	104,198.7
Citrus fruits.....	58,961.0	115,825.5	99,156.0	98,547.0	180,658.9	131,916.8	226,546.6	323,871.4	225,668.8	299,625.4
Dried fruits.....	51,828.2	61,386.4	48,522.8	75,159.7	76,662.7	86,925.3	90,052.8	106,987.1	151,944.5	149,531.1
Raisins.....	46,954.4	46,390.1	34,434.6	39,065.8	47,793.3	36,008.7	36,047.0	43,314.0	47,575.2	39,963.4
Nuts.....	3,953.5	3,234.7	4,972.6	5,808.6	5,815.8	6,608.4	6,518.4	8,462.4	10,918.9	9,377.4
Canned fruits.....	60,352.6	41,395.5	45,546.9	73,464.7	52,219.7	75,240.0	75,556.9	83,229.1	80,634.8	94,204.8
Carloads fruit, by rail and by sea.....	31,274.4	33,547.2	29,026.7	36,439.6	43,288.6	43,364.3	52,901.5	65,953.8	61,713.3	69,689.8
Carloads vegetables, by rail.....	4,276.6	3,613.6	1,130.6	4,243.8	3,045.6	2,613.6	4,367.8	8,371.7	6,130.2	7,839.2
Carloads vegetables, by sea.....	410.0	40.0	487.7	490.8	801.4	790.7	772.9	801.1	826.4	822.6
Carloads wine and brandy, by rail and sea.....	7,633.5	8,056.8	7,609.0	6,897.8	9,014.0	8,713.9	9,067.3	8,605.3	8,808.2	9,733.2
Carloads fruit, vegetables, wine, and brandy, by rail and sea.....	43,624.7	45,257.4	38,254.0	48,072.0	56,149.6	55,482.5	66,797.8	83,731.9	77,538.1	88,084.8

EXPORTS OF FRUIT AND NUTS FROM THE UNITED STATES DURING THE FIVE YEARS ENDED JUNE 30, 1904.

Articles Exported.	1900.		1901.		1902.		1903.		1904.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Fruits—										
Apples, dried (lbs.).....	34,964,010	\$2,247,851	28,309,023	\$1,510,581	15,664,468	\$1,190,593	459,579	\$26,024	1,168,030	\$67,517
Apples, green or ripe (bbls.).....	526,636	1,444,655	883,673	2,058,964	459,719	1,628,886	2,127	6,910	925	3,552
Apricots, dried.....	.....	.....	.....	.....	1,928,367	178,143	370,244	26,092	72,980	5,679
Oranges.....	.....	271,468	.....	436,560	.....	420,835	.....	56,830	.....	86,823
Prunes (lbs.).....	25,922,371	1,646,332	10,021,564	589,113	23,358,849	1,404,422	2,823,839	131,593	1,241,249	60,926
Raisins (lbs.).....	2,415,456	139,689	3,512,161	218,715	2,323,274	149,216	100,583	9,733	213,339	11,465
Other green, ripe, dried.....	.....	2,545,451	.....	2,716,269	.....	2,153,050	.....	202,486	.....	194,996
Preserved—										
Canned.....	.....	3,127,278	.....	3,006,109	.....	1,195,635	.....	62,488	.....	26,930
Other.....	.....	63,448	.....	71,597	.....	94,323	.....	4,796	.....	10,150
Total fruits.....	.....	\$11,486,172	.....	\$10,607,908	.....	\$8,415,103	.....	\$526,952	.....	\$468,038
Nuts.....	.....	156,490	.....	218,743	.....	304,241	.....	20,669	.....	23,978
Total fruits and nuts.....	.....	\$11,642,662	.....	\$10,826,651	.....	\$8,719,344	.....	\$547,621	.....	\$492,016

Included in the dried fruit shipments for 1901-02 were 1,928,367 pounds of apricots, valued at \$178,143, which had not been segregated prior to this year.

NUMBER OF FRUIT TREES GROWING IN CALIFORNIA IN THE SPRING OF 1904.

As per Assessors' Returns.

Counties.	Apple.		Apricot.		Cherry.	
	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.
Alameda	55,000	800	100,000	8,000	82,000	19,000
Alpine	1,700	200	75	20		
Amador	4,690	950	1,320	45	640	100
Butte	6,530		10,700		7,340	
Calaveras	6,000	4,000	2,000	1,000	500	200
Colusa	4,600	1,220	14,580	3,100	600	250
Contra Costa	9,450	955	47,265	4,360	8,725	850
Del Norte	8,200	700			600	
El Dorado	28,140	5,090	1,800	500	3,600	890
Fresno	8,000	2,600	27,000	560	60	
Glenn*						
Humboldt*						
Inyo	19,985		395		200	
Kern	7,000	3,000	20,000		1,000	
Kings	2,000		81,800	1,300		
Lake	13,645		1,195		440	
Lassen	48,765		300		1,135	
Los Angeles	136,110	31,710	115,610	6,300	175	1,075
Madera	3,500		5,850		35	
Marin	20,165	1,115	5,600	2,160	425	80
Mariposa	10,900		1,090		400	
Mendocino*						
Merced	4,200	955	16,000	4,110	325	60
Modoc	42,780		1,960		2,230	
Mono*						
Monterey	42,200	21,000	19,200	3,400	1,100	200
Napa	49,600	12,200	13,500	2,000	23,650	8,600
Nevada	16,300		2,400		1,200	
Orange	9,715	3,700	115,420	45,060		
Placer	19,400	6,770	14,900	7,670	16,200	9,000
Plumas	4,215	1,820				
Riverside	3,535	16,830	30,600	6,254	800	590
Sacramento	5,800	1,200	22,000	33,000	4,500	8,500
San Benito	8,500	1,100	14,500		2,500	
San Bernardino	12,500	1,500	47,500	1,800	9,800	2,300
San Diego*						
San Francisco*						
San Joaquin	9,760	1,820	95,745	3,980	21,985	5,220
San Luis Obispo	72,200	11,900	59,850	6,200	7,840	2,700
San Mateo	27,000	3,800	11,800	640	1,350	
Santa Barbara	13,590	7,490	7,120	1,865		
Santa Clara	17,100	39,000	541,250	9,400	129,100	21,600
Santa Cruz	285,365	272,325	36,245	33,740	18,095	5,170
Shasta	15,000		500		500	
Sierra	7,100				2,000	
Siskiyou*						
Solano	2,265		33,155		36,740	
Sonoma	210,470	72,470	18,990	2,530	42,620	18,840
Stanislaus	5,000	700	16,600	500	80	120
Sutter	5,350		5,500		1,500	
Tehama	17,500	1,650	63,745	4,710	3,310	1,670
Trinity	4,800	2,500	40	10	500	140
Tulare	2,515	1,560	75,970	590	250	
Tuolumne	4,000	5,000	2,000	560	2,800	365
Ventura	7,025	1,165	176,910	24,340	1,400	
Yolo	420		198,000		7,500	
Yuba	7,400	10,090	15,000	41,000	1,000	3,000
Totals	1,326,965	550,885	2,092,980	260,704	448,550	110,520

* No report.

NUMBER OF FRUIT TREES GROWING IN CALIFORNIA IN THE SPRING OF 1904.

As per Assessors' Returns.

Counties.	Fig.		Olive.		Peach.	
	Bearing.	Non-Bearing.	Bearing.	Bearing.	Bearing.	Non-Bearing.
Alameda	200		4,300	1,000	86,000	1,100
Alpine						
Amador	470	25	165	55	13,720	340
Butte	10,200		113,725		127,420	
Calaveras	400	200	5,000	1,000	4,000	1,000
Colusa	3,475	100	2,450	1,000	11,000	1,500
Contra Costa	2,560	620	18,275	4,875	25,935	3,565
Del Norte					300	
El Dorado	1,450	300	1,900	500	114,270	19,000
Fresno	14,000	160	1,100		20,000	16,000
Glenn*						
Humboldt*						
Inyo	60				5,300	
Kern	1,000		5,000		40,000	
Kings					167,000	47,500
Lake	800		1,320		8,105	
Lassen					865	
Los Angeles	1,750	560	373,430	57,110	146,745	12,710
Madera	635		5,500		22,500	
Marin	215	55				
Mariposa	1,350		9,000		5,670	
Mendocino*						
Merced	11,145	3,510	28,185	1,460	95,760	25,100
Modoc					2,850	
Mono*						
Monterey			450	100	6,500	3,600
Napa	1,650	200	52,000	1,200	97,650	12,670
Nevada	380		400		6,500	
Orange	2,200		19,115		18,910	23,585
Placer	5,100	2,960	36,000	20,000	804,200	597,600
Plumas					500	400
Riverside	1,705	10	35,315	11,645	29,200	9,415
Sacramento	1,200	2,600	12,200	6,500	11,000	38,000
San Benito	200		300		14,070	1,230
San Bernardino	1,600	800	21,500	13,000	62,000	2,000
San Diego*						
San Francisco*						
San Joaquin	4,430	1,030	18,820	4,330	138,710	19,510
San Luis Obispo	2,440	1,250	3,230	860	65,350	19,100
San Mateo	100		8,750	800	1,200	
Santa Barbara			19,470	10,620	5,405	2,045
Santa Clara	1,600	530	9,320	4,750	510,700	37,900
Santa Cruz	360	150	720	620	17,575	1,420
Shasta	1,000		12,000		60,000	
Sierra					400	
Siskiyou*						
Solano	5,430		3,050		322,570	
Sonoma	3,970	1,350	59,270	44,990	256,710	8,850
Stanislaus	4,000	6,000	9,600	400	20,800	16,000
Sutter	1,420		1,025		97,845	
Tehama	10,090	1,245	18,500	119,760	580,850	116,050
Trinity	15	10	10		1,450	500
Tulare	3,715	460	1,245	945	280,378	10,870
Tuolumne	950	270	25	25	9,100	2,900
Ventura			35,380		6,380	
Yolo	4,100		20,000		149,500	
Yuba	4,500	2,000	8,000	1,800	64,000	27,000
Totals	111,865	26,395	975,045	308,845	4,536,793	1,078,460

No report.

NUMBER OF FRUIT TREES GROWING IN CALIFORNIA IN THE SPRING OF 1904.

As per Assessors' Returns.

Counties.	Pear.		Prune (French).		Prune (other kinds).	
	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.
Alameda	66,000	4,000	145,000	22,000	2,100	400
Alpine			120	50		
Amador	6,215	70	1,230	1,340	230	60
Butte	20,995		73,125		15,430	
Calaveras	500	100	200	200	800	100
Colusa	26,095	575	72,400	100		
Contra Costa	64,125	16,180	32,450	6,530	8,515	1,415
Del Norte	650				1,500	
El Dorado	68,000	34,050	16,020	150	90,000	2,500
Fresno	1,040	480	2,600	960		
Glenn*						
Humboldt*						
Inyo	5,300		1,325		2,200	
Kern	1,500		70,000		1,000	
Kings			77,000	1,800	4,500	
Lake	16,730		41,880		4,190	
Lassen	1,895		570		1,470	
Los Angeles	15,325	8,070	25,750	3,065	23,845	750
Madera	2,000		4,200			
Marin				2,350	400	
Mariposa	2,550		1,000		1,200	
Mendocino*						
Merced	9,200	1,620	18,430	2,640		
Modoc	1,740				1,700	
Mono*						
Monterey	4,000	1,000			8,760	
Napa	58,260	2,250	125,840	56,400	34,000	1,850
Nevada	23,200		1,300			
Orange	3,280	1,560	20,450	5,820		
Placer	112,700	53,000	7,000	3,000	118,900	176,400
Plumas	800	600				
Riverside	9,575	3,735	38,295			
Sacramento	65,300	57,000	24,000	46,000	27,000	43,000
San Benito	9,500	2,500	75,000	7,000	8,000	
San Bernardino	2,800	800	21,500	13,000		
San Diego*						
San Francisco*						
San Joaquin	23,145	1,715	30,900	5,930	5,840	610
San Luis Obispo	37,300	8,900	160,400	31,020	44,200	9,600
San Mateo	4,000				31,000	
Santa Barbara	1,210	480	1,245	450	1,365	385
Santa Clara	122,150	15,700	3,920,140	357,400	48,710	37,900
Santa Cruz	15,600	2,480	112,990	16,140	19,265	4,995
Shasta	10,000		70,000		6,500	
Sierra					15	
Siskiyou*						
Solano	218,550		281,460		105,630	
Sonoma	76,240	23,970	480,670	110,260	44,590	5,290
Stanislaus	4,060	320	11,560	2,880		
Sutter	4,520		26,865		1,655	
Tehama	45,790	15,260	83,135	7,835	16,430	4,225
Trinity	500	200	1,000	200	500	100
Tulare	5,895		333,010	15,975	5,670	345
Tuolumne	2,300	500			300	150
Ventura			25,875			
Yolo	51,000		122,000			
Yuba	18,000	3,100	179,000	5,060	3,400	600
Totals	1,438,535	260,215	6,736,935	725,555	690,810	290,675

* No report.

Kings, miscellaneous, 7,100; Madera, nectarines, 2,450; San Benito, nectarines, 250; Santa Clara, nectarines 1,025, quinces 2,440.

NUMBER OF FRUIT TREES GROWING IN CALIFORNIA IN THE SPRING OF 1904.

As per Assessors' Returns.

Counties.	Lemon.		Orange.		Almond.		Walnut.	
	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.
Alameda	1,200	100	2,300	100	79,000	4,000	2,000	300
Alpine								
Amador	15	5	370	65	3,140	520	90	35
Butte	930		321,430		19,320		875	
Calaveras	50	50	250	250	800	300	500	500
Colusa	300	20	3,650	250	16,220	600	1,410	150
Contra Costa	330	75	1,100	130	147,825	50,875	3,450	2,430
Del Norte								
El Dorado	150		1,260	850	2,000	600	500	200
Fresno	160		1,200	400	200	10	25	30
Glenn*								
Humboldt*								
Inyo					200		375	
Kern	300		4,000		1,200		100	
Kings								
Lake			55		5,460		200	
Lassen					20		460	
Los Angeles	145,675	33,840	611,420	275,870	42,615	8,175	95,235	63,415
Madera	40		175		1,075		50	
Marin	35	20	535	75	135	45	60	45
Mariposa	175		450		425		250	
Mendocino*								
Merced	1,600	200	8,100	2,610	18,125	4,175	825	210
Modoc								
Mono*								
Monterey								
Napa	450	180	3,385	260	45,860	9,680	9,560	2,150
Nevada	180		320		380		425	
Orange	35,605	45,610	422,180	94,785			113,850	70,190
Placer	900	850	27,800	17,400	6,300	3,900	1,000	700
Plumas								
Riverside	111,567	7,075	995,000	309,075	10,145	1,500	1,400	20
Sacramento	1,500	950	24,800	20,000	32,700	30,000	1,900	1,700
San Benito			100		8,500		1,000	
San Bernardino	165,500	25,500	1,150,000	530,000	1,700	350	3,950	250
San Diego*								
San Francisco*								
San Joaquin	310		2,245	1,200	12,970	6,415	500	410
San Luis Obispo	14,800	7,560	4,210	1,580	6,000	720	25,250	10,780
San Mateo	110		120		560		550	
Santa Barbara	79,280	53,520	985	540	1,310		18,460	15,920
Santa Clara	365	695	990	725	15,420	4,940	9,250	2,450
Santa Cruz	165	90	145	80	340	90	1,370	4,555
Shasta	250		1,000		2,000		250	
Sierra								
Siskiyou*								
Solano	2,130		3,440		100,240		3,760	
Sonoma	740	250	8,710	2,010	7,020	3,015	4,040	1,380
Stanislaus	65	15	8,960	2,240	7,600	1,600	320	240
Sutter	55		735		25,720		60	
Tehama	405	280	4,900	5,480	62,205	945	3,970	500
Trinity	10	5			20	10	75	25
Tulare	32,800	575	177,240	47,960	1,200	385	500	240
Tuolumne	100	75	325	100	325	50	860	850
Ventura	61,530	4,190	83,135	19,990	14,385		69,240	10,965
Yolo	1,500		8,000		120,000		2,500	
Yuba	30,700	2,100	33,800	29,600	5,000	700	2,100	5,060
Totals	691,977	186,830	3,918,820	1,363,615	827,660	133,600	382,545	195,700

* No report.

ENTOMOLOGICAL.

Bug vs. Bug.
Insects of the Year.
Pear Blight.

BUG VS. BUG.

By JOHN ISAAC.

A somewhat small and unpretentious exhibit was that made at the St. Louis Exposition by the State Commissioner of Horticulture, but it was one that attracted a great deal of attention, especially among scientific men and the more intelligent class of orchardists and farmers who visited that great exposition. This exhibit consisted of a very complete and well-arranged collection of the various insect friends to which California owes so much of her prosperity, and which are ever and continuously working in our interest. Many of these insects are exceedingly minute, so much so as to be practically out of the range of the naked eye. To overcome this difficulty they were displayed behind magnifying glasses of sufficient power to enable them to be seen, while descriptions of them and the work they are doing for our State were made in plain language. The result of this has been a great deal of inquiry from Eastern sources as to our beneficial insects and our California method of fighting bugs with bugs. To answer these inquiries, as well as to give our own people a wider knowledge of what our insect friends are doing for us, the following pages have been prepared.

Below is a list of the different insects exhibited at the St. Louis Exposition by this Commission:

PREDACEOUS COCCINELLIDÆ.

Beneficial Insects.

Host Insects.

Vedalia cardinalis	Cottony Cushion Scale (<i>Icerya purchasi</i>).
Novius koebelei	Cottony Cushion Scale (<i>Icerya purchasi</i>).
Novius bellus	Cottony Cushion Scale (<i>Icerya purchasi</i>).
Vedalia sp. (black)	Cottony Cushion Scale (<i>Icerya purchasi</i>).
Rhizobius ventralis	Black Scale (<i>Saisseta oleæ</i>).
Rhizobius ventralis, larvæ	Black Scale (<i>Saisseta oleæ</i>).
Orcus australasia	Black Scale (<i>Saisseta oleæ</i>).
Orcus chalybeus	Yellow Scale (<i>Chrysomphalus</i> [<i>Aspidiotus</i>] <i>citrinus</i>).
Rhizobius toowoombæ	San José Scale (<i>Aspidiotus perniciosus</i>).
Scymnus vagans	Red Spider (<i>Tetranychus telarius</i>).
Rhizobius debilis	Various scale insects.
Cryptolæmus montrouzieri	Mealy Bugs (<i>Pseudococcus</i> [<i>Dactylopius</i>] sp.).
Hyperaspis lateralis	Cypress Mealy Bugs (<i>Pseudococcus ryanii</i>).
Exochomus pilatii	Various scale insects.
Chilocorus bivulnerus	San José Scale (<i>Aspidiotus perniciosus</i>), and others.
Coccinella sanguinea	Various scales and aphids.
Coccinella californica	Various aphids.
Coccinella abdominalis	Various aphids.
Coccinella oculata	Various aphids.
Hippodamia ambigua	Various aphids.
Hippodamia convergens	Various aphids.

PARASITIC HYMENOPTERA, DIPTERA, ETC.

<i>Beneficial Insects.</i>	<i>Host Insects.</i>
Scutellista cyanea	Black Scale (<i>Saisseta oleæ</i>).
Dilophogaster californica.....	Black Scale (<i>Saisseta oleæ</i>).
Hymencyrtus crawii	Black Scale (<i>Saisseta oleæ</i>).
Aphelinus mytilaspidis.....	Black Scale (<i>Saisseta oleæ</i>).
Aspidiotophagus citrinus	Yellow Scale (<i>Chrysomphalus</i> [<i>Aspidiotus</i>] <i>citrinus</i>) and San José Scale (<i>Aspidiotus perniciosus</i>).
Pteromalus puparum.....	Internal parasite of the Cabbage Butterfly (<i>Pieris rapæ</i>).
Comys fusca.....	Brown Apricot Scale (<i>Eulecanium armeniacum</i>).
Encyrtus flavus.....	Soft Brown Scale (<i>Lecanium</i> [<i>Coccus</i>] <i>hesperidum</i>).
Coccophagus lecani.....	Soft Brown Scale (<i>Lecanium</i> [<i>Coccus</i>] <i>hesperidum</i>).
Coccophoctonus sp.....	Yellow and Red scales.
Eupelmus mirabilis.....	Internal parasite of the Katydid (<i>Microcentrum retinervis</i>).
Braconid sp.....	Parasite of Cutworm.
Anastatus sp.....	Egg parasite of Tent Caterpillar.
Tachnia fly	Internal parasite of Cabbage Butterfly (<i>Pieris rapæ</i>).
.....	Internal parasite of <i>Lecanium robinarum</i> .
Aphelinus sp.....	Internal parasite of Aphis.

Somewhere about the year 1868, a California nurseryman in San Mateo County, not far from San Francisco, imported some lemon trees from Australia. There was nothing unusual about this, nor was there apparently anything unusual on the trees themselves; nevertheless that importation cost the State of California millions of dollars and came near destroying one of the most important of its fruit industries, for on those trees, unseen and unnoticed by any one, were some of the young of the now well-known cottony cushion scale (*Icerya purchasi*). These soon reached their mature stage, and still no notice was taken of them; they were regarded merely as a curious object when noticed, and it was never dreamed that they were the commencement of one of the most terrible pests that California fruit-growers have ever known. The insects increased in numbers, but not being in a fruit section, and their depredations being confined largely to ornamental stuff, they were disregarded. Soon afterwards a Los Angeles nurseryman and florist secured some of the imported stock, with the imported pest, and so it was introduced into southern California. Here conditions were better suited to it than even in the section where it had first obtained a footing in the State, and it spread much more rapidly. Soon it got into the orange orchards. Here conditions seemed perfect, and in a very short time it had spread to an alarming extent. Orchards in which it had become firmly established were covered with it until they looked as though they had been exposed to a severe snowstorm. It was soon found in remote sections, and in a short time appeared to have taken possession of the whole country. Nor did it confine itself to the orange trees; many varieties of fruit and a great quantity of ornamental plants fell beneath its attacks. It even found its way to forest trees, and for some time it looked as though it would reduce the whole country to a desert. Orange-growers were in despair. From eight thousand

carloads, shipments dropped to six hundred in one year. Every possible remedy was tried, but none was found effective, and even the most costly served only to temporarily check the spread of the pest. Orange-growers were digging out and burning their trees to get rid of the pest, but even this did not avail, for had all the orchards been destroyed there was sufficient wild stuff to keep it spreading.

In 1888 the National Government made an appropriation for the purpose of advancing the American interests at the Melbourne Exposition, and the appointment of the late Hon. Frank McCoppin as chairman of the commission to forward said interests was the nucleus of California's first effort in the search for natural enemies of orchard pests. McCoppin's friends in the orange district where this pest had caused such terrible losses urged that he should do something to save the orange industry. Correspondence was opened with the Hon. Thomas F. Bayard, Secretary of State, and through him, with the Secretary of the Interior, whose department at that time had charge of the entomological division. This resulted in the sending of Albert Koebele, who discovered the *Vedalia cardinalis*, with the commission. While there were others in the State who were convinced of the parasitic theory and enthusiastic in their efforts to bring about the investigation, there was no available money until the above opportunity presented itself.

This discovery of a small ladybird known as the *Vedalia cardinalis* started California on her present course of fighting bugs with bugs, and no doubt this will continue until every insect pest that disturbs plant life and its fruits will be overcome by natural insect enemies, even if it should require traversing the very ends of the earth.

It is to be hoped that other States, and the National Government, will take up this work and thereby save hundreds of millions of dollars loss that is now borne by the cultivators of the soil.

This ladybird was collected and forwarded to California and distributed all over the State wherever the scale had made its appearance.

Nearly, if not quite, all of the injurious pests of any section are introduced species, and in every case they have been introduced without their checks, for in its native habitat every pest, in fact, every form of life, has some other form of life which preys upon it and prevents it from becoming redundant. Now, when any such form is removed to a new section, where it has no natural enemies, there is nothing to stop its unlimited spread, and as insects propagate more rapidly than any other form of animal life, without some check they would soon overrun everything within reach. These checks are usually other insects, and they are divided into two general classes—the predaceous class, or those which devour their prey from the outside, the most important among which is the great ladybird family, and the parasitic class, or those which

work in or on the body of their host. These latter are often microscopic, or very nearly microscopic, in size, but are among the most effective of our insect friends.

Usually each predaceous or parasitic insect attacks but one kind of insect; each has its own particular form of food and will touch no other. The *Vedalia*, for instance, lives wholly upon the cottony cushion scale, and if it can not get this, it will starve before it will touch any other form of food, so that, in searching for the enemies of our destructive insects, it is necessary to find just the right one.

It is a fact well known to all entomologists, that in their native homes, while insects are sometimes very troublesome, and in some sections exist in unusual numbers, they never become the serious pests that they do when they are removed to a new country where their checks do not exist. Usually in their native homes they are rather rare than otherwise. So when it is known that any pest is especially severe in any section, as, for instance, the San José scale (*Aspidiotus perniciosus*) over a great part of the Eastern States, it is very certain that it has been introduced there, and in order to find its check, we must find its native home, where it is scarce, and then we must find what agency is keeping it down. Sometimes our native parasites will adapt themselves to the introduced species, as has been the case in California with the San José scale. This pest was as great a terror to our growers some twenty years ago as it now is over a great part of the Eastern States; but one of our native parasites, the *Aphelinus fuscipennis*, adapted its taste to it, and finding in the San José scale a suitable food supply, it increased with almost unprecedented rapidity until it overtook the scale, and to-day this scale is no longer a pest in the California orchards. It is true that it occasionally makes its appearance in remote sections, but never to any dangerous extent, and the little parasite soon overtakes it and reduces it below the danger line. So little regard is paid to the San José scale in California now, that we never recommend any action against it. Spraying is still carried on, but this is more for the purpose of keeping the trees clean and healthy than for the purpose of getting rid of the San José scale. Before this parasite did such effective work, California orchardists were having very much the same experience that their Eastern brethren are having now, and trees by thousands were dug out and destroyed in order to get rid of the scale. It is to be hoped that the days of this terrible pest in the Eastern orchards are numbered, for it has been discovered that the same parasite which has freed the California orchards is now at work there, and in a report made by Prof. W. G. Johnson, when entomologist of Maryland, he says:

Since we assumed charge of the State work in Maryland, we have collected the San José scale on various food plants and inclosed infested twigs, about four inches in length, in glass cylinder tubes, open at both ends; the ends were closed with cotton, and if any parasites existed upon the scale, they were easily detected and mounted for

study. Only upon rare occasions have we taken more than a half-dozen specimens from a single tube. This experience has been repeated year after year until the fall of 1899. * * * Last fall, however, I discovered a new locality for *Aphelinus fuscipennis*, near Easton, Talbot County, in an infested orchard along the Miles River. The orchard contained a miscellaneous variety of fruits, and all the trees were quite seriously infested with the San José scale. Instructions have been given the owner to cut them down as soon as possible and burn them. A quantity of small branches infested with scale were brought to the laboratory and inclosed in breeding tubes. Much to my surprise, these tubes were swarming with parasites a few days later. From one tube 1,114 specimens of *Aphelinus fuscipennis* were taken, while a second tube gave 432, a third, 1,478, and a fourth more than 1,000, but owing to an accident, the count in the case last mentioned was not exact.

The California method of fighting insect pests is to use the most efficient artificial means while we have to, and to this end we apply all sorts of known washes, dips, and fumigation, but, while so doing, we realize that these measures are very cumbersome, costly and inefficient, and that nature has provided a better way, and it is of this way that we avail ourselves. We endeavor to trace back the course traveled over by our destructive pests, to trail them to their native lair, and there we will find their check. This check, whether it be a parasitic or a predaceous insect, or both, as sometimes found, we secure, introduce, and breed, with the greatest care, in our insectary, where it becomes acclimated in its new home, and as it propagates it is sent into those sections where the pest upon which it is to prey is most prevalent. This method has been found so effective that we have now very few really troublesome orchard pests, the worst at the present time being the codling-moth, and for this we hope to find a natural check, and are now working towards that end.

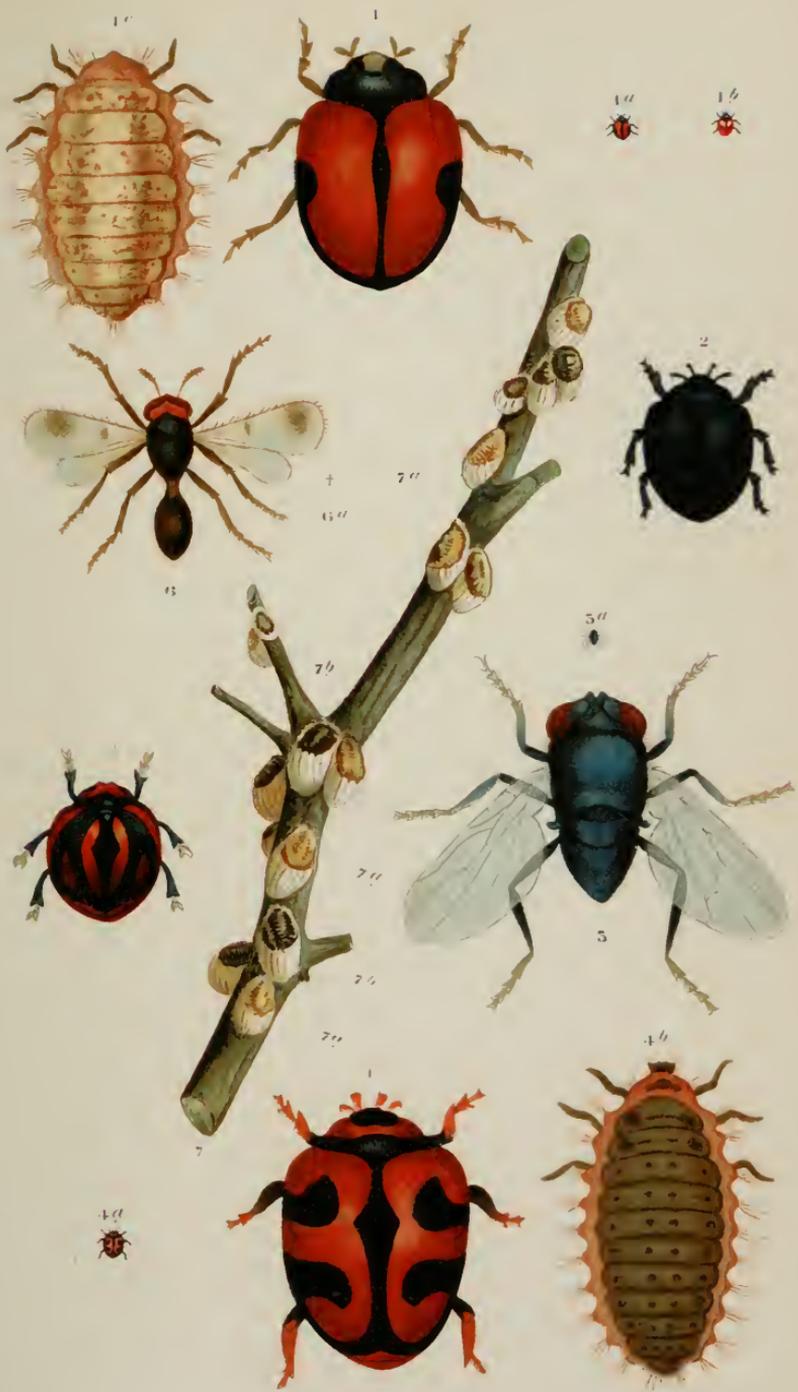
It must not be supposed from this that there are no insect pests in California. We have been importing these pests from all parts of the world for half a century past and have had representatives from all parts of the world, and have them still, for when an insect once obtains a foothold, its eradication is practically impossible, but by introducing its natural enemy, we offset one against the other, and give ourselves no further uneasiness as to the outcome. The pests may do some damage, they may break out in sections in unusual numbers for a time, but invariably they are reduced below the line of serious damage shortly by the natural means, and it is done more effectively and permanently than can be done by any artificial method.

In an address before the fourteenth annual meeting of the Association of Economic Entomologists, Prof. C. L. Marlatt gave an account of a trip he had made to Japan and China in search for the native home of the San José scale, and in speaking of its discovery there he alluded to parasites which he found working upon it, and which are the same species which have done such good work on this pest in California. He said:

The apple industry of Japan is of recent origin, say within the last thirty years; most of the stock has been obtained from California, and as a rule was more or less infested

EXPLANATION OF PLATE I.

- Fig. 1. *Novius koebelei*, Olliff; Koebele's ladybird. Male; enlarged.
- 1a. *Novius koebelei*. Male; natural size.
- 1b. *Novius koebelei*. Female; natural size.
- 1c. *Novius koebelei*. Larva; enlarged.
2. "Black Vedalia." Enlarged.
3. *Novius bellus*; beautiful ladybird; enlarged.
4. *Novius (Vedalia) cardinalis*, Mulsant; Australian ladybird; enlarged.
- 4a. *Novius (Vedalia) cardinalis*. Natural size.
- 4b. *Novius (Vedalia) cardinalis*. Larva; enlarged.
5. *Lestophonus icerya*. Dipterous parasite of the cottony cushion scale; enlarged.
- 5a. *Lestophonus icerya*. Natural size.
6. *Ophilosia crawfordi*. Hymenopterous parasite of the cottony cushion scale; enlarged.
- 6a. *Ophilosia crawfordi*. Natural size.
7. Twig infested with cottony cushion scale; natural size.
- 7a. *Icerya purchasi crawii*, Cockerell.
- 7b. *Icerya purchasi maskelli*.



BUG VS BUG

THE BENEFICIAL INSECTS
THAT SAVED THE
CITRUS FRUIT INDUSTRY OF CALIFORNIA

with San José scale when received. Throughout this region the San José scale was found scatteringly in all orchards and in all gardens. In Aomori and vicinity it is doing no very great damage in any of the orchards, but in some of the small gardens and especially in one or two neglected ones in the city of Aomori, it was as abundant on particular trees as it often is in America. At the first investigation no evidence of parasitism was seen, but from later collections, two of the parasites which attack the scale insect in America were raised in great numbers from infested branches collected at Aomori. These as determined by Dr. Howard are *Aphelinus fuscipennis*, How., and *Aspidiotophagus citrinus*, Craw, the latter being the more numerous.

This latter parasite is the true internal parasite of the Japanese yellow orange scale. The San José scale is not a native of Japan, so it is evident that this little parasite adapts itself to the introduced variety, which is a near relative of the yellow scale upon which it is generally found.

So effective has this work of introducing beneficial insects and encouraging native parasites been, that we have practically reduced all the worst of our scale pests and very many other destructive insects below the danger line. Among the many beneficial insects which are now at work in our State, and the pests which they are at work upon, and most of which they keep in control, we name the following:

COCCINELLIDÆ.

Vedalia cardinalis, Mulsant. (Plate I, Figs. 4, 4a, 4b.) This is commonly known as the "Australian ladybird," from the fact that it was imported from Australia in order to work upon the cottony cushion scale (*Icerya purchasi*, Maskell). As stated above, this pest had obtained such a foothold in our orange orchards that the citrus industry of California was threatened. The fact that the cottony cushion scale came from Australia, where it was not a pest, was sufficient proof that there was some very efficient check at work upon it there, and investigation by Albert Koebele discovered this little beetle. The orange-growers of Los Angeles County, especially, had a very expensive experience with this scale. As it had spread into the wild bushes and trees, extermination by artificial means was out of the question. Now the scale is no longer a pest. When it appears in an orchard the owner is supplied with a colony of *Vedalia*. During the summer the transformations of this ladybird are very rapid. From the egg, through the larva and chrysalis, to the perfect beetle, takes only twenty-one days. Of course, the larvæ are the most active feeders. When short of feed, the larvæ will attack each other, but no matter how hungry they are they will not eat any other species than the cottony cushion scale. This ladybird breeds throughout the year.

Novius koebelei, Olliff (Koebele's ladybird). (Plate I, Figs. 1, 1a, 1b, 1c.) This is another effective enemy of the cottony cushion scale and

does as good work as the *Vedalia*. The latter, however, was first introduced, and its reputation became so great that all others were overshadowed by it. The *Novius koebelei*, however, has proved itself equally as prolific and quite as voracious a devourer of the cottony cushion scale as its companion. This ladybird is also an introduced species, having been sent from Australia for the State Board of Horticulture by Mr. Koebele on his second trip to that country.

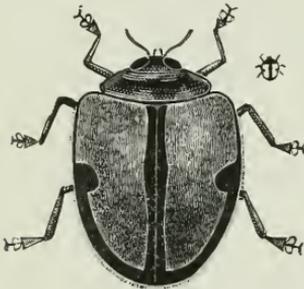


FIG. 1. *Novius koebelei*, male, enlarged.

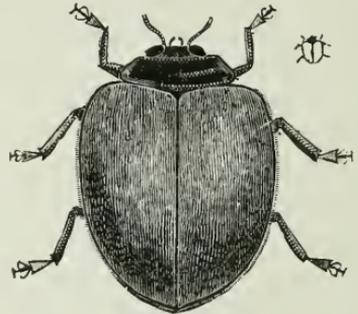


FIG. 2. *Novius koebelei*, female, enlarged.

The illustrations give a good idea of this beautiful and active little ladybird. It feeds upon the cottony cushion scale (*Icerya purchasi*), searching out the solitary scales even better than the *Vedalia*. It passes through its different stages in about the same time as the latter.

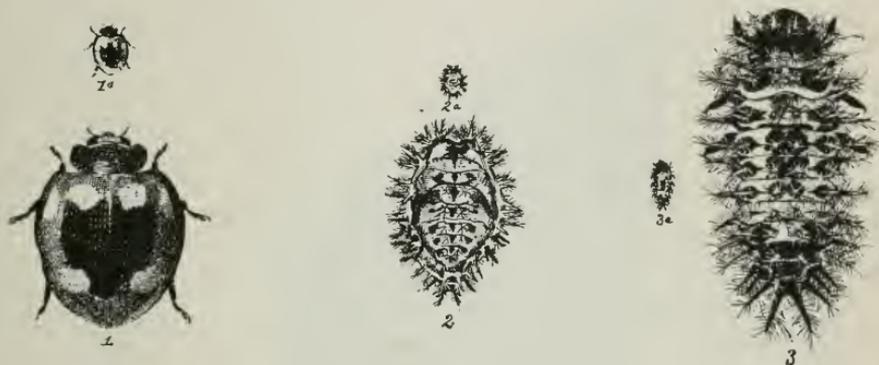
Novius bellus (Beautiful ladybird). (Plate I, Fig. 3.) This is also an Australian species, having been introduced into California from that country by Mr. George Compere. It is one of the several coccinellid enemies of the cottony cushion scale, and has done very excellent work upon that pest. It has been generally distributed over the State.

Vedalia sp. (Plate I, Fig. 2.) This is an unnamed species of *Vedalia*, from its color commonly known as the "Black *Vedalia*." It is also an Australian species, introduced by the State Board of Horticulture through Mr. George Compere, and is another of the coccinellids which prey upon the cottony cushion scale.

Rhizobius ventralis (Black ladybird). (Plate IV, Figs. 3, 3a, 3b.) This is also an Australian ladybird, introduced by the State Board of Horticulture through Mr. Koebele, and is one of the natural enemies of the black scale (*Saisseta* [*Lecanium*] *oleæ*). This ladybird was introduced for work on the black scale, and was generally distributed by the State Board of Horticulture wherever that pest was found. It was one of the most promising of the many importations of beneficial insects and took hold of its work with a vigor that gave promise of soon extirpating one of the worst of the California scale insects. Wherever it was introduced in the coast counties of the State, it increased with wonderful

rapidity and the scale as rapidly disappeared, and in those sections it still continues to do good work, but efforts to establish it in the interior counties have not met with as good success, the heat probably being too intense for the young larvæ. This insect, however, is well established all over the State, and in many sections is as abundant as any of our native species. Wherever it is abundant, it is a chief factor in keeping in check the destructive black scale.

Orcus australasia, Boisd. (Six-spotted blue ladybird). (Fig. 3.) This is one of the most beautiful of the introduced species. Like most



ORCUS AUSTRALASIA, Boisd (magnified); 1a Ditto (natural size);
2 Pupa enveloped in larval skin; 2a Ditto (natural size);
3 Larva; 3a. Ditto (natural size).

FIG. 3. *Orcus australasia*.

of the latter, it is a native of Australia, and was imported from that country by the State Board of Horticulture through Mr. Koebele. It is an enemy of the black scale (*Saisseta* [*Lecanium*] *oleæ*), and is now well established in many parts of California, especially in the coast counties. The female is nearly one fourth of an inch in length, deep blue in color, with six orange red spots on the wing-covers. The male is similarly marked, but is a smaller insect. This species is a more general feeder than *O. chalybeus*. In Santa Barbara County it is bred on black scale, and in Alameda on the pernicious scale. It loves the sunshine, and is found more numerous toward the top and the outside branches of the trees in which it is established. The larvæ and pupa resemble the same stages of Pilate's ladybird.

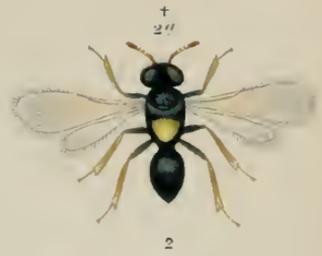
Orcus chalybeus, Boisd. (Steel-blue ladybird). (Fig. 4.) So named from its brilliant steel-blue color, which makes it a conspicuous object wherever it is found. This ladybird preys largely upon the yellow scale (*Chrysomphalus* [*Aspidiotus*] *citrinus*, Coquillett), and also upon the red scale (*Chrysomphalus* [*Aspidiotus*] *aurantii*, Maskell), which it consumes in great quantities. This was



FIG. 4. *Orcus chalybeus*, enlarged.

EXPLANATION OF PLATE II.

- Fig. 1. *Encyrtus flavus*, Howard. Enlarged.
- 1a. *Encyrtus flavus*. Natural size.
 2. *Coccophagus lecani*, Howard. Enlarged.
 - 2a. *Coccophagus lecani*. Natural size.
 3. *Comys fusca*, Howard. Enlarged.
 - 3a. *Comys fusca*. Natural size.
 4. Soft brown scale (*Coccus* [*Lecanium*] *hesperidum*, Linn.).
On orange leaf.
 5. Brown apricot scale (*Eulecanium* [*Lecanium*] *armeniicum*,
Craw). On prune twig.
 6. Brown apricot scale, showing exit holes of *Comys fusca*.



BUG VS BUG.

THE INTERNAL PARASITES THAT HOLD IN CHECK
THE "SOFT BROWN SCALE" AND THE
"BROWN APRICOT SCALE" IN CALIFORNIA

introduced into California by the State Board of Horticulture some years ago and is now found established in many parts of the State.

Rhizobius (toowoombæ) lophantha. (Plate III, Fig. 6.) This little ladybird was formerly described under the name of *Scymnus marginicollis*, but is identical with *Rhizobius lophantha*. Mr. Koebele sent this beetle about the same time that he introduced the *Vedalia*, but it was found in the State previous to that. However, it has only been within the past few years that its value has been observed. It breeds from early spring until late in the fall. As compared with the beetles the larvæ are very large, they are light colored, with a lighter oblong square on center of the back, and remain a long time in the larval stage, feeding voraciously. When about to change to the chrysalis, they hide away under cobwebs, dry leaves, and other débris. The beetle is metallic black, with a brown thorax. They feed on *Aspidiotus perniciosus*, *Chrysomphalus (Aspidiotus) aurantii*, *Chrysomphalus (Aspidiotus) citrinus*, *Aspidiotus hederæ (nerii)*, and occasionally on aphids. In San Diego County it is proving effective on purple scale (*Lepidosaphes beckii*). In alluding to the excellent work of this little beetle on the purple scale in the above named county, Mr. Allen, of Bonita, writes :

With us the largest hatch of purple scale has usually been in May. So far this year I have not seen a single instance of purple scale hatching, nor can I find any live scale in an orchard adjoining us, every tree of which a year ago was literally alive with them. Since last July this orchard has been to my knowledge thoroughly stocked with the *Scymnus*, though when they first entered it I can not say. As they undoubtedly came in large numbers their work has been rapid.

I sprayed only a small part of the ranch last summer, and there can be no question but that, except for the work of this parasite, our place would be teeming with the purple scale, whereas I have yet to see the first live one, and our fruit, from trees that used to be infested, is now coming off the tree clean. I believe this ladybird is also eating the yellow scale, because there is so much less of it on the fruit, but of this I am not yet sure.

By September the efficiency of the purple scale parasite should be thoroughly established, for if any live eggs are left they must hatch before that time; yet even now it seems to me that the work of the *Scymnus* is second only to that of the *Vedalia*, and, considering the difference of the scales and the fact that the purple is so heavily armored, its work seems even more remarkable.

Scymnus vagans. This is one of the smallest of the ladybird family, but not one of the least important. It is an enemy of the red spider, a pest which is very general all over the world, and especially detrimental to almonds, prunes, and citrus trees. The long, dry seasons of California are favorable to the spread of this pest, which flourishes under arid conditions, and which has been especially troublesome here.

This little ladybird was introduced from Australia by Mr. George Comper for the State Board of Horticulture. It was found to be very effective in checking the spread of the pest, and has been generally established in California.

Rhizobius debelis. This is another one of the introduced species of ladybirds which we owe to Australia. It is a scale-feeder and has been very generally distributed in the State.

Cryptolaemus montrouzeri. (Fig. 5.) This is another of the Australian coccinellidæ. It is the natural enemy of the mealy bug (*Pseudococcus* [*Dactylopius*]). It has been introduced into the Hawaiian Islands, where this pest was so bad in the coffee plantations as to almost threaten the total destruction of the crop, and it has done such good work that the pest has been practically cleaned out. Successful efforts have also been made to establish it in the coffee plantations of Central America, where the mealy bug has also appeared in destructive numbers.

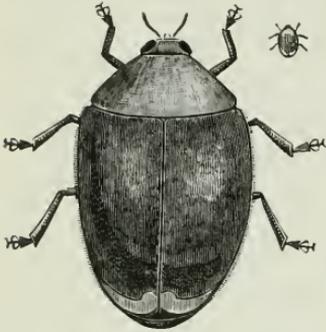


FIG. 5. *Cryptolaemus montrouzeri*, enlarged.

Hyperaspis lateralis, Mulsant. This is one of our native ladybirds and is very generally distributed over the State. It is a small, black ladybird, with two reddish-yellow spots on the elytra, near the apex, two spots on the disc, and two blotches of the same color on the forward lateral margins. Forehead and edge of thorax yellow. Feeds on pernicious scale in the adult form. Cypress trees (*Cupressus macrocarpa*) in the suburbs of San Francisco that were seriously infested with the cypress mealy bug (*Pseudococcus* [*Dactylopius*] *ryani*) were cleared of the pest by this ladybird. The larvæ of this species are covered with a cottony secretion and resemble mealy bugs.

Exochomus pilati, Mulsant. (Fig. 6.) This is another of our very common native ladybirds. It resembles in general appearance the twice-stabbed ladybird (*Chilocorus* [*bivulnerus*] *fraternus*), but is much larger. It also differs from the latter in having the under side of the extremity of the abdomen black, instead of red. The larvæ resemble the twice-stabbed, but are larger and lighter-colored. Both the larva and beetle feed upon young black scale, but they do not increase very rapidly.

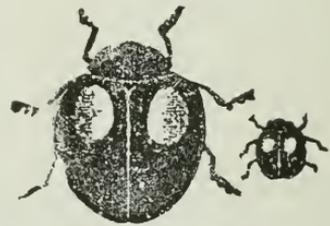


FIG. 6. *Exochomus pilati*.

Chilocorus (*bivulnerus*) *fraternus* (Twice-stabbed ladybird). (Plate III, Figs. 3, 3a.) This is one of our most important native ladybirds. The larvæ are most voracious, and destroy great numbers of young black, pernicious, and other scales. The young are long and covered

with dark spines, crossed with a yellowish band near the middle. When about to change into the pupa or chrysalis, the larva selects the under side of the large branches, where it attaches itself with a gummy substance to the bark, head downward. In a few days the spiny, larval skin splits longitudinally, exposing the inclosed chrysalis. When the beetle issues from the chrysalis it has a black head, with white wing-covers; in a short time this changes to a shiny black, with a red spot on each elytra. In this stage it also preys upon scale insects.

Coccinella sanguinea, Linn. (Blood-red ladybird). This is a medium-sized native species, found very generally distributed over California. It feeds upon aphids and young scale insects, but is not so common as some of the other species, and is not, therefore, so beneficial. The beetle is of a solid color, varying in intensity from a dull red to a bright scarlet.

Coccinella californica, Mann. This species is a very common one in this State, and the beetles are sometimes found in enormous numbers. They are very social in their habits, and can sometimes be found in such numbers as to be gathered by quarts. They are larger than the *sanguinea*. The elytra are orange-red, without spots or markings; thorax is black, with a light spot on each side. They feed principally on aphids. Like other species of ladybirds, the larvæ do the most good.

Coccinella abdominalis, Say. This is known as the "ashy gray ladybird," from its prevailing color. This ladybird is hemispherical in form, ashy gray in color; with seven small black spots on the thorax and eight on each wing-cover. It is said to be one form of *Coccinella oculata*, Say. It is an aphid-feeder, and where it exists in quantity does good work.

Coccinella oculata, Say (Eyed ladybird). This, while it is supposed to be one form of the preceding, does not resemble it in any manner, in its markings or general appearance. The adult insect is deep black in color, with two distinct orange-red spots on the wing-covers, and might easily be mistaken for *Chilocorus fraternus*. There is a distinct difference in these two insects in the markings of the thorax, the *oculata* being light yellow on the under side and around the margin of the thorax. Like its other form, *abdominalis*, it is an aphid-feeder, and a very effective one where it is found; but in this form it is not a common insect in this State.

Hippodamia ambigua, Le Conte. (Figs. 7, 8, 9.) This is a very abundant native species. The adult beetle resembles the blood-red ladybird somewhat, but is narrower in proportion to its length, and flatter. It is distributed over the whole State, and is often found in

EXPLANATION OF PLATE III.

- Fig. 1. *Aspidiotophagus citrinus*, Craw. Enlarged.
1a. *Aspidiotophagus citrinus*. Natural size.
2. *Aphelinus fuscipennis*, Howard. Enlarged.
2a. *Aphelinus fuscipennis*. Natural size.
3. *Chilocorus bivulnerus*; "twice-stabbed ladybird." Natural size.
3a. *Chilocorus bivulnerus*. Larva. Natural size.
4. San José scale (*Aspidiotus perniciosus*, Comstock). Natural size. On pear twig.
5. Yellow scale (*Aspidiotus citrinus*, Coquillett). Natural size. On orange leaf.
6. *Rhizobius (toowoombæ) lophantha*. Natural size.



BUG VS BUG

THE FOUR SPECIES OF INSECT LIFE SHOWN ON THE
"SAN JOSE SCALE" AND "YELLOW SCALE"
IN CALIFORNIA.

great numbers. It is an aphid enemy, and does excellent work on the plum, apple, and woolly aphid. During the later fall months these insects may often be found in sheltered places in great masses, in which condition they hibernate during the colder months.



FIG. 7. *Hippodamia ambigua*, enlarged.



FIG. 8. *Hippodamia ambigua*, pupa.



FIG. 9. *Hippodamia ambigua*, larva.

Hippodamia convergens, Guer. This is another of the common lady-birds of California, and is found throughout the State during the summer months very plentifully, among corn and other vegetables. The larvæ feed upon aphids and other insects, while the mature insects also feed upon aphids, young scale, etc. The beetles vary somewhat in color; some are of a deep red, while others are of a dull brown, the markings, however, being uniform. Sometimes after ripe fruit has been punctured by birds or other agencies, the beetles of this species will be found upon it, sipping the moisture, and on this account they have been thought sometimes to be injurious. They are, however, among the most important of our insect friends.

HYMENOPTERA.

Scutellista cyanea, Motsch. (Plate IV, Figs. 1, 1a, 1b, 1c.) This is comparatively a new introduction to our State, having been secured from South Africa, where it was found to be a very effective worker on the black scale (*Saisseta oleæ*). In the short time it has been established among us, it has done most remarkable work, and, so far, promises to be as efficient a check for the black scale as the *Vedalia* has been on the cottony cushion scale. Of its introduction, Mr. Craw writes:

It was not until Prof. Charles P. Lounsbury, Government Entomologist of Cape Colony, called attention to the *Scutellista cyanea* as an efficient enemy of the black scale in that country, that its true value was recognized.

Through the efforts of the Hon. S. F. Lieb, of San Jose, and Mr. Ed. M. Ehrhorn, of Mountain View, Senator Perkins appealed to the United States Department of Agriculture to use its good offices toward securing this valuable insect. Several colonies were forwarded to Mr. Ehrhorn, but, unfortunately, without any practical results from either sending. On October 1, 1901, Professor Lounsbury wrote me:

"By to-morrow's boat we start you two boxes containing cuttings of oleander bearing parasitized scale. It is not ideal material by any means, and this is not the season we most wish to send in, but the scale and its parasites are both so scarce that we must send what we find as soon as we find it. Most of the scale in your vicinity will be old

by the time this reaches you, but I am in hopes that you may be able to get material from the south of the State that will take a generation of the parasite. Owing to the probable presence of secondary parasites, it is, of course, inadvisable to send the original material to any orchardist down there."

From this sending, seventeen perfect insects developed, of which four were females. When placed in a breeding case, a small spider that was hidden in a rolled-up leaf seized and killed one of the females, leaving us but three from which to colonize the State.

On December 26, 1901, I examined a full-grown black scale from the tree in the breeding case, and found a small maggot of the *Scutellista cyanea*, about twice the size of a black scale egg. This convinced me that they were breeding, so no further examination was made. On February 7, 1902, the parasites began to issue from the scales. During the warm summer months we found that the *Scutellista* passed through all its metamorphoses in forty-seven days.

Colonies have been sent to all the counties of the State where black scale has been troublesome. From personal examination and from material sent in, it is evident that the parasites have obtained a good start, and the coming season will, we hope, see them thoroughly disseminated.

Description: In the female, the antennæ are reddish-brown, with the ring joints and hips dark and more spreading than in the male. The antennæ of the male are black from the ring joints to and including the clubs, with the scape reddish-brown; the legs in both sexes are black, tarsi reddish-brown, and claws black; the scutellum in both male and female is very large. As the flies are small and very active, it is difficult to detect them on the tree upon which they may be placed, and the best way to determine if they are established, is to remove and examine the inside of the full-grown scales about forty to forty-five days after liberating the parasites. The larva is maggot-shaped and white, this soon changing to the pupa, which is black just before changing to the perfect fly.

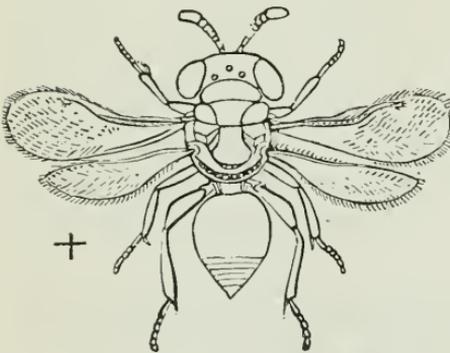


FIG. 10. *Tomocera californica*, male, greatly enlarged.

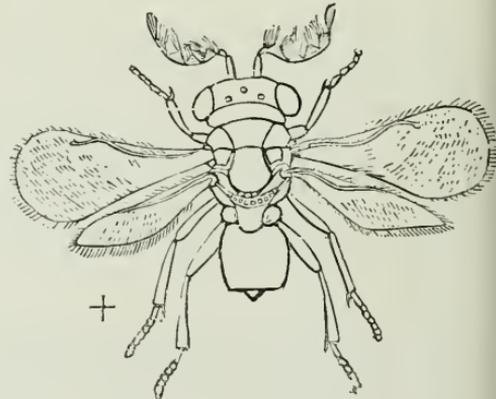


FIG. 11. *Tomocera californica*, female, greatly enlarged.

Tomocera (Dilophogaster) californica, Howard. (Figs. 10, 11.) This is one of our native internal parasites. It has been one of the most effective checks of the black scale in the State, but was not able to keep

this pest wholly under control. In a report on scale insects and their parasites, Professor Comstock says of this insect:

This is one of the most interesting parasites, both structurally and economically, which we have discussed in this paper. It lives upon the destructive black scale, and so abundant is it in certain regions that upon more than one tree, at least seventy-five per cent of the scales appeared to be parasitized. In no locality was the black scale found without this attendant destroyer.

The female parasite pierces the body of the female bark-louse and deposits probably but a single egg. At all events but a single parasitic larva has ever been found upon a single scale. The larva of the parasite feeds upon the eggs and the young of the *Lecanium*, and, also, later upon the mother herself. When full grown it is about 0.15 inch long, broad, spindle-shaped, somewhat more pointed at the anterior than at the posterior end of the body. Its color is clear white, the contents of the alimentary canal, however, often showing through and giving it a blackish tinge. This larva transforms to a whitish pupa, which soon turns black. The adult parasite makes its exit through a round hole which it cuts in the back of the scale.

Hymencyrtus crawii, Ashmead. This is an Australian insect, and is one of the very effective internal parasites of the black scale in that country. It was introduced into California by Mr. George Compere, and has been reported as doing very good work in the districts where it has become established.

Aspidiotophagus citrinus, Craw. (Plate III, Figs. 1, 1a. See Fig. 12.)

The internal parasite of the yellow scale (*Chrysomphalus* [*Aspidiotus*] *citrinus*) and the San José scale (*Aspidiotus perniciosus*). The former scale was at one time as great a source of trouble to the orange-growers of southern California as the red scale (*Chrysomphalus* [*Aspidiotus*] *aurantii*) is now. It fairly covered the citrus trees, reduced the quantity of fruit, and destroyed its quality. Every effort was made by artificial means to resist its attacks, but these were unavailing. Finally it was discovered that there was some natural check at work, and investigation discovered this little internal parasite. Instructions were at once given to the orange-growers to stop spraying for the yellow scale and to give this little friend a chance to increase. This advice was followed, and in a very short time the yellow scale disappeared from that section and it has not since been regarded as a pest, although no other means have been taken to check it. Mr. Craw has bred this parasite from yellow scale upon imported trees from Japan. Mr. Marlatt bred it in numbers from San José scale in Japan. It is also one of our best checks for the same scale in California.

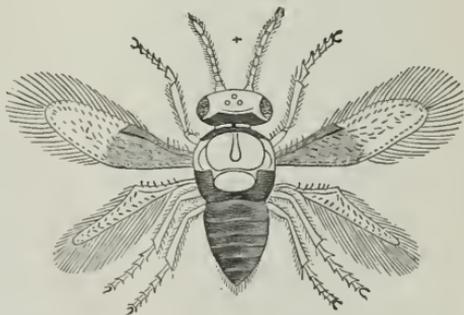


FIG. 12. *Aspidiotophagus citrinus*, greatly enlarged.

EXPLANATION OF PLATE IV.

- Fig. 1. *Scutellista cyanea*, Motsch. Female; enlarged.
- 1a. *Scutellista cyanea*. Natural size.
- 1b. *Scutellista cyanea*. Larva; natural size.
2. *Scutellista cyanea*. Male; enlarged.
3. *Rhizobius ventralis*, Blackburn. Black ladybird; enlarged.
- 3a. *Rhizobius ventralis*. Natural size.
- 3b. *Rhizobius ventralis*. Larva; enlarged.
4. "Black Scale" (*Saisseta* [*Lecanium*] *oleæ*, Bern). On orange twig.
5. "Black smut"; fungus, existing on exudation of black scale.
6. "Black scale," showing exit holes of *Scutellista cyanea*.



1
2
3

BUG VS BUG.

THE TRUE PARASITE AND ENEMY
OF THE
"BLACK SCALE"

Aphelinus fuscipennis, Howard. (Plate III, Figs. 2, 2a.) It is well within the memory of the fruit-growers of California when the San José scale was the most terrible of our pests. It antedated the appearance of the cottony cushion scale and attacked nearly all of our deciduous fruit trees. For some time it seemed as though the fruit industry of our State were doomed, at least such varieties as were attacked by this pest, and orchardists were digging out and destroying their trees by thousands in order to stay its ravages. Various compounds were devised to fight it; among them the now celebrated wash of salt, sulphur, and lime was discovered as most effective. This wash is still the best known artificial remedy for San José and kindred scales on deciduous trees; but it is impossible with the greatest care to destroy any kind of pest by artificial means. There are always solitary trees which will be neglected, careless people who refuse to spray, wild shrubbery out of reach of the operators, and all of these become sources of infection. While active and efficient work was being done by artificial means against this pest, it was discovered to be disappearing in sections where no spraying was done, and investigation showed that one of our native parasites, the *Aphelinus fuscipennis*, had adapted its taste to it and was rapidly getting it under. Today, wherever the San José scale is found we also find its parasite, and while the pest has not, and never will disappear, it is entirely controlled by its little enemy until we pay no further attention to it. Spraying is still carried on, however, as it has been found beneficial to our fruit trees in killing of other pests, preventing fungous diseases, and keeping the trees healthy; but so far as the San José scale is concerned, there is no further need of artificial remedies.

This same parasite is generally distributed all over the United States and is undoubtedly doing good work, as shown in our quotation from Prof. W. G. Johnson of Maryland, but the long winters and comparatively short summers there may check its spread. In the mild winters and long summers of California it probably has more broods than there, and, increasing in greater quantity, it is enabled to do more effective work.

Pteromalus puparum. This is a very common enemy of the cabbage butterfly (*Pieris rapæ*) in this State, and undoubtedly to its work is due the fact that this pest is not more common than it is. This parasite has a wide range and is found over the greater part of the United States. It is parasitic upon the pupa of the butterfly, upon which it lays a number of its eggs, which, hatching out in its unfortunate victim, puts an end to its career. Prof. F. M. Webster in "Insect Life" gives an interesting account of the operations of this insect, as follows:

On the morning of August 9th, we observed a larva of *Pieris protodice*, Boids., in the act of transforming to the chrysalis. Near by, and very evidently watching this transformation, were a male and female of this parasite. The trio were observed several times during the early part of the day, the parasites always on guard, as it were,

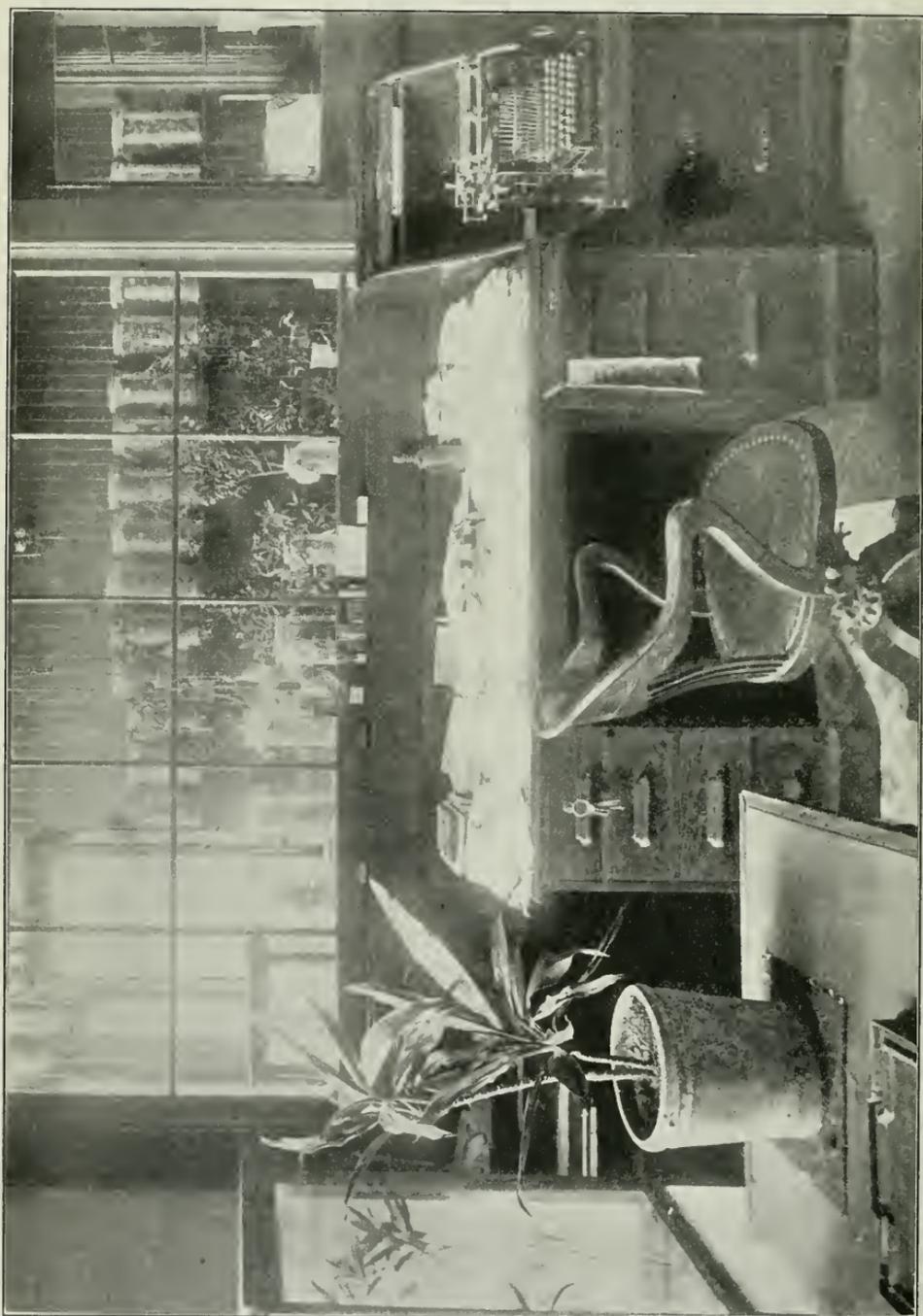


PLATE V. Office of the Horticultural Commission in San Francisco, showing insectary and breeding-jars in the background

although the females several times were observed to attempt oviposition, in every case, however, being deterred from so doing by the jerking of the larva, now in a semi-pupal state. During one of these visits the male was driven away, but soon returned. About 6 P. M., the last observation of the day, the transformation of the larva, while not complete, had so far advanced as to prevent the radical movements which had characterized its struggles during the forenoon, and the female was busily engaged in her work of oviposition, the male still present as a spectator (?). On the morning of the 10th, the chrysalis, now fully developed, was removed and placed in a glass jar, awaiting further developments. On the morning of the 27th, seventeen days after, the adult *Pteromalus* were observed issuing from the chrysalis in great numbers. After all had emerged, they were counted and found to number 68 males and 4 females. The same parasite had been reared from a similar chrysalis on August 13th, but the individuals were not counted.

Comys fusca, Howard. (Plate II, Figs. 3, 3a.) This is one of the most effective of the scale parasites in our State. Its efforts are principally directed to keeping down the brown apricot scale (*Eulecanium* [*Lecanium*] *armeniaceum*, Craw), and wherever it has become thoroughly established, it has accomplished this object in very good style. The brown apricot scale has been one of the most serious scale pests of the State, frequently covering the twigs of apricot, plum, and prune trees with an almost solid incrustation, destroying the vitality of the trees, ruining the fruit, and doing incalculable damage. By means of this little internal parasite, however, we are enabled to keep the pest well under control, and whenever there is an outbreak of the scale, colonies of the parasite are sent and soon become established. The parasites are small, and their capture and shipment require great care. The method in which this is done is by noting an orchard in which the insects are well established the preceding season. From this orchard large quantities of infested twigs are secured about the middle of May, or before the parasites begin to emerge from the scale. These are carefully trimmed of all leaves to prevent mildewing, and then placed in square, wooden receptacles or boxes, as shown in the illustration (Plate VIII). These boxes are bored with a number of half-inch holes in the upper half and all light elsewhere excluded. Into these holes small vials are fitted, with the mouths inward. The insects, as they emerge from the scales, seek the light and enter the vials placed to receive them and when there are enough in any one to form a colony of sufficient size, usually from twenty-five insects up, the vial is removed, stopped with a little cotton wool to prevent their escape and yet admit air, another vial is set, and the process is repeated. The vials are then carefully packed in stiff paper tubes (see Plate IX) and mailed to all sections where there have been any reports of outbreaks of the scale. In this manner, beneficial insects are distributed by tens of thousands all over the State and nature is aided in her efforts to keep our insect enemies within proper limits.

Encyrtus flavus, Howard. (Plate II, Figs. 1, 1a.) This is one of several internal parasites of the soft brown scale (*Coccus* [*Lecanium*]



PLATE VI. Breeding-cases for beneficial insects, in San Francisco office.



PLATE VII. Insect breeding-jars, showing method of breeding and capturing beneficial insects for shipment.

hesperidum). This scale was another of the very serious pests which the orange-growers of California had to contend with and from which they have been relieved by insect aids. When orange-growing was in its infancy, the soft brown scale obtained a foothold in the orchards, and without any check soon spread. In a short time, the trees were covered with it and were suffering greatly from its depredations. In a comparatively short time, however, it began to disappear, and investigation showed that several internal parasites, among which the *Encyrtus flavus* was one of the most important, were actively at work upon it, and reducing it below the danger limit.

Coccophagus lecani. (Plate II, Figs. 2, 2a.) This is another of the internal parasites of the soft brown scale (*Coccus hesperidum*). It is found in several of the *Lecaniums*, but its best work in this State has been on the soft brown scale of the orange, which, in connection with *Encyrtus flavus*, it has kept below the danger limit.

Coccophoctonus sp. This is an internal parasite of both the yellow and red scales, and while it has not done as extensive work as some of the other parasites above described, it is none the less an important addition to our list of friendly insects.

Eupelmus mirabilis, Walsh. This is an egg parasite of the katydid (*Microcentrim retinervis*, Scudder). The female insect lays her eggs within those of the katydid. The young parasite is hatched and at once proceeds to eat the eggs of the host insect. The *Eupelmus mirabilis* has been an invaluable friend to the orchardists of California and especially to those engaged in orange-growing, where at one time the katydid was an annoying and destructive pest. It is now rather a rare insect in those sections where it was once so common, and it is difficult to find its eggs without observing that they have been perforated and destroyed by this parasite.

Besides the above-named insects which are common in California, and to which without doubt we owe our position as a fruit-producing State, there are a number of others of greater or less importance, among them a species of *Braconid*, parasitic on cutworms; *Anastatus*, an egg parasite of the tent caterpillar, and another parasite of the tent caterpillar eggs. There is also a Tachnid fly which destroys the cabbage butterfly by laying its eggs on the victim, the young larva hatched from which eats up the caterpillar and destroys it. There is also an internal parasite of the *Eulecanium* (*Lecanium*) *robinarum*, Douglas, and a species of *Apelinus* working as an internal parasite of the aphid.



PLATE VIII. Trap boxes, showing method of catching beneficial insects for transportation. Scale-infested twigs, containing the parasites, are placed in the boxes, and as the insects hatch they work to the light shown in the tubes and are captured without being handled.

DIPTEROUS INSECTS.

In the great family of dipterous or two-winged flies, we find very many of our worst pests; among them the many fruit flies, which do so much damage by laying their eggs in the ripening fruit, and which hatching out into a mass of crawling maggots render it wholly unfit for use; but at the same time this order gives us very many of our best friends, and prominent among them are the following:

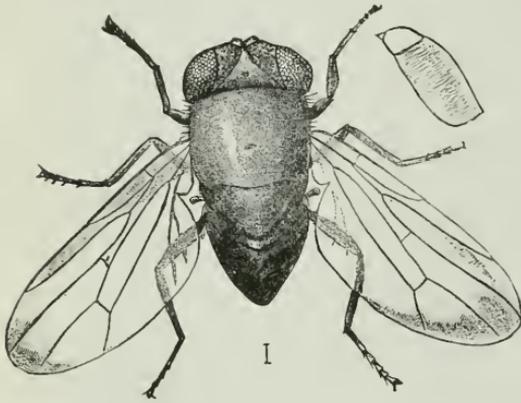
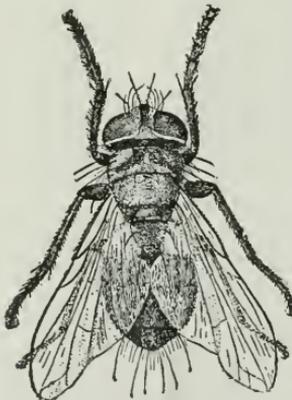


FIG. 13. *Lestophonus icerya*, enlarged.

Lestophonus icerya. (Plate I, Figs. 5, 5a; also Fig. 13.) This is an exceedingly small, two-winged fly, which was found at work on the cottony cushion scale at Sidney, N. S. W., by Albert Koebele. It is now thoroughly established all over California wherever the cottony cushion scale is found, and has proved itself a valuable auxiliary to the *Vedalia cardinalis* in keeping that pest in check.

Celatoria crawii, Coquillett. (Fig. 14.) This is another of our beneficial flies, being an internal parasite of the well-known twelve-spotted squash beetle, so common in fruit-growing districts, and is one of the



Female, enlarged.



Larva.



Pupa.

FIG. 14. *Celatoria crawii*, Coquillett.

rare instances that have been recorded of a beetle being destroyed by the larvæ of a fly. It is not only interesting to an entomologist, but is of great assistance to the horticulturist in reducing the numbers of such

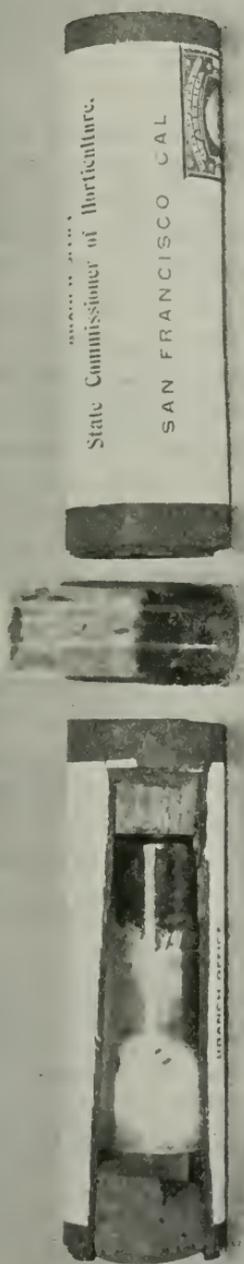


PLATE IX. Beneficial insects ready for mailing. Showing a section of one tube removed to illustrate method of packing.

a serious pest. Mr. Craw discovered this parasite in the neighborhood of Los Angeles, where he collected a large number of the beetles, and found that fully one third were parasitized. He found them in the larval state in the beetles as early as May and as late as the middle of October. The May brood pupate early in June and remain in this condition about two weeks, when they change to the winged form. They are numerous in July and August.

Masicera pachytyli, Sk. (Fig. 15.) This is one of the Tachnid flies, the whole of which family are parasitic on other insects. They are of

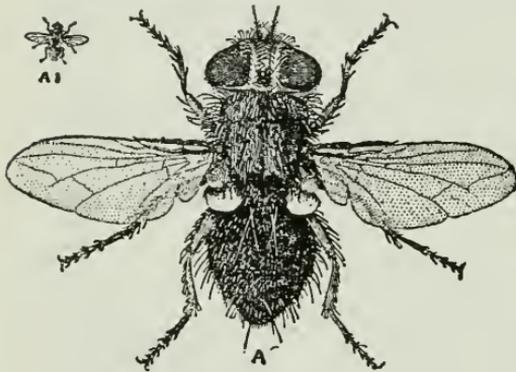


FIG. 15. *Masicera pachytyli*, Sk., parasite of the locust.

medium size generally, and to a casual observer resemble our common house flies. The favorite food of the greater part of the members of the family are the caterpillars. The female lays her eggs on the soft bodies of the caterpillars and the young grubs devour their host, which never attains its mature state. It is to this family that the reduction of moths and butterflies below the danger limit

is due. The one of which we give an illustration in Fig. 15 is parasitic on the locust, and unquestionably does much toward keeping this terrible pest in check in Australia, where it is native. This is one of the introduced species and has been established in our State. Mr. A. H. Bray gives his observations on this insect, as follows:

The grub, or larva, is found within the locust, where it appears to live upon the adipose tissues of the victim, avoiding the vital parts with unflinching instinct. The grub lives indifferently in the thoracic region or the abdomen of the locust, and frequently three or four may be found in a single grasshopper.

The grubs leave their victims when they are full grown, usually by means of an opening which they eat in the side of the locust at the point where the abdomen joins the metathorax; but they do not invariably make their exit from the body of the unwilling host at that particular place, as on one occasion I observed two grubs escaping from a grasshopper at the same time—one from between the first and second abdominal segments, and the other from between the head and prothorax. As soon as the grub makes its escape, the grasshopper, which has gradually grown more and more feeble as the inclosed parasite has gained in size, dies. In several instances I have observed that the grasshopper died before its enemy succeeded in making its escape; and in one case a larva was seen vainly struggling to free itself from between the metathorax and the abdomen of a dead grasshopper, where it was firmly held by the contracting remains of its victim. The grub, which subsequently died without extricating itself, succeeded in freeing more than half its body, but it was firmly held by the tail.

The *Syrphidæ*, or syrphus flies (Figs. 16, 17, and 18), are another large family of dipterous insects, many of which are beneficial to man.

They are usually very conspicuous from size, color, and markings and very many of them resemble other insects and may be mistaken for bees, wasps, etc. They are often seen in sunny weather poising almost motionless on the wing, especially over flower-beds, occasionally darting on their prey. The larva of the syrphus flies is of great benefit in destroying all kinds of aphids. It is quite blind, but the egg from which it hatches is deposited by the parent fly in the midst of a colony of plant aphids, where it gropes about and obtains an abundance of food without much trouble. The larva is fleshy, thick and blunt behind, and pointed in front. Its mouth is furnished with a triple-pointed dart, with which it seizes and pierces its prey, and, elevating it as shown in the figure, deliberately sucks it dry.

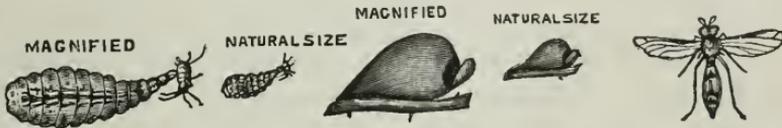


FIG. 16. Larva of Syrphus Fly. FIG. 17. Pupa of Syrphus Fly. FIG. 18. Syrphus Fly.

This is but a partial list of the very many insect friends which are doing so much for California horticulture, and which it has been the policy of the State Board of Horticulture and the State Horticultural Commissioner to foster and encourage to the widest extent, and at the same time to add to their numbers all beneficial insects which can be secured from any part of the world. To this end correspondence is carried on with entomologists in different parts of the world, while agents of this department are dispatched to discover and introduce beneficial species wherever they can be found. It is the policy of this State to use artificial remedies so long as there are no better ones, but to secure, introduce, and distribute the better means, and these consist of beneficial insects, as soon as possible. In California, at least, this plan has been found a very effective and profitable one, for of all the many insect pests which have been found here, and they are as numerous as anywhere on earth, and have been imported from all parts of the earth, there are not now more than two or three really serious species, and all are controlled by their insect-checks, either native or introduced; and so far as those for which we have not yet found an effective parasite are concerned, we are now searching for one, and in view of our past success in this line, will undoubtedly find it.

INSECTS OF THE YEAR.

By EDWARD M. EHRHORN.

The season of 1904 is at its close, and although it has not been marked by any particular destructive pest affecting crops in California, yet the character of the year, combined with a very mild spring, with an abundance of weeds, favored a general increase of our more common species. These conditions naturally caused many inquiries to be directed to the office of the State Commissioner of Horticulture, resulting in an increased volume of correspondence.

PLANT LICE.

Every farmer knows the enormous prolificacy of this group of insects, and 1904 was rather favorable to their increase.

Apple-tree Plant Louse (Aphis mali). (Figs. 1 and 2.) This species occurs in greater or less numbers throughout the apple orchards of our State, and at times becomes a great nuisance and does considerable

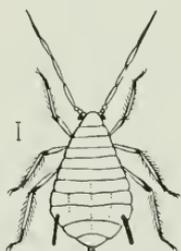


FIG. 1. Apple-tree Plant Louse (*Aphis mali*),
immature insect.

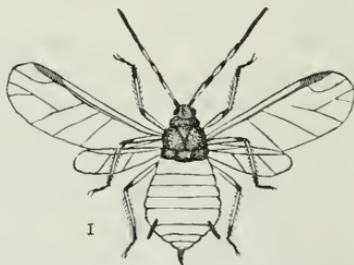


FIG. 2. Apple-tree Plant Louse (*Aphis mali*),
mature insect.

damage to trees. Reports from various sections show that this species appeared in great numbers. Thanks to the good work of our common ladybirds, this pest does not continue during the summer months. On young trees it is well to check the ravages as soon as the pest makes its appearance, using a good kerosene emulsion or whale-oil soap wash consisting of one pound of soap to five gallons of warm water so as to prevent the stunting of such trees.

Prune Aphis (*Aphis prunifoliae*). (Fig. 3.) Very little inquiry reached this office in regard to this pest, and no doubt wherever it made its appearance it was kept in check by its natural enemies, as verified by subsequent correspondence with the growers.

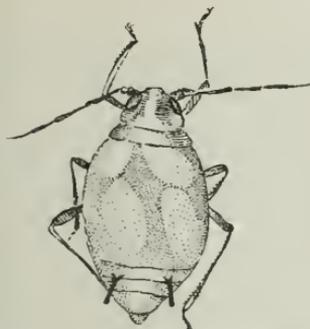


FIG. 3. Prune Aphis (*Aphis prunifoliae*).

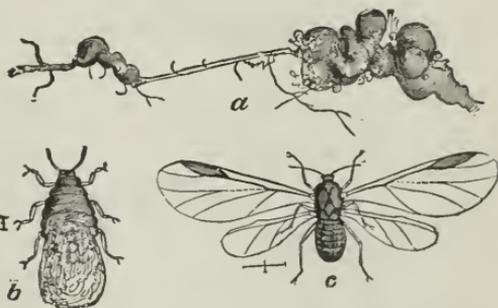


FIG. 4. Woolly Aphis (*Schizoneura lanigera*).

Woolly Aphis (*Schizoneura lanigera*). (Fig. 4.) Every season this insect has been reported, and 1904 records quite a lot of inquiry. The root form, or winter brood, does not seem to be as closely observed by the grower as its importance demands. This pest could be materially checked by attacking the root or winter brood in season, which can be accomplished by an application of gas-lime placed in a trench around the base of the tree. Care should be taken to avoid allowing the lime to come in contact with the bark. An ordinary shovelful to a full-grown tree is the usual dose. Smaller trees must be treated in proportion, as this material is very apt to do injury to the tree if an overdose be applied. Where gas-lime can not be obtained, wood ashes applied in the same manner have given good results. For the summer brood, aërial or branch form, as it is called, the same remedy as recommended for the apple-tree louse should be applied.

Black Peach Aphis (*Aphis persica-niger*). (Fig. 5.) This pest has been reported from some of the northern counties during the season. This species was introduced from the Eastern States several years ago into some of the northern districts, where the counties did not avail themselves of the horticultural protection provided for by our statutes. This insect is one of the most dangerous foes of the peach tree, and should be stamped out wherever found. It



FIG. 5. Black Peach Aphis (*Aphis persica-nigra*).

is a small brownish-black insect, and exists in the wingless as well as

the winged forms. It attacks the roots as well as the leaves and the new growth. The root form makes it possible for this pest to be easily transported from one county to another, so that vigilant inspection should always be made, or strict quarantine measures placed against districts infested with this pest.

Cabbage Louse (Aphis brassica). (Fig. 6.) This insect, although mostly confined to vegetable gardens and attacking the cabbage family, has of late been reported as becoming a serious pest in the seed farms. Great loss has been experienced on mustard, turnips, and radishes. Our common ladybird (*Hippodamia convergens*) has proved of great benefit. The experiment of placing enormous numbers of these ladybirds among the young

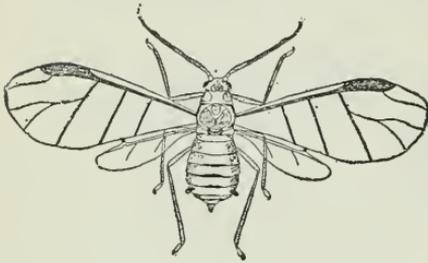


FIG. 6. Cabbage Louse (*Aphis brassica*).

plants when the first lice appeared proved of material help; in fact, one field of turnips was practically uninjured. These ladybirds can be collected in endless quantities in the fall in some of our mountain districts adjacent to the banks of streams, where they hibernate during the winter. After being collected they can be placed in well-ventilated boxes and stored in a cool place, requiring no attention or care until needed in the spring.

Grape Louse (Phylloxera vastatrix). (Fig. 7.) This pest has been reported from nearly all the grape-growing sections of California for many years past, and

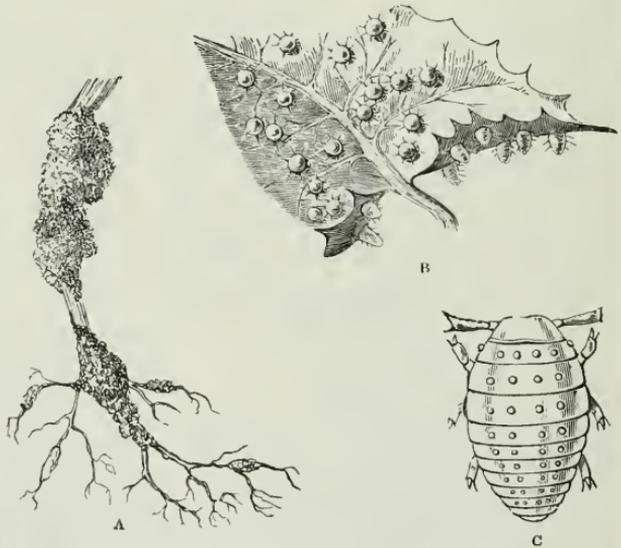


FIG. 7. The Grape Louse (*Phylloxera vastatrix*).
a. Root galls; b. Leaf galls; c. Root form, female.

the planting of resistant vines has proven the only money-saving check against its ravages. While it is true that for a time, when the pest makes its appearance in new localities, it can be kept down by removing all affected vines, as this pest spreads in circles and by removing

these circles, it very often happens that eradication for a time at least can be made. However, the planting of phylloxera-proof roots is the only thorough method of checking the pest.

SCALE INSECTS.

Closely allied to the aphid are the scale bugs, which are another group of sap-sucking insects.

Black Scale (*Saisseta* [*Lecanium*] *olea*). (Plate IV, Fig. 4.) Reports from every section are very encouraging regarding the decrease of this terrible pest. Orchards that were covered with scale are beginning to brighten up their foliage, and the dirty, soot-like, fungus-covered leaves are gradually disappearing. All of this can mostly be attributed to the efficient work of two of our beneficial insects: *Scutellista cyanea*, the African parasite, and *Rhizobius ventralis*, an Australian ladybird, introduced several years ago.

Brown Apricot Scale (*Eulecanium* [*Lecanium*] *armeniaceum*). (Plate II, Figs. 5, 6.) Investigation shows that this scale, although held in check by its parasite, *Comys fusca*, will, at times, show a slight increase. As it is well known that complete extermination by parasites is against the laws of nature and can not be expected, a sufficient number of scales are always left to propagate the species.

After the parasite has reduced the scale to almost nothing, it in turn decreases in numbers and apparently disappears. In a few years the scale again becomes sufficiently numerous to cause alarm, but examination will disclose the presence of the parasite in small numbers, preparing for a great battle, and soon a reduction of the scale follows and normal conditions are restored. In some seasons, climatic conditions very often retard the development of the parasite, and such seasons are favorable to scale increase. Growers should not feel discouraged at these conditions, as in time their little friends, a colony of which can always be obtained in season by making application to the State Commissioner of Horticulture, at San Francisco, will do the work for them at a cost of nothing.

Cottony Cushion Scale (*Icerya purchasi*). As usual, many applications for colonies of *Vedalia cardinalis* were received at this office. This shows that the cottony cushion scale still appears at intervals and causes no little annoyance to the grower and the florist. The office always keeps the ladybird for just such cases, and it may be interesting to know that at times it is very difficult to obtain sufficient food for the propagating jars, showing that this terrible pest will never invade our State again as long as we have its natural enemy.

Among the other species of scale insects which are always being reported from various sections, I may mention the following that have been complained of this season:

San José Scale (Aspidiotus perniciosus). (Plate III, Fig. 4.) This species, although pretty well under control in the southern and central portions of California, has been frequently reported from the northern sections of the State. Every grower who has had experience with the terrible ravages of this species, when it had its full sway in California, knows too well that to neglect taking stringent measures at once against it, wherever it may exist, would be the greatest folly. It is true that parasites and predaceous enemies keep the scale in check in most locations, but by unfavorable surroundings and with climatic conditions more salubrious to the scale and not as wholesome to the parasite, the scale will undoubtedly gain ground. In such cases the old reliable lime, salt, and sulphur wash is without question the best solution for the trouble.

Pear Scale (Diaspis pyricola). This species is becoming quite a troublesome pest on prune trees in the Santa Clara Valley, and although the twice-stabbed ladybird (*Chilocorus bivulneris*) reduced its numbers considerably, yet the habit which the scale has of getting under moss and lichens and loose bark makes it very difficult for the ladybird to accomplish much on that class of tree. The first important step, then, is to remove the moss and lichens from the larger limbs and trunk of the tree by applying either a strong lye spray, consisting of one pound of caustic soda (98%) to six or eight gallons of water, according to the condition of the trees and lateness of the season, or spray with lime, salt, and sulphur as for San José scale, and this will remove the moss as well as kill most of the scale.

Red Scale (Aspidiotus aurantii). (Fig. 8.) This scale is principally confined to certain localities of the State, some years showing an increase and others a decrease. Unfortunately, the internal parasite of this pest is a very minute fly, making its propagation and distribution very difficult. The fly is hardly discernible to the naked eye, and the fact of its microscopic nature has caused it to be entirely overlooked in many cases where colonies have been sent to applicants, they claiming that there was absolutely nothing in the vials sent. Reports from sections where it has become established are very encouraging, and we hope that in time it may aid materially in subduing this terrible pest.

As this is one of our most destructive orange and lemon pests, stringent measures should immediately be taken wherever it makes its appearance in new sections and a thorough eradication should follow, to stamp out this pest before it can gain a foothold.

The old reliable method of fumigation with hydrocyanic acid gas has for years been used successfully in holding this pest in check. The expense of this method has in the last season caused considerable experimenting along the line of sprays as a means of fighting it. A cheaper method appeals very strongly to the average grower, and certainly a reduction of expense in the method of warfare would materially aid the producer and be welcomed by all, if the same results can be obtained by its use. Reports from some of the southern districts claim that excellent results have been obtained by the use of distillate spray, but this as a remedy for red scale is as yet somewhat of an experiment and we must await with patience the outcome of the controversy now

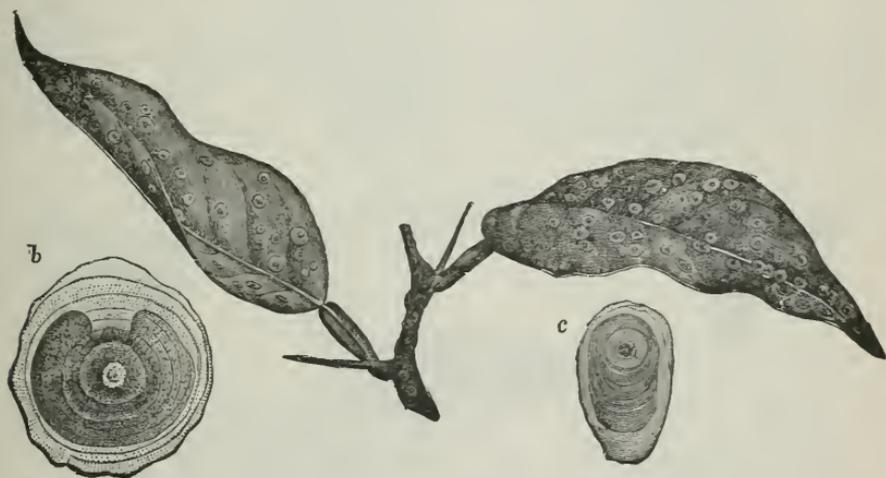


FIG. 8. Red Scale of the Orange (*Aspidiotus aurantii*).

pending between these remedies, and make our individual decisions solely on results, for in the final count *results* will be the deciding point.

Mr. George Compere, who is traveling abroad in search of beneficial insects, has sent several species of ladybirds which he found feeding on red scale (*Aspidiotus aurantii*) in orange groves, which were apparently kept clean by these species, as the scale was found in very limited numbers. These ladybirds are now being propagated by the Quarantine Division, and will in time be liberated in sections where this pest is to be found.

LEPIDOPTEROUS INSECTS.

Peach-root Borer (*Sanninoidea opalescens*). (Fig. 9, *a, b, c, d.*) By a thorough and systematic method of fighting, this pest is much reduced throughout the infested regions, and more confidence regarding the future is generally observed. For a number of years endeavors have been made to find some substance which would kill boring insects by

contact, but so far the nearest approach to such a substance is heavy crude oil.

In 1902 Mr. D. B. Pickering, of Santa Clara, applied heavy crude oil of an asphalt base, an oil of from 14° to 16° Beaumé, to the trunks of his trees which contained borers, and the result was so gratifying that the next season he extended his experiments and induced some of his neighbors to follow his method. Mr. Pickering's method is as follows: Remove the earth from around the trees to the larger roots and scrape off all clinging material, such as gum, borings, and clinging earth, it being necessary to open all channels where borers are located, which are usually clogged by these substances. As soon as the trunk and exposed roots are thoroughly cleaned, a heavy coat of oil is applied with a paint brush as high up as the ground level and the trench left open for a few days, when the earth can be replaced. The fumes of the oil will enter the opened channels and drive the borers out, and coming in contact with the oil, they will soon perish. In order to avoid any



FIG. 9. Peach-root Borer (*Sanninoidea opaleseens*).

possible injury to the tree by the application of this remedy, it has been deemed wise never to bring the oil above the surface, so as to prevent the sun from driving it into the bark. It is well to paint the trunk above the ground with lime and crude oil mixed as follows: Slake 50 pounds of lime, and while slaking pour in from 2½ to 3 gallons of heavy crude oil, with enough water added to make a thick paste, like white-wash. Another very good substance is made as follows: Slake 50 pounds of lime, and while slaking pour in from 1½ to 2 gallons of gas tar. Dissolve 12 pounds of whale-oil soap and add this to the lime and tar solution, making the whole into a thick whitewash by adding a little water at a time and stirring constantly. These applications will prevent the young borer from entering the bark above the surface line and are absolutely necessary to be applied in conjunction with the crude oil below ground.

Digging out the borer in the fall is still practiced by many growers and will answer the purpose where careful work is done by the grower himself and followed up with the lime and gas-tar solution, but where careless help does the digging greater damage than that done by the borer is usually the result.

Peach Moth (*Anarsia lineatella*). (Figs. 10, 11, 12, 13.) A great deal of complaint regarding this pest was received, and generally speaking it was more numerous this season than in 1903. Growers should endeavor

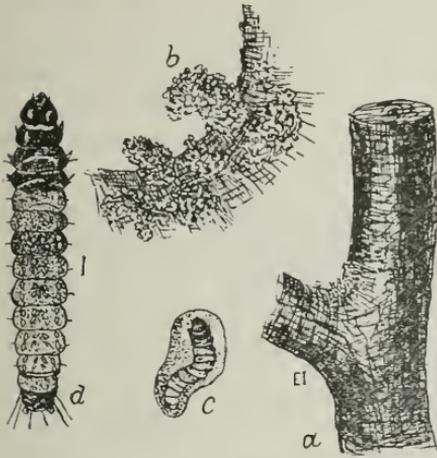


FIG. 10. Peach Moth (*Anarsia lineatella*).

a. Peach-twig, showing minute masses of chewed wood in crotch above larval chambers. b. Same, much enlarged. c. A larval cell with contained larva. d. Dorsal view of young larva, much enlarged. (After Marlatt.)



FIG. 11. Peach Moth (*Anarsia lineatella*).

a. New shoot of Peach withering from attack of larva. b. Larva, enlarged. c. Pupa, enlarged. d. Anal segment. (After Marlatt.)

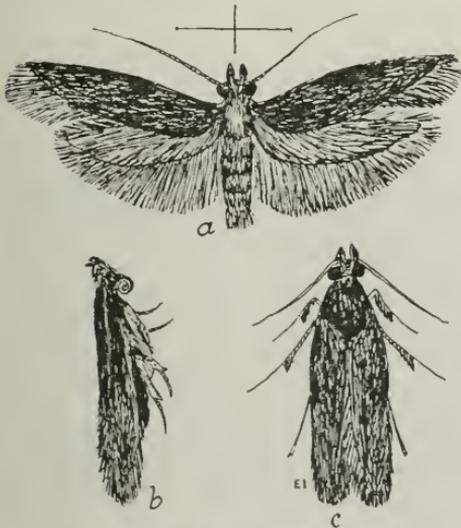


FIG. 12. Peach Moth (*Anarsia lineatella*).

a. Moth with spread wings. b, c. Same, with wings closed, illustrating positions normally assumed. All much enlarged. (After Marlatt.)

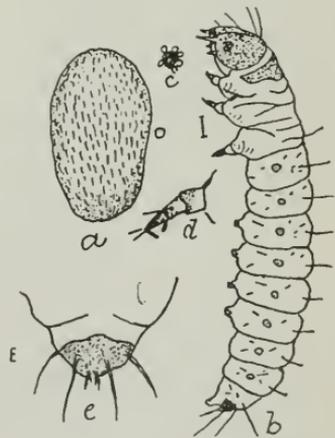


FIG. 13. Peach Moth (*Anarsia lineatella*).

a. Egg. b. Young larva. c. Eye. d. Thoracic leg of same. e. Anal segment from above. All greatly enlarged. (After Marlatt.)

to check this pest by spraying with lime, salt, and sulphur as close to the growing season as possible. The hibernating larvæ can be easily destroyed at this period and in this way prevent the development of a later brood which attacks the fruit. The grower who objects to lime, salt, and sulphur can use a good kerosene emulsion in place of it.

Codling-Moth (*Carpocapsa pomonella*). (Figs. 14, 15.) This pest is one of the oldest in our State and causes enormous losses annually. If reports, correspondence, and frequent interviews have any significance, then 1904 was a banner year for the codling-moth. No doubt the late rains helped somewhat to prevent thorough spraying as well as to wash off a great deal of the poison calculated to do good work against this pest. Cannons, generally speaking, have reported an abundance of wormy

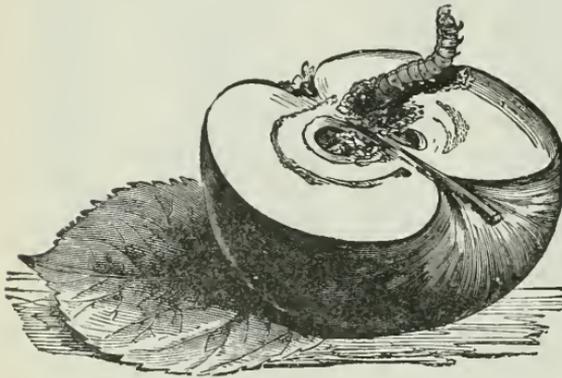


FIG. 14. Codling-Moth (*Carpocapsa pomonella*), larvæ in apple.

pears, and from my own observations I have never known Bartletts to be so severely attacked as they were this season. The question now arises, what can be done to overcome these ravages? The only way at present is to apply poisonous sprays and capture the larvæ under bands, as has been practiced for years. It is essential to procure the best of paris green

and, before using it, have it tested as to its purity. Another very important point is the application of the poison in as fine a spray as possible, and never drench the trees, as the surplus will drop off the trees and carry the paris green, which is heavy and settles readily, with it.

Mr. George Compere, who is at present engaged in the search for parasites for this terrible pest, has already sent two species to the Commissioner of Horticulture, which arrived in good condition, and if it be true



FIG. 15. Codling-Moth (*Carpocapsa pomonella*), showing variations, all natural size.

what Mr. Compere has observed and what he reports of the work of these insects in Europe and we can propagate and establish the parasites in California, then we have gained a victory which is worth untold millions to the growers and to the State.

Cankerworms (*Alsophila pometaria* and *Paleacrita vernata*). (Figs. 16, a, b, and 17.) During the early part of this year cankerworms were

reported from various sections of the State. Much spraying with paris green was resorted to, but as usual the results mostly proved failures.

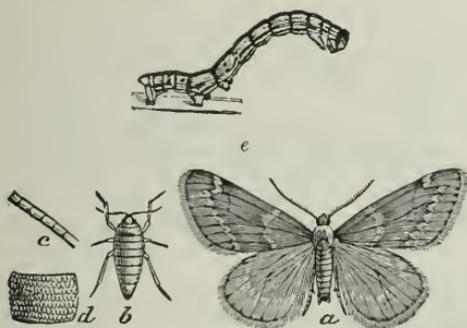


FIG. 16. Fall Cankerworm (*Alsophila pometaria*).

a. Male moth. b. Female moth. c. Joints of antennæ of female, enlarged. d. Segment of body of female, enlarged. e. Larvæ of cankerworm.

The wire-mesh traps, wherever correctly adjusted, proved a great success, as they capture the female moths in autumn and in this way prevent a brood of worms. The reason we often hear of the failure with the wire-mesh traps is on account of their careless adjustment to the tree, as many growers employ inefficient help for such important work and the traps are put on in a haphazard manner.

Another failure can be attributed to neglect in removing the traps, after the moth has been captured. This is absolutely necessary, as a great many eggs are laid on and about the trap and these hatch into minute worms, which can readily pass through the mesh and crawl up into the tree. By removing the traps, burning the cotton batting, and whitewashing the trunks of the trees from where the trap was placed to the ground, all eggs will be killed and the pest materially checked. The traps can be scalded and dried, stored away, and again used for several seasons.



FIG. 17. Spring Cankerworm (*Palecrista venata*).

a. Male moth. b. Female moth. c. Three joints of antennæ of female moth. d. Abdominal segment of female moth, enlarged. e. Ovipositor, enlarged.

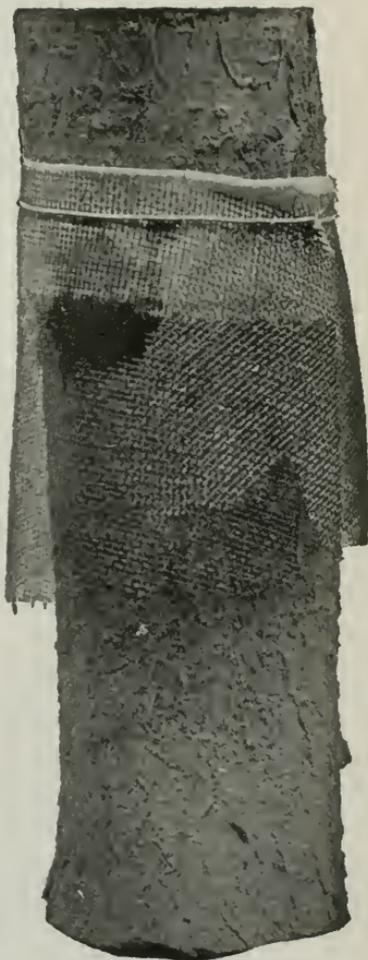


FIG. 18. Cankerworm Moth Trap.

Leaf-Rollers (Cacæcia obsoletana, Walk.). With the cankerworms this season there appeared a green caterpillar with a black head resembling the cankerworm, but not looping when in motion. These are leaf-rollers, and generally hide between two or more rolled-up leaves. Much alarm was felt for a time and various poison sprays were tried, but with poor results. Many trees were stripped of their leaves and growth, giving them a very ragged appearance. This insect has been with us for some time and its appearance in such great numbers can be attributed to the mild spring weather with little rain. As soon as the caterpillars matured the damage ceased and the trees soon recovered their verdure.

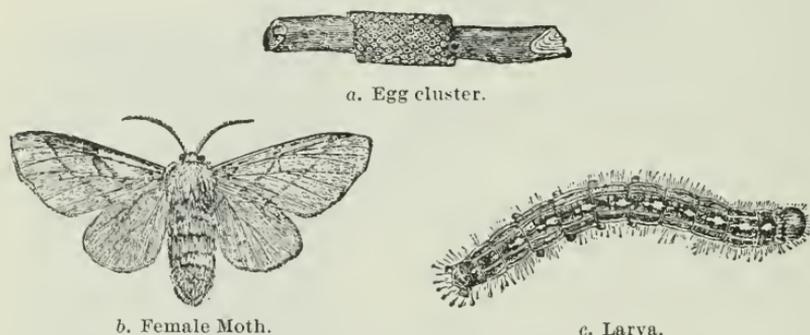


FIG. 19. Tent Caterpillar (*Clisiocampa sylvatica*).

Tent Caterpillars (Clisiocampa californica and C. constrictor.) (Fig. 19, a, b, c.) These caterpillars were not reported as plentiful as last season, although occasionally complaints of their damage would reach the office. We have a great number of enemies attacking our common caterpillars, and some of our insect-feeding birds do much toward keeping down their numbers. Climatic conditions very often help greatly in the increase of these pests, and in such seasons an early attack on the brood will in most cases prevent much damage. Collecting and burning the webs containing the caterpillars has been found the easiest and best method of coping with this pest.

MISCELLANEOUS INSECTS.

Cherry Slug (Eriocampa cerasi). (Fig. 20.) This pest was found quite abundant in various sections, especially doing damage to cherry trees. The pest is easily killed by dusting the trees with either road dust or air-slaked lime, and the fault of increase can be attributed to the fact that



FIG. 20. Cherry Slug (*Eriocampa cerasi*).

the grower generally waits too long and allows the first brood to multiply. If the first individuals are killed off, a complete check will be

made for the season. Spraying with paris green will greatly help toward checking the ravages, provided the finest spray be applied and the trees not drenched with the liquid, as is usually the practice among orchardists.

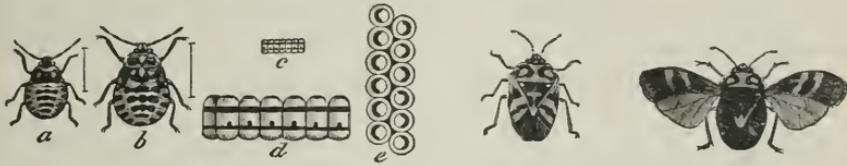


FIG. 21. Harlequin Cabbage-bug (*Murgantia histrionica*).

a. Larva. b. Pupa. c. Eggs, natural size. d. Eggs, enlarged. e. Eggs seen from above, enlarged.

Harlequin Cabbage-bug (*Murgantia histrionica*). (Fig. 21, a, b.) This insect belongs to the true bugs, and is a flattened black bug with bright red or yellow markings, living on plants belonging to the cabbage family. It lives by puncturing the leaves and sucking the sap, and causing much damage to the fields of cabbage. This pest is very difficult to kill, and the contact sprays which usually kill sucking insects have to be applied in such strength that they generally ruin the plant. The hibernating bugs which gather in clusters on old dried plants during the winter can be collected or killed by very strong sprays. Collecting the winter brood by hand is too expensive and too tedious an undertaking if done on a large scale. This insect has been reported from a great many sections of the State as doing considerable damage, but much of this damage can be overcome by destroying the winter brood.

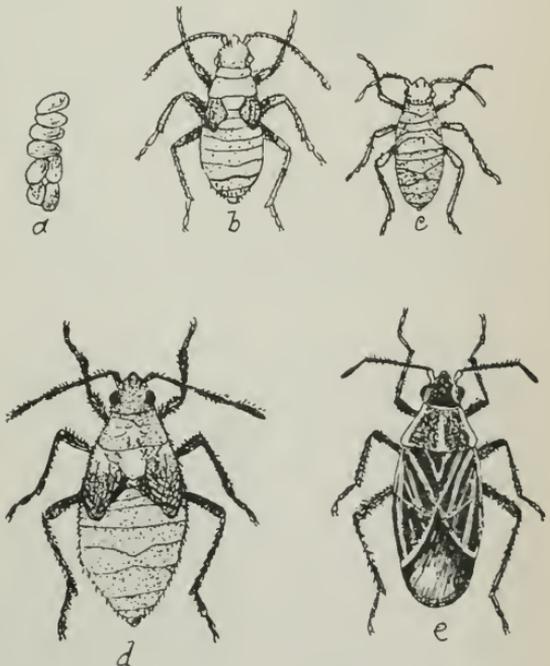


FIG. 22. Box Elder Plant-Bug (*Leptocoris trivittatus*)
a. Eggs, enlarged. b, c, d. Different stages of immature bugs; all enlarged. (After Howard.)

Box-Elder Plant-bug (*Leptocoris trivittatus*). (Fig. 22.) Although this pest is a feeder on the box-elder tree, it does at times attack fruit trees, such as peaches, plums, and apples, and also various plants of the flower garden. Its habits are somewhat similar to those of the Harlequin cabbage-bug, especially the winter hibernating brood,

which sometimes collects in houses or in the crevices of the rustic boarding and in the angles of stone buildings. On warm winter days one can observe these individuals flying in every direction. In the fall of the year, when they congregate, they can be readily destroyed with hot water or may be collected in kerosene pans. When this pest has been observed doing damage it will pay to be a little industrious and kill off the hibernating individuals in the manner suggested.

Fuller's Rose Beetle (*Aramigus fulleri*). (Fig. 23.) This beetle has been recorded as being plentiful in some of the southern counties and as one of the most destructive pests known to young orange groves. Although it exists in the northern districts, yet the damage caused by it is not a circumstance to that done in the south. This pest, although found feeding on every variety of plant, seems to prefer the young growth on orange trees, and here is where the great damage to newly budded trees occur. The larvæ or grubs live in the ground and feed on the roots of



FIG. 23. Fuller's Rose Beetle
(*Aramigus fulleri*).

trees and plants and are very hard to control. Trapping the beetles is about the only way to get rid of them; they can also be prevented from ascending the tree by using a band of cotton, which should be tied around the trunk and loosened at the bottom, so as to be woolly, thus preventing the beetle from climbing over it. The beetles are easily shaken from the tree and can be collected on a sheet, as they can not fly. Experiments with carbon

bisulphide have been carried on against the grub with some success, but as the grub is found generally distributed through the ground, it will take a large amount of the chemical to go around; it is therefore too expensive to be used as a practical method of eradication.

Thrips. (Fig. 24.) These minute insects have again appeared in several sections and have done considerable damage to the buds, blossoms, and leaves of deciduous as well as evergreen trees. One species, *Euthrips fuscus*, in particular has been very destructive to the buds and blossoms of prune, apricot, and peach trees in the Santa Clara Valley. The infested area is well marked, as the fruit did not set at all, and during the blossoming season each infested orchard presented a dismal look in contrast to the beautiful white blossoms of other sections. The damage done by this insect is first caused to the style of the blossom, which it punctures, so that fertilization can not take place; but if fertilization has taken place, then the injury will be noticed on the mature fruit, which is badly scarred, and this will serve as an indication to the grower that the insect is present on his trees. To what

extent this pest will spread is difficult to say, but stringent measures should at once be taken to prevent it from gaining a strong foothold. Spraying with any oily mixtures, whale-oil soap, crude oil, or kerosene emulsion, just as the buds are swelling, will greatly reduce the pest.

RED SPIDERS AND MITES.

Perhaps the most troublesome small things to annoy the grower are what are popularly known as red spiders and mites. Almost every season these microscopic creatures are reported as doing some damage to fruit trees or they are injuring the vegetable gardens or hothouse plants.



FIG. 24. Thrips.

Red Spider of the Almond (*Bryobia pratensis*). This species was not reported as abundant in the sections where last season such damage was experienced, and this is probably due to the late spring rains. In the drier sections of the State this species, with its cousin, the yellow mite (Fig. 26), holds full sway and can only be kept in check by the application of dry sulphur or by a sulphide of potash spray.

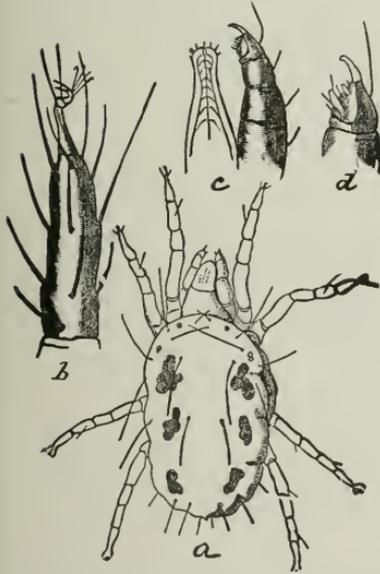


FIG. 25. Six-Spotted Mite (*Tetranychus maculata*).

a. Insect, much enlarged. b. Tarsus. c. Rostrum and palpus, still more enlarged. d. Tip of palpus, still more enlarged.

Orange Mites (*Tetranychus mytilaspidis* and *T. sexmaculatus*). (Fig. 25.) These species have been reported from several sections as doing considerable damage to young citrus trees. In some sections they can always be found in limited quantities only, especially where fumigation or spraying is generally practiced, but they become a very serious pest if not subdued in time by either of the above methods. The presence of these mites may be easily detected by an examination of the leaves, which have a

drooping appearance. The young spiders wander all over the surface of the leaves, feeding in different places by puncturing them. These punctures give the leaves a mottled appearance when examined through a lens. It is this terrible sapping of the leaf which causes it to have that unthrifty look, and naturally is the result of the sap being taken by these minute insects.

Pear-leaf Blister Mite (Phytoptus pyri). (Fig. 27.) This mite differs very much in structure and habits from all common mites, it being cylindrical in form and living in the tissue of the leaves. Early spray-



FIG. 26. Yellow Mite.

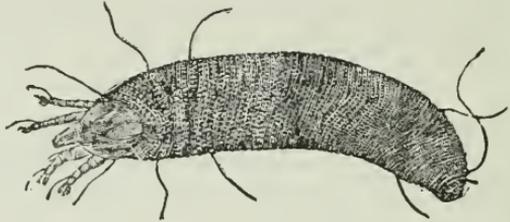


FIG. 27. Pear-Leaf Blister Mite (*Phytoptus pyri*), very greatly enlarged.

ing with kerosene emulsion or treating the trees with dry sulphur will check further development. The presence of this mite can be readily detected by the blisters or galls on the young foliage, which are easily recognized by their reddish color. This or a near species also attacks the walnut, grape, orange, and lemon, and the same remedies can be used to check these.

MISCELLANEOUS.

Pear Blight.

The Apple in California.

Marketing California Fruits in Europe.

PEAR BLIGHT.

This disease, which until some three years ago had confined its ravages to the upper San Joaquin Valley, and had appeared, though not to a serious extent, in the southern counties, has now spread over the greater portion of the State, the only sections so far reported as free from it being the coast counties. It has shown itself in San Joaquin County, has appeared in destructive force in the great pear section along the Sacramento River, and is reported in all the counties of the Sacramento Valley and most of the mountain counties. Its attacks have not been confined to the pear, but in the apple sections in the mountain valleys the apples have also suffered. In Sacramento County, along the river, and through the Sacramento Valley, pear-growers have been indefatigable in their efforts to stamp out this dread disease. Vigorous cutting-back has been resorted to, the orchards have been carefully watched, and the disease has not been allowed to obtain any headway. It is yet too early to judge what the result of this treatment has been, but it is to be hoped that it has checked the spread of the trouble.

In Sacramento County, Dr. L. C. Chisholm, who has been acquainted with the disease for many years in the Eastern States, where it originated, has been engaged in the prosecution of the campaign against it all summer, and we append herewith his report on the matter:

ZYMOTIC PEAR BLIGHT.

By L. C. CHISHOLM, of Sacramento.

We are told by our plant pathologists that the pear blight appeared in the beautiful valley of the Hudson River as early as 1794. Duhamel (1768) mentions a pear blight that was very destructive in Europe in the seventeenth century. Again we have Downing, an eminent American horticulturist, writing of pear blight in 1845. It remained, however, for Prof. T. J. Burrill, of Illinois, in 1879, to discover that true blight is of a bacterial nature, and is caused by a minute microbe, and it is now known as *Bacillus amylovorus*.

Much time and study have been given to this disease, but as yet it seems that little has been published as to its treatment. The true or zymotic pear blight is now in nearly every pear orchard along the rivers in northern California, and is seriously threatening the very existence

of the greatest pear-growing district in the State, that of the lower Sacramento Valley. This same bacterial blight has devastated the pear orchards of Kern, Kings, Tulare, and Fresno counties, in the San Joaquin Valley.

In a report from the State of Washington the statement is made: "All through the inland region, pear blight has been a terrible scourge. A conservative estimate is that seventy per cent of all the pear trees in this region have been ruined by pear blight within the last six years. Pear-growers are generally discouraged at the outlook." The "Pacific Homestead," of June 2, 1904, says: "Pear blight has wrought such havoc of late years that interest in pear-growing is at a low ebb."

This disease attacks not only pears but apples, quinces, and all pomaceous fruit trees. Pear blight has been particularly bad on apple trees in the Alleghany regions this year, and recent reports from Utah declare that it has such a hold there as to seriously menace the pear-growing industry, and the situation is made more serious by the recent discovery of what is called the same disease in apricot trees in Brigham City orchards, where its deadly effects were more rapid in developing than in the pear or quince trees, the apricot tree succumbing very quickly after the first appearance of the malady. From three to five years is the time usually required by this disease to destroy an orchard.

No variety of pear trees is exempt from blight, but some are less susceptible than others, the Duchesse, Kiefer, Winter Nelis, and Seckel pears being less subject to blight, while the Bartlett, Clapp's Favorite, and Idaho are its prime choice. Top-grafted or field-grafted trees of any variety suffer most when once attacked.

While malignant blight is quite an old disease, it is apparently of American origin, as we hear nothing of it from Europe to indicate that the zymotic blight exists there.

There are several forms of disease that affect the pear trees, hence we have several kinds of blight, mentioned as Winter leaf blight, Summer blight, Winter blight, Insect blight, Frozen sap or Sour sap blight, Malignant, Zymotic or Bacterial blight (Burrill). The last named is the disease with which California orchardists are now contending. As there are so many causes, local and otherwise, that perhaps call for so many names, we shall mention, aside from zymotic blight, what is called insect blight by Downing. It would perhaps be impossible in California to reconcile each name to a condition. Insect blight, which was very prevalent in the lower Sacramento Valley this season, is caused by the larva of a very little brown beetle about one fourth to one half of an inch in length, one of the Scolytids. The beetle deposits its eggs at the foot or crotch of a fruit spur. The larva burrows its way straight down to the center of the twig from two to four inches. The twig dies and the leaves turn brown or black in the sun, having much

the appearance of fresh blight. The larva or the bug is easily found in May and June, in the lower Sacramento Valley. The shot-like hole can always be found and there is no chance to confuse this dead twig with true blight. Downing in his work on horticulture calls this bug the *Scolytus pyri*.

Frozen-sap blight is a condition common to fruit trees of all kinds in countries of very variable climate. This so-called disease is not communicable by inoculation. Several theories are advanced as to its cause, the most feasible being that of the sap and cambium freezing or chilling, and later souring, causing the death of the limbs. A lack of sufficient moisture during the latter part of the growing season, which makes it impossible for the tree to furnish sap enough to compensate for the evaporation from the leaves, is a prime cause for so-called dieback blight. Root fibers killed by too much water result in the same effect.

Nothing new or peculiar is noticed in the present epidemic, but in all countries where blight first makes its appearance much is taken for the typical disease which is not true blight, and much that is true blight, left over from previous seasons, is taken for "dieback." There is no difficulty in noting the difference between insect blight and true blight. As before remarked, the shot-like holes and the beetles themselves may be found. One can readily recognize the true disease by the peculiar dark reddish brown of the leaves, accompanied by the discolored and blackened limbs, and while it is yet growing the cambium is darker lower down the twig than is shown on the bark. Many orchardists have declared that the blight had just broken out, when it could be seen by the line of demarcation, plainly separating the diseased from the healthy wood and by new twigs putting out as if to repair the injury that the blight was of old standing and was dormant for the season.

Many claim that as fast as they cut it out it appears again. This is in a great measure a false idea, as I shall try to show.

Zymotic pear blight first makes its appearance in the spring on the blossoms. When the blossoms begin to drop their petals, a few bunches may be observed to turn brown and cease growing, having the appearance of being frost-bitten or scorched with fire. The growth of the disease, which now begins to creep down the fruit spurs, is at first slow. Many cases will remain dormant until several of the pears are quite large, and then begin as if a new case had just been inoculated. This is called by Professor Ward, United States Plant Pathologist, "blossom blight," and many observers have found very little of any other kind. It is safe to say that ninety per cent of the blight found in flowerless twigs was carried there and the twig punctured or injured by an insect of some kind or the claw of a bird after just having had its feet in the gummy exudation spoken of later. In many cases of extended blight

the leaves remain green for several days. Especially is this the case later in the season, and on blossomless twigs or water sprouts. Let it be remembered that no well-authenticated case of malignant pear blight has ever been known to begin in the leaves. The twigs and smaller limbs, after the blight attacks them, turn very dark or black. Where the limbs are larger and the bark thicker all of the cambium is not killed at once. This may in part account for the leaves remaining green so long after the blight has reached below them.

Usually after May 1st in California the disease advances very rapidly, running down the tender new twig growth to the larger limbs and to the body of the tree. Sometimes this rapid march of the disease reaches the body of the tree the first year of attack.

In many cases of blight in the lower Sacramento Valley, this season (1904), it was found that the disease had gone down the limbs in streaks from blossom to the body of the tree, a distance of four feet with only a few dead leaves. The blight germs rarely if ever kill the leaves. The foliage on the blighted limbs will eventually die as the source of the water supply is cut off. Sudden hot, dry spells and dry north winds cause the leaves in such cases to die and turn brown so suddenly as to give the appearance of very rapid spread. When a limb is girdled by the disease the foliage will also wilt and dry in a few hours.

Many small, tender twigs may be found black with blight, and only a dead and dried blossom appear, with all the leaves green. This was noticed very many times. This accounts for the report that it is constantly spreading, the operator having simply cut out the dead foliage. Atmospheric conditions usually control the rapidity of the spread of the disease.

One of the most prolific causes of the continued appearing of the blight is to be found in the failure to cut it back below all diseased wood, and perhaps the inoculation of the next healthy limbs cut. In hundreds of reappearing cases, it was the same old blight very slightly crippled, as the fresh cuts were always found, or else the primary fruit bunch was there to show its blossom origin. The disease usually stops growing by the 15th of July in this valley, but many cases in soft, tender wood, as in top grafts, continue to grow slowly all summer.

Professors Waite, Burr, and others have shown conclusively that the disease is of bacterial origin. The bacteria are found in the cambium layer, the thin, pulpy substance between the wood and the bark. The disease works down the twig from the blossom usually. It continues growing until the cambium gets too dry and hard for the microbe to grow (or ferment). This is usually in July, when the fruit ripens. When the disease ceases to advance, a plain line of demarcation is drawn at the healthy bark, which has rather a swollen appearance or full, plump look in contrast with the black, shriveled, and dead bark of

the blighted limb. After a few days, new shoots put out from the healthy wood as if to repair the damage. There can be no doubt that the disease is scattered from the blossom in the spring, as the microbes multiply or cultivate very fast in the nectar and it is thus scattered by the bees and nectar-feeding insects. Bright, warm days during flowering time are conditions very favorable to its culture and spread. Sometimes the conditions not being favorable to the growth of the bacteria, they will lie dormant for some time, then grow very rapidly.

In 1901 in the State of Washington the disease did not become noticeable until the fruit was fairly well grown.

Mr. Chauncey, Horticultural Secretary of Fresno County, says that it did not make its appearance in Fresno County until April 22d, this season. When the blight is growing slowly the healthy bark sometimes breaks from sap pressure, and a gummy exudation takes place. This exudate contains myriads of the microbes, and thus becomes a great source from which insects carry the disease to the late blossoms or injured twigs.

The disease germs are no doubt carried over from one season to another in the bark of tender shoots, not dry, where the diseased wood blends gradually into the healthy wood and sap pressure in the spring causes the sap to exude with the germs. A single limb can infect a whole orchard. The cold breezes of the East do not seem to kill the germs of the disease.

Tender twigs inoculated with the diseased cambium or exuded gummy sap, blighted in twelve to twenty-one days, blighting sooner in warmest weather. The diseased cambium or exudate smeared on twigs did not produce blight unless the twigs were injured by pricking with a knife point or a needle.

Professor Waite says: "The pear blight microbe is a very delicate organism and can not withstand drying to any length of time. In old dried bark where the disease has stopped, the microbes are all dead and have disappeared." This being true, we can take the disease at its weakest time, late summer or fall, and greatly check the prime cause by destroying the microbes left in any large limbs which retain any living virus, and in order that the disease may not reach a serious stage, we must cut it out well below the diseased part, thus being sure that none of the dead cambium remains. This dead cambium shows discoloration usually while growing for quite a distance below the blackened bark.

The best time to find all of the diseased wood is in the fall, as the leaves of blighted wood do not drop at once; but all agree that it should be cut just as soon as it makes its appearance.

The biennial report of the State Board of Horticulture, Utah, 1901-02, has the following, page 29: "In pear blight control in the orchard of

James Meldrum is an illustration of what may be accomplished by active early treatment. The writer hearing of the disease in Mr. Meldrum's orchard in the latter part of June, visited the premises, and having battled with the pear and apple blight in his youth in Nebraska, immediately pronounced it the much dreaded disease blight, and advised the cutting out and burning of all affected parts, at least eight inches below the part showing disease. The entire Board afterwards visited the orchard and advised in addition to cutting out diseased parts the application of kerosene on the stub whence the limb was cut. This was to insure the death of any germ that, through accident, might remain, and also to destroy any germ that might come in contact with the fresh cut thus left exposed. Mr. Meldrum went over the entire orchard, consisting of one thousand trees, and cut away and burned all diseased parts. Some, however, were left, and a later cutting and burning had to be done; but Mr. Meldrum, being a Scotchman, had the stick-to-itiveness necessary for the existing conditions, and kept up the warfare. Mr. Meldrum's orchard is situated so as to give pear blight every advantage. The soil is deep and heavy. The surface is well cared for and kept free from undergrowth, weeds, grass, or anything of the sort, and the abundance of the water used forced an extraordinarily strong growth. There are a few diseased limbs noticed in Mr. Meldrum's orchard at this writing, but he will cut out and burn at an early date all such affected limbs. He is not discouraged at the prospect, though in July a bargain might have been had at his place, for with one thousand trees nearly all containing branches blackened and dying with a disease which apparently had full sway, Mr. Meldrum demonstrated that much may be accomplished by the proper treatment at the right time." Later: "No appreciable damage was done to crop of fruit on trees. In same vicinity other pear orchards not properly worked were ruined by the blight."

Captain R. S. Emory, of Chestertown, Md., one of the veteran and largest pear-growers of the United States, says in a letter of date July 7, 1904: "The blight has given me much trouble, but I have been able to keep it down by simply cutting it out, *well back to healthy wood*. Should any mistake be made and you cut into healthy wood, *wipe the shears clean* or you will inoculate the next limb. I use coal oil with a few drops of carbolic acid in it. I carry in my pocket a piece of woollen goods for that purpose. Piece of an old flannel shirt I find excellent. I have been more successful in keeping it down by *careful* cutting out just before winter, but cut out in *summer also*. Am at it now. Have it very bad, particularly in Bartletts. Mr. Waite, of Government employ, has spent a good deal of time with me to find a remedy. The knife is the only one we have yet found. It is epidemic this year with us. Have not lost any trees." It can plainly be seen that "eternal cutting" is the price of the pear orchard.

There is a peculiar condition of the bark of the pear tree called "crater blight." In this condition the bark is black and shrunken to such an extent as to form a depression or crater. This shrunken or black bark is usually so hard as to be with difficulty cut with an ordinary knife. The cambium layer is usually found alive in crater blight. I do not know the cause of this condition, but some ascribe the same to strong alkaline washes used a year or two previous to the crater formation, while others declare it is peculiar to the pear tree. When the zymotic blight reaches the larger limbs or the body of the tree it sometimes spreads out over the entire trunk of the tree or large limb without immediately destroying the foliage above, as the inner layer or cambium is not totally destroyed. In this condition the cambium renews itself the following spring, when the bark resembles crater blight very much. In cases like this the true blight sometimes has a spontaneous cure. When the true blight reaches a large area of crater blight it is a most difficult matter to know what to do, or to decide how far the zymotic disease has gone. In cases of doubt cut out smaller limbs and split bark with sharp knife or point of hatchet and smear splits with crude carbolized petroleum.

Treatment.—The treatment of zymotic pear blight, after years of careful study, crystallizes itself into—destroy the microbes, and render the tree as resistant as possible. Our only way to destroy the microbes is to cut the diseased parts away and destroy with fire. After cutting out limbs, apply crude petroleum, or common coal oil, to the cuts, and wipe the shears with a cloth damp with oil. Add a teaspoonful of carbolic acid to the gallon of oil. This helps to drive away insects, and keeps out water to a small extent. The stubs are thus disinfected, and insects neither bring nor carry away the virus. The 95 per cent carbolic acid found in drug stores is the kind used.

As to *preventive measures*, we recommend the practice now used in some parts of the country, that of taking off all fruit spurs on the main trunk and large limbs each season, leaving only the terminals to bloom and bear. Hence, whenever the blight makes its appearance it is upon the terminals. On account of the bacteria finding entrance through the tender surface of the blossoms, the attacked portion can then be cut away as often as is necessary without destroying the symmetry of the tree or sacrificing any of its framework. In course of time the malady thus treated is found to practically disappear as it seems to lose its pristine virulence, the only loss being to the crop, while the tree has not suffered.

As to other methods of prevention, they are purely speculative, not having been tried west of the Rockies. Pear trees are not as long lived in California as in the East, and they come into bearing much earlier.

It is found that where the pear trees in Sacramento County exhibit an abundance of health and thrift, as in the orchards near Sacramento City, on rich, loose, light soil, no blight is seen, while those half a mile away on hardpan, with heavy top soil, have an abundance of the disease. The Eastern idea to neglect trees and so prevent the ravages of the disease, is based on the theory that very tender wood, late to mature its growth, rendered the tree more susceptible to blight. The same treatment will not do in district No. 2, in Sacramento County, as the splendid sub-irrigation keeps the trees producing tender wood, and a failure to cultivate renders the shoots watery and immature, thus producing the very condition you do not want, and results in more and worse blight. The uncultivated tree is deprived of mineral nutrients, needful to its proper development, as it can only get these nutrients sufficiently by good cultivation and letting in the air to nitrify the soil. It is also a custom in the East to top-dress soils in orchards with fertilizers that contain carbonate of lime. For more than twenty years dwarf pear trees on quince stock have borne good crops with this treatment, with blight appearing at intervals. In the Yearbook of 1897, United States Department of Agriculture, it is stated, "a coating of lime and sulphur annually reduced blight to a minimum."

Here is food for thought. The functions of the mineral nutrients in plants contribute a highly important problem. Why should not the Bartlett pear be as immune from blight as the Kiefer or Nelis? In orchards in district No. 2, with Nelis and Bartletts side by side, the Nelis is seen to have darker green leaves, heavier foliage and twigs, and has every indication of being a more vigorous grower, and has not blight. Yet in the hills I find the Nelis with lighter foliage, less evidence of "good blood" (chlorophyll), and blighted. In all orchards examined where there was "good blood" as evidenced by an abundance of deep green chlorophyll in the leaves, there was a minimum of blight or it was entirely absent. In such orchards, it was easily checked, as the cambium was moist and the blight could be seen and cut all at once, none dormant.

Charles Downing long since advocated the use of lime to produce short, stocky wood to pear-fruit spurs. While the lime may not make the twigs shorter, it will make them mature much earlier. Lime has the tendency to make heavy, damp soil lighter. It was found that in soils showing most evidence of alkali, the blight was most severe, and that pear trees on such soil had every indication of starvation—small fruit, pale leaves, etc. Here I found most of the dieback. This was attributed to the fact that too much alkali renders the rotting of organic matter very slow, at the same time rendering the phosphoric acid unavailable to the rootlets. Hence a thin, watery cambium, easily dried up and very subject to blight quickly. Such limbs seldom die the first year,

but make an effort to put out leaves and blossoms next season, and die outright before the leaves are half grown. This is the "dieback." Not every time from an excess of alkali, however. In this condition the cambium is light brown or not discolored at all—not black as in blight. I do not ascribe the cause of pear-blight microbes to a deficiency of certain mineral matters in the soil, but such deficiency renders the cambium, the seat of the disease, more subject or a more fit medium for the propagation of the bacteria (ferment).

As in the animal economy the leucocytes assist in warding off disease, so do certain mineral nutrients help to ward off diseases in plants. In alkali lands, lime is needed to render the phosphoric acid more available, which the alkali (sulphate of soda, chloride of soda, and carbonate of soda) has a tendency to "lock up."

The phosphoric acid with the iron compounds is absolutely necessary to the formation of chlorophyll green. Hence, in addition to the soil of ashes, lime, sulphur, potash, sulphate of iron produces stocky, well-ripened growth and early maturity.

Preference is given to five hundred pounds of well-slaked lime to the acre; on wet soils, and if the soil is poor, two hundred to five hundred pounds of bone meal may be added. On drier soils in California the raw bone meal alone is best, as the lime dries out the soil.

Spraying the trees well in spring, about the time of flowering (as recommended by the County Board of Horticulture), with solutions containing arsenic, no doubt lessens the attack of blight, as the spray renders inert the germs in the gummy exudations and perhaps poisons insects that eat it.

While we have offered no specific for pear blight, we trust that these thoughts will put men to thinking. "To agitate is to educate."

As this matter of pear blight is at the present time the one of superlative interest and importance to the fruit-growers of California, we reproduce a paper dealing with it, from the pen of Prof. L. E. Henderson, of the Agricultural Experiment Station at Moscow, Idaho. The disease has got as strong a hold in Idaho as it has in California, and except for a few favored localities, of limited extent, it may now be said to be general all over our country.

The name "fire blight" is the proper one to use; it should not be called "pear blight," for two reasons. In the first place it is liable to be confused with the pear-leaf blight, a disease which attacks the leaf of the pear, and incidentally injures the fruit. In the next place this disease is not limited to the pear; it is fast becoming too common on the apple as well, in our State. Nay, in many States it attacks all of the pomaceous fruits, such as pear, apple, quince, crab, and hawthorn. Three years ago, this disease was unknown to the writer in the southern part of the State; to-day, there is hardly an orchard in certain districts which does not show some blight, and in many it is very serious. In northern Idaho it has been in our pear orchards for over ten years, but

luckily it has hardly ever attacked the apple. From the devastation this disease is causing in the southern Idaho apple orchards, we can not expect that the northern portions of the State will be long exempt.

Though this trouble has been known as working havoc in orchards for a century or more, it is only in comparatively recent times that its true nature has been well understood. For a long period of years the discussions of this trouble were of such a theoretic nature, that many horticultural societies forbade its being brought up in their meetings, unless some one had something of absolute knowledge to offer about it. Various causes were ascribed for its presence, such as "sour sap," "atmospheric conditions," "soil conditions," and "effects of various fungi." In 1878, however, Professor Burrill of Illinois discovered the true cause and announced his discovery to the world. This was found to be a bacterial disease, due to the presence of myriads of little germs in the inner bark and cambium. The germ was called by Professor Burrill *Micrococcus amylovorus*, from the eagerness with which it seizes upon and devours the starch in these tissues. From the subsequent studies of Arthur at the Geneva Station in New York, and of Waite in the United States Department of Agriculture, we know how this germ or bacterium lives, reproduces itself and is carried from tree to tree.

Luckily the disease is a very conspicuous one, which renders its presence in an orchard the more inexcusable when well known. It affects twigs, leaves, young fruit, and even the branches or trunks. From the experiments of Waite, it has been found that it can not attack the plant through the *uninjured* bark or leaf. It can, however, gain entrance through any injured place on trunk, limb, or even leaf. Its most common points of entrance are natural ones. These are the young growing tips of the branch, the stigma of the flower, or the glands which secrete nectar. Therefore, the "flower blight," the "twig blight," and the "branch or trunk blight" are all forms of this disease.

In the first, the young twig, especially if it be growing rapidly, turns black in both leaf and stem, and wherever the leaves are blighted, they remain black and dead *through the ensuing winter*. This black, piratical flag is the surest evidence of its presence.

In the "flower blight" a whole bunch of flowers, or frequently *every* bunch upon the tree, will be affected, and dying back to the beginning of the spur, hold the blackened flowers and young fruit also through the entire year. This is the most common form on the apple.

Frequently an entire limb or even the trunk will be affected for only a short distance, while the top will still be entirely free from the disease, and this can only be understood when we speak of how the disease is spread.

More frequently upon the pear several limbs and even the whole trunk will be affected, and when this is the case the tree should be cut out root and branch.

If the young shoots of a tree affected with blight be examined, small drops of sticky, thick fluid will be found exuding from the edge of the diseased area. If one of these drops be examined with a high power of a microscope, myriads of little oblong bodies will be seen, some separate, some in short chains. These are bacteria. Arthur proved that these bodies, innoculated into a sound tree by a needle, would produce the disease; Waite proved to us beyond dispute that insects, especially *bees*, are the main instruments in their dissemination. They are attracted by the viscid sap, suck up part or all of the drop, and then carry thousands of these germs with them to innoculate flowers, shoots, or wounded places in the bark. Undoubtedly heavy currents of wind assist in spreading the disease and probably account for the commonness of "twig blight." The question comes right here: Shall I keep bees if I have an orchard? Certainly, and for two reasons: First, the honey, and the revenue derived from it, are often no small object to the farmer. Second, the bees are absolutely needed to assist in proper cross-fertilization or pollination of the flowers. This leads us to the subject of remedies, for *preventives* there are none.

As soon as the bacteria are carried to the young flower or the wound, they effect entrance, and living upon the sap and starch, multiply rapidly. If they gain entrance along a limb or trunk, they live in the *inner* bark and cambium layer—that layer which adds yearly to the growth of both bark and wood.

It can readily be seen from this that they are well covered, and consequently spraying does no good. *The only remedy thus far found has been and is the careful and continuous*

use of the saw and pruning knife. All diseased shoots and limbs should be cut off at from six inches to one foot below the place of evident infection or injury, as the bacteria have always gone down deeper into the limb than *seems* to be the case from the outside. Many pruners have the habit of splitting down the bark *to see* how far the disease has proceeded, but this practice is to be condemned, as they never can see how far the disease has proceeded, and the incision of the knife may carry the bacteria from diseased to healthy tissues. If the blight is bad in either the pear or apple orchard, the knife or saw should be *sterilized* each time it is used, by either passing it through a flame, or dipping it into weak carbolic acid-water, or into kerosene. The pruned limbs or fragments should be collected and *burned* and both pruning and burning should be done mainly in the dormant season, before the sap has started, the bacteria have awakened, and the bees are visiting the orchard. This is the best time for pruning and burning, but not the *only* one; it should be done whenever the disease makes its appearance. All large wounds should be painted over with paint as soon as the tree is trimmed, to prevent the reinoculation through the exposed tissues. Where the blight is bad, even young shoots or water-sprouts should have their cut bases painted, for it has been shown time and again that the limbs and even trunks have been inoculated through these cut stubs.

The pear is much more easily pruned for this disease than is the apple. On the former it commonly manifests itself in dead or dying shoots, limbs, or trunks, which can readily be cut away below the progress of the disease. On the apple, however, it is commonly the shoots all over the tree, and *especially the fruit spurs and their clusters of flowers*, which are most affected. Pruning here becomes a much more difficult and even serious undertaking. Where only a few shoots and fruit spurs are affected these can be cut away close to the tree, and the wound immediately covered with paint. Where, however, almost all of the fruit spurs on the whole tree have died, the best way is to cut off entire and large limbs, cover the wounds with paint, and stimulate the production of new shoots and subsequent fruit spurs. Many such trees are to be found in and around Boise, New Plymouth, and many other places. In the former place my attention was called by Inspector McPherson to a very interesting though sad evidence of the efficacy of bees in spreading the disease. All the splendid large apple trees near the hives were without exception seriously injured by blight, while as we proceeded on radii from the hives the blight grew less and less, and almost disappeared on the edge of the orchard farthest from the hives.

It has been often noticed that rapidly growing trees are more subject to blight than slower growers, and that those in low ground or "swales" are more subject than those on drier ground. Orchards should therefore be planted on well-drained land, and should not be stimulated by too much water or too much fertilizer.

Though all of the varieties of the pomaceous fruits are subject to this disease, as said before, some varieties have been found more subject to the attacks of blight than others. Of the apples, the crabs of all kinds have been found very prone to blight. Among the pear, in most places, the Anjou, Angoulême, and Seckel are most resistant, Bartlett and Flemish Beauty are less so, while the Idaho, Clapp, and Winter Nelis are very subject to blight.

THE APPLE IN CALIFORNIA.

BY FRANK FEMMONS, OF AHWAHNEE, CAL.

Some of the earliest recollections of my childhood are associated with a garden lot that had a few fruit trees in it—a plum, two or three peaches, and an apple tree that grew just by the well. How those bright memories still cling to the heart, and bloom to-day though their roots were planted more than sixty years ago!

I have never yet known a man, woman, or child that did not like a good apple; nor would I care to know one, as it would be so unnatural that it would scarcely be a curiosity—there would surely be something wrong with it. This universal taste has its roots far back in the infancy of our people, and the ages of association have fixed it as one of our greatest enjoyments. From central Europe the apple has gone with its people into every part of the world where it can be grown; and where it can not, our commercial lines are taking it to meet the demand—the apple has become a commercial staple.

Fifty years ago but few apples were taken beyond the neighborhood where they grew. A few were sent to some of the nearby towns, or a few choice ones to some friend a hundred miles away, if some conveyance should be going; but to grow, pack, and ship apples to the markets of the world was scarcely thought of. Like so many other of our productive industries, it has grown up with our railroad and steamship lines, and in some form or another is now reaching every part of the commercial world.

With the new conditions of distribution came new problems of production. The few trees on the two- or three-acre home orchard of our "boyhood's fond recollection" were planted to meet the home needs. Many of the old orchards were grown from the seeds and trees planted without grafting. Any apple was far better than none at all, and in many parts of our country at that time but few of the better varieties were generally known or obtainable. An orchard in which were found a few trees of Stanley Early, Sweet Bough, Rambo, Romanite, and Vandivere, and a little later, the Seek-no-further, was of high excellence, and I doubt whether to-day any of the new varieties can give more real enjoyment than did some of the older ones. Some of them are good apples yet, if grown where conditions suit them, and no home orchard is complete without them. Their juicy freshness seems to come to us from an almost forgotten past.

Just why the American apple, or varieties that have originated in America, are better than those produced in Europe, is an interesting

question. It seems to be a fact that the better varieties of Europe when grown here have failed to give entire satisfaction. A few, like the Gravenstein and Ribston, seem to do well in certain limited locations; but except the Red Astrachan none of them has reached a wide planting in our orchards, and even that seems to be losing its popularity within the past few years. That our American apples are better is proven by the fact that they are so considered in the markets of the Old World and the demand for them there growing at such a rapid rate.

"American Fruits," giving "The Apple Situation" in its April number of the present year, has this to say: "Last year's crop was a large one, about 45,000,000 barrels for the United States and Canada. The demand from abroad has been very heavy—approaching 3,000,000 barrels. Exports have been 90,000 barrels per week, with prices high on the other side." Another item in the same paper, giving shipments of deciduous fruits from California: "Shipments of apples during the season of 1903 will reach from 1,900 to 2,200 cars." Another from the same paper (published at Rochester, N. Y.), in commenting on California fruit shipments: "In ten years hence California will be even less able to supply the demand than now. The Californian who looks ahead is planting trees and vines."

There was as much or more talk in our State in 1892 about the danger of overproduction of citrus fruits when we were producing about 80,000 tons than ten years later, in 1902, with an output of over 525,000 tons. Our horticultural and other papers from all over the country are full of the facts that demonstrate that the demand for all kinds of our best fruits is growing faster than production can as yet supply them. The statement was made two or three years ago that 2,000,000 barrels of apples were shipped from Boston to Europe in one month. All the country homes in the Eastern States from Maine to Kansas have their apple orchards, and in many places they are being planted for commercial purposes by the thousands of acres; but so great has become the demand for good apples in our towns and cities and for export that buyers are out into every section where it is possible to find a carload. People all over the world are fast learning that fruit is one of our food staples, and the natural or inherited taste of our people for the apple gives it the first place as the "king of fruits." Its many varieties, the many ways in which it can be prepared and used, its satisfying and health-giving properties, make it at once the favorite fruit of the rich and the poor.

I have rambled off in this line farther than intended. When one gets over the orchard fence and begins to gather up the history and facts of apple production and to compare the present with what we know of but a few years ago, and then tries to think of the future in the light of experience, the subject becomes one of intense interest. If the history

and experience in other lines of productive industry were not almost bewildering in their new magnitude and possibilities, the faith so many have in apple-growing for the markets of the world would seem to be a fancy; but there is no fancy in the commercial facts of a world-wide demand and its supply. With the already created taste and the long-ing desire to satisfy it, the consumption of fruit depends upon its production and placing it within the reach of all, and the production must come first.

THE APPLE IN CALIFORNIA.

We have had many examples of the natural capacity of California for fruit production. Some of them have been the wonder of the world. Our oranges, raisins, prunes, pears, apricots, and peaches have stood at the head, and the fig is fast taking its place in the list. With one notable local exception the apple has received but little commercial consideration, and it would seem strange, too, when we know that many portions of nearly every county in the State have for years produced apples of fine quality, and from these portions of our State the product, wherever exhibited in the apple-growing sections of the Eastern States, have received the admiration of all.

There are but few varieties that do their best in our warmer valleys. The Astrachans and the White Winter Pearmain are perhaps the best for such locations. The possibility of finding or producing other varieties that will do fairly well is certainly encouraging. Nature puts a wide limit to its adaptation to environment; time and encouragement work wonders.

In the cooler climate of our mountain sections, many of the best varieties of the apple have long been known to reach to high perfection, and some of them grow here to their finest development in size, color, texture, flavor, keeping and handling qualities, that make them the best commercial apples in the world. From Julian, in San Diego County, up through the valleys and slopes of the upper foothills of the Sierra Nevada Mountains, and widening out over almost the entire northern portion of our State, are found climatic and soil conditions the apple delights in, and where it has been grown in small orchards for many years. Every little mountain home has its orchard—some with but a few trees, and at most but a few acres, and little attempt has been made to supply more than the local market.

Many varieties were planted that were found to be unsuited to the local conditions or for market purposes. Many that were known as among the best in some portions of the East were found to lose some of their best qualities when grown here. Some are found suited to limited locations, while some others seem to be suited, or adapt themselves, to almost any location or condition—some varieties reach their highest development at certain altitudes or where the local conformation gives a

climate and temperature they need. At the higher altitudes, where will grow the finest Yellow Newtowns and Spitzenburgs, the White Winter Pearmain ripens before maturity and is never found at its best. Some varieties require for their best growth a heavy, rich soil, while others are better in a loose, poorer one, and all varieties show some peculiarity of adaptation to conditions of soil and climate that should be understood and applied in planting an orchard for best results. The want of such knowledge has been the principal factor in many failures and has injured the reputation of California-grown apples. If the facts along this line, growing out of the experience of the past forty or fifty years, could be gathered together, their general knowledge would be of great value in the horticultural development of our mountain country.

In both Europe and America the apple has always reached its highest development in the mountain or hilly sections, and in New Zealand and other portions of the world the same thing is true. The extent of our mountain country, the diversity of its climatic conditions, the productive richness of its soil, the abundant rainfall of the winter months, and the almost cloudless sunshine of our summers, with its proximity to the center of a commercial activity that is fast growing into one of the widest in the world, or that the world has ever seen; the already demonstrated fact that we can grow apples of the highest excellence over a greater section of the State, and the universal demand for them that has made them a commercial food commodity, would all seem to encourage their production here and give an assurance of a high reward.

Except for their mineral, timber, and grazing resources, to what other or better use can be put the thousands of now unproductive acres all through our mountain country? And what countless prosperous homes would be added to the growing wealth of our State! I feel confident that no other line of horticultural production offers a wider field, or gives a brighter encouragement for the future.

With the hope that it may aid in the effort of any one who may wish to plant an apple orchard in our mountains, I will give, in as few words as may be, some of the observations and items of interest growing out of an experience of the past twenty years. Perhaps none of them are new to many, but their knowledge was not always an easy thing to get when wanted, and their statement may help others.

Home Orchard is at an altitude of 3,000 feet, and its vicinity from 2,000 to 6,000 feet, which about makes the limits of the "apple belt" in central California. To the north and also nearer the ocean influences, similar climatic conditions are reached at a lower elevation, and except in the Sacramento Valley, extend over the entire northern part of the State. Wherever you find

The forest-clad hills, where oaks and the pines
Are mingled with shrubs and the wild-tangled pines,

there, you may be sure, the apple will grow.

VARIETIES.

Nearly every one has his personal preference. Our tastes differ, and we naturally like a variety. Apples ripen, or develop, at different seasons. Some varieties ripen and are gone by the end of July; others are at their best in the fall months; some in midwinter or spring, and others last until apples ripen again. Here, on my desk as I write, is an apple in good condition of last year's growing, and by its side a beautiful red one of this. We like apples the year round, and yet it is an easy thing to plant too great a variety. It is possible to get all the best apple qualities combined in a few that have proven themselves adapted to a wide range and always give satisfaction. Among the many hundreds of named varieties found in nursery and other catalogues, a list that would include the best only, for both home and commercial use, would be a short one—not over twenty at most, and if confined to half that number would lose very little. If selecting for a purely commercial orchard, the list might be divided again.

In trying to give a condensed list for California planting, I am well aware of the fact that many that have a high excellence and are the favorites in some places will be left out. The fact that so many of the best varieties when grown here in the genial climate of our California mountains reach such a high development of size, beauty, and excellence, makes the task to choose a few from the many a difficult one. If some three varieties—early, medium, and late—could combine the best qualities of all, the task would be simple. The effort that is everywhere being made to find some better apple is in this direction, but the hope may be expressed that the case supposed is beyond a possibility. There is one fact that is sometimes lost sight of in talking about apples adapted to different uses—that our best commercial varieties are just as good for any other purpose.

Our orchard homes and the general markets should never be without the best the year round. Perhaps the most widely planted and the most satisfactory of the early apples is the *Red June*. Its beautiful glossy red color and pleasant acid flavor make it the favorite early apple, and it seems to be at home in any location where apples will grow. It should always be planted near the house or where it can be protected from the birds. They have a great fancy for it and their judgment of a good apple is always reliable. There is another apple, the *Benoni*, that is sometimes called Red June, and trees are sold with that name, but it is not so fine in growth and is very subject to mildew.

Early Harvest.—A yellow apple beginning to ripen just after the Red June, and continuing through a long period, should be in every list of early varieties. Before they are gone the

Red Astrachan, a Russian apple, is ready for use. It was introduced into some of the Eastern States at an early date and has filled its place with credit in the pioneer orchards across the country. It has a very pleasing rich flavor—a little too acid in its fresh state for some to eat, but for all cooking purposes there are but few better.

Maiden Blush.—Gather it and put in a cool, dark place as soon as it gets size and color. There is no purpose to which an apple of its season can be put that it will not fill, and for drying it has no equal in the quality of its product. Though it is a good apple over a wide range, it reaches its highest perfection in the highest altitudes at or above the pine timber line.

Gravenstein.—If this apple was not so hard to please with its conditions of soil and climate it would certainly find a choice place in the list. It is usually more or less a failure in many places, but where it does succeed and bear well it is certainly a grand apple. There may be different strains of it, or even different varieties under the same name that would account for its poor showing in so many places. I feel like throwing in a strong caution and urging the importance of using every care in obtaining the best stock, both by our propagators and our orchard planters. I know of no better line upon which all our fruits can be improved.

Baldwin.—Perhaps no apple grown in California is as puzzling as this. From Michigan east to the Atlantic it is almost ideal in every quality that could be desired. In the West it is disappointing, but in the cooler locations it sometimes grows to a pleasing promise to redeem itself. In most parts of our apple-growing belt it is only a good fall or early winter apple. It varies so greatly in form, color, and quality that we are never quite certain that it is a Baldwin at all.

Rhode Island Greening.—In nearly every orchard we find a tree or two of this grand old apple, and as it grows in most parts of our apple-growing section no one need mistake it—it always shows its individual characteristics. It reaches its best development in the cooler locations, and when well grown has a wonderfully rich, satisfying flavor. It is among the best for all apple uses. Here in the West it loses its quality too soon after ripening and requires care to keep it until near Christmas, but repays any care that can be given it.

Yellow Bellflower.—Some are trying to give this grand old New Jersey apple a French flavor in the spelling of its name. No other apple is more distinctively American—it belongs to the sunny skies and pine woods of our whole country—its every characteristic is racy of the spirit of our western world. The tree and its habit of growth are not suited to locations where our heavy wet snows are liable to make a wreck of it,

and the fruit is too tender for rough handling in long distance shipping, but in many locations it is a valuable apple.

Ortley.—A seedling of Bellflower, and like it, too tender for distant market. Its mild flavor and juicy texture make it a favorite about the holidays, when it is in its prime. It has gained a reputation in our local markets, and is known as the "Golden Pippin." The confusion is unfortunate and may lead to many mistakes. We have the American Golden Pippin, and the Grimes Golden, that take their names from their resemblance to the English Golden Pippin; but the Ortley, while not so deep a yellow in color or so acid as its parent, is a true Bellflower, and about its only offspring of any great merit. It is sometimes known as the White Bellflower—a very distinctive name.

Jonathan.—One of the very best of our red apples when well grown in a locality that suits it. It has the fault of bearing very full some years and then doing little or nothing others, and sometimes drops its fruit badly as soon as ripe. We have a great number of late fall and midwinter apples that are good while they last. The greater portion of them could be dropped from the list for general planting to the advantage of the better varieties and all apple-growers.

Esopus Spitzenburg is an apple that is almost universally known by its bright, rich red color and high juicy flavor. It grows and bears well in all sections, but finds its most congenial home in the cool, high, altitudes, where, if it has a deep, damp soil, it produces fruit that is a surprise to many who have known the Spitzenburg all their lives. At its best, it is large, heavily ribbed, and with a juiciness of texture that is pleasing in every way, but I have thought had not developed its highest flavor. The best I have ever seen were grown in the Yosemite Valley, and I have seen some good ones from Oregon. It is a hard apple to keep through the winter in our climate without becoming shriveled, and it loses badly if kept too long. While every one likes its flavor, many find it a hard apple to digest and some do not dare eat it at all in a fresh state; but if you like a good apple pie you will never find a better apple to fill it with, or a better one for any cooking purpose.

Northern Spy.—In every quality that goes to make up a good apple this would stand very high in any list; but its uncertain and irregular bearing in many locations prevents it from being a profitable one for general planting.

Winesap.—Has been planted and succeeds in all our apple-growing sections and has many good qualities. The persistent tendency of the tree to overbear soon reduces the size of the fruit and it becomes too small for general use. If an apple to make the best of cider is wanted no better one can be selected.

Paragon.—A seedling of Winesap. Though known for many years in Tennessee where it originated, it is comparatively new in California. It is a good grower and forms a widespreading, healthy tree—strong and fine in every way. It does not come into bearing so young as some varieties, but makes a good crop every year, if any apple does, and the fruit keeps solid and firm until late; it is a good, satisfying apple to eat and is much larger than its parent—fully double in size. This apple has been confounded with another, the Arkansas Mammoth Black Twig—and also a seedling of Winesap. At one time the American Pomological Society thought them identical. The mistake was afterward righted, but the confusion led to many mistakes and disappointment.

Ben Davis.—I know of no other apple that is so much influenced by local conditions—soil, climate, and also by the stock on which it may be grown—as the old Ben Davis. Local modifications seem to produce many strains of it, and as grown in some locations it is certainly a poor apple and its reputation is sometimes deserved. It has been a great market apple over the greater portion of the West, and in its proper season is much better than it sometimes gets credit for. Here in the mountains it is in its prime from the beginning of February and is good for all purposes. The rough handling in packing and shipping long distances affects its color and freshness less than most other apples. Some that are the most beautiful on the tree and are among the best for home use or a near market lose much of their beauty, or quickly decay from bruises that can scarcely be avoided. Others are able to withstand much hardship—the Ben Davis preëminently so. This characteristic must always be a large factor in our commercial apples. One that can be packed and shipped to the different parts of the world and there open up with a bright, solid freshness and give a reasonable satisfaction to the greater class of consumers, has a value that should not be overlooked. The apple that will grow and produce over a wide range of planting and has the greatest number of other good qualities, combined with one of withstanding rough usage, is the ideal so much sought for by all commercial growers. We have an abundance of varieties that we can scarcely imagine how they could be improved for home use, but the perfect commercial apple is perhaps yet to come.

York Imperial.—Has many qualities that place it among our best apples—large, red, a rich flavor, and keeps fairly well. The bearing habit of the tree in producing its fruit near the larger limbs is valuable. Some individual trees bear very fine fruit and are productive in a regular annual way, while others seem to be shy or the fruit inferior. This habit or trait could, no doubt, be greatly improved with time, and by care in selection. If it could, and the irregular shape of the fruit be somewhat corrected, it would become one of our finest winter apples.

White Winter Pearmain.—The catalogue of the American Pomological Society drops the "Winter" from this well-known name. Few apples are more widely known, and when well grown there are but few better, or which give more universal satisfaction. The tree grows well over a wide range, but to develop the fruit best requires rather a warm location where there is not too much difference between the day and the night temperature—some slope of the mountain where the nights are warm. It very seldom fails to bear too great a crop and requires severe thinning.

Yellow Newtown.—Grown in a soil and situation that suit this apple, perhaps it more nearly combines all the excellent qualities than any other that has been produced. It originated on Long Island, and on the Atlantic coast is everywhere one of the best. It seems to reach its highest development in the mountain sections of Virginia and North Carolina, where it is known as Albemarle. Throughout the Mississippi Valley it is but little planted. Here on the Pacific Coast it seems again to find a home and produces fairly good fruit everywhere; but give it a rich clay soil, where the climate is not too warm, no finer or better apple for all purposes can be grown. If it had a bright, beautiful red color, and the tree took more kindly to a wider range of conditions, we could think of it as the masterpiece of fruit production.

It is unfortunate that another variety (the *Green Newtown*), quite similar in some characteristics, has been so often planted instead of the Yellow. Many do not recognize the difference until the disappointment comes at the maturity of the fruit. The Yellow Newtown takes on a rich yellow color, the Green never does, and is not usually so large or well formed.

The prominence commercial apple-growing has assumed in the Eastern States within the past few years has greatly stimulated the effort to find some better varieties for that purpose. The same line of production will undoubtedly develop here. Within the past ten years about forty new apples have been grown at Home Orchards to test their value and adaptation to our mountain fruit belt. Out of the number, two seem, from their behavior here and elsewhere, to be worthy of a wide planting.

Delicious.—This noble apple originated near Des Moines, in Iowa, which would indicate something of its hardness to withstand a rough climate. The tree is a strong, healthy, upright grower, the bloom hardy and not easily killed by frost, and bears every year; the fruit is all grown on spurs near the larger limbs, large, conical and prominently ribbed near the eye; color red, or a suffusion of light and darker red on a yellow ground; flavor somewhat similar to White Winter Pearmain, but more refined and pleasing, and its fine texture makes it an apple that any one can eat with comfort and pleasure. It is rightly named Deli-

cious. In a cooler climate it would, no doubt, keep much longer, but here it should be gathered as soon as fully grown and colored, and kept in a cool place, when it will be at its prime at Christmas, though I have kept them sound with only usual care until April.

Black Ben Davis.—I wish this grand apple had a name that more nearly fitted its individuality. All that could be said in praise of an apple would seem to have been exhausted in talking about this one. It is a seedling of the old Ben Davis and originated in the Ozark Mountains of Arkansas—a region of country that has produced many varieties of excellent apples, and the promise for other and better ones is encouraging.

In habit of growth and foliage the new apple shows its parentage, but the tree is inclined to become more spreading and with a heavier, darker green foliage; fruit rather larger, more juicy and less of the peculiar Ben Davis flavor—a better apple in every way and besides has the most beautiful deep red color of any apple grown. “As beautiful an apple as ever grew since Eden days—noble, royal, magnificent in beauty, an apple that for pure splendor of appearance and fruit-producing capacity has no parallel in American orchards.”—Parker Earle. From every apple-growing section from New Jersey to Colorado and from California to British Columbia, Black Ben Davis has received the highest praise, and its friends are everywhere delighted with it.

A mistaken belief of some that it was identical with an older known variety of the Ben Davis family of apples has led to an unfortunate controversy and has no doubt caused much confusion, and great care, as in the Yellow Newtown, should be used in obtaining trees of known purity.

I have thus given a list and said something of twenty different varieties that seem to be the most reliable for bearing, or have qualities of fruit that are desirable and generally found good over the greater portion of the State. The same general conditions are found through Oregon, Washington, Idaho, and into the British possessions. If required to divide the list and to retain ten varieties for a general orchard that would contain only those with the best qualities and give a succession through the entire year, they would be varied perhaps in some locations: Red June, Early Harvest, Maiden Blush, Rhode Island Greening, Delicious, Yellow Bellflower, Black Ben Davis, Paragon, White Winter Pearmain, and Yellow Newtown. They would ripen or come to maturity about in the order named. Then, out of these ten can easily be selected a fewer number, if desired for a purely commercial orchard. If where the Yellow Newtown would do its best, an orchard nearly divided between it, Black Ben Davis, and Delicious would be something near the ideal for simplicity, utility, and profit.

MARKETING CALIFORNIA FRUITS IN EUROPE.

At the request of a leading fruit-exporting house in New York, the Secretary of the Department of Commerce and Labor issued a circular to the United States consuls in different parts of the world asking them for information relative to American fruits in their districts. Answers were received from all these, and the Department has issued a separate consular report containing them, from which we quote the following paragraphs relative to California fruits and of direct importance to our growers.

We have long known France was a heavy customer for California prunes and that our fruit, after being shipped all the way to France, was reprocessed and repacked there, returned to the United States, paying a heavy import duty as French fruit, and was offered for American consumption in competition with our own goods. That this is possible seems somewhat strange, but can probably be accounted for in two ways: the more attractive package in which it is offered as French fruit, and the disposition on the part of a great many consumers to prefer anything coming into our country with a foreign name. With the latter class, in the case of fruit of the same quality selling side by side, they would select the foreign package, paying a higher price for the same article. With the other class, those who are attracted by the package, this should not be the case, and it is possible that if our packers would take a hint from the French packers and put up their fruit in the same way, we could supply a large part of that demand which we now only have through French channels. The average purchaser is willing to pay for looks. An article that is nicely packed in attractive shape and is clean in appearance will get the price where fruit put up in unattractive boxes will not. We quote the following from Albion W. Tourgee, Consul to Bordeaux, France:

I have the honor to acknowledge receipt of a dispatch asking the exact meaning of my statement that "California prunes are imported to Bordeaux and there repacked to maintain the superiority of French prunes."

The following is the paragraph in my annual report which I suppose to be that referred to:

"The failure of the prune crop would have entailed very serious consequences on the trade of this region but for the large stock of California prunes which were held over from last year, and the sagacious enterprise of French dealers in securing early control of this year's crop on our Pacific coast. Bordeaux is the real center of the prune trade of the world. The methods of preparing this fruit practiced here are so superior to the manipulation it receives elsewhere that California prunes brought here and repacked maintain the superiority of French prunes and are re-exported in large quantities to the United States, where they compete successfully with the American fruit which has not incurred the cost of a double exportation."

I can not imagine anything more explicit. Last year (1903), for instance, there were almost no prunes raised in this region, probably not one twentieth of a normal crop. The deficit was supplied by the importation of prunes grown in California and Oregon. This fact I know from having been required to inspect the condition of such importations and afterward take testimony in litigation resulting from controversies over the quality and salability of such prunes.

Though the prune crop of this region was so small as to be almost a negligible quantity in the markets of the world—not enough, in fact, to supply the home demand—the export of French prunes was not materially lessened. A considerable portion of this exportation was to the United States, amounting to 95,000 francs (\$18,335), in the last six months. I have been unable to learn that any were shipped as “California prunes.” None passing through this consulate were invoiced as such. French prunes are shipped in much smaller boxes than the California product and are so different in appearance that it would be absurd for a Bordeaux merchant to send out California prunes to fill his orders without repacking and reworking.

The chief difference between California prunes and French prunes as they come from the growers' hands is that the latter are “cooked.” I have seen a few shipments of California prunes which seemed to have undergone some sort of process to simulate the appearance of French prunes. I do not know what it was, but official experts here concluded that the prunes had been steamed and that some viscid substance like glycerin used to give the peculiar glistening appearance of the best French product.

The French prune is the result of moist conditions, almost always ripening in a rainy season. It is possible that this has something to do with the difference in the result of treatment. The French prune is allowed to remain on the tree until it is thoroughly ripe and soft. Very often a considerable portion of the crop falls of its own weight.

When picked the prunes are placed on shallow crates, just touching one another, and the crates are then put into stone ovens raised to a temperature of about 40° C. This very moderate heat is intended to remove the moisture of the prunes so gradually as to avoid breaking the skins by explosion. They remain exposed to it for several hours, according to their condition, and are then removed and allowed to cool. When entirely cold they are replaced in the oven and the temperature is raised to 80° C., and after a sufficient time they are again taken out and allowed to cool, after which they are replaced and the temperature is raised to 90° or 100° C., the whole process occupying from thirty to forty hours.

This treatment leaves the fruit soft, so that the stone is easily slipped out, and the skin has the glistening appearance always sought in this class of prunes. This is claimed to be the result of the bringing of the saccharine to the surface by the long process of heating and cooling alternately. The prunes are thoroughly cured, and are not liable to become dry or hard.

After this treatment the fruit is sorted and packed in 50-pound cases and sold to the wholesale merchants and exporters, and by them it is again sorted and put up in small boxes with various ornamentation. Prunes which are exported to the United States are sometimes packed in jars. They are used as sweetmeats and employed in the making of confectionery—not for cooking purposes. These require a special preparation, which is a trade secret, probably varying with the different manufacturers. It is believed that California prunes are dried in the open air, or at a much lower temperature than are French prunes, and so are fitted for consumption, not as sweetmeats, but only when stewed or otherwise cooked as a table dish. The smaller sizes are usually dried and used for the making of jams and other fruit comestibles.

The ovens which are used in the curing process to which prunes are submitted here are of various sorts, some being of stone and others of metal, but there is nothing special about their construction requiring description. They are simply ovens with bars or flanges to support the crates of fruit. This method of curing produces an altogether different result from that brought about by the mere drying process applied to California fruit. There is no doubt that the importer of California prunes prepares them for sale or export by a process of practically the same character. Precisely what it is I am unable to say.

Under the caption of "How to Increase Trade," A. M. Thackara, our Consul at Havre, says:

When the exports of American prunes to France began to reach large proportions two or three years ago, the quality and packing gave rise to few or no complaints. The fruit was well prepared, the "count" and the weight were always correct, the packages were strong and neat, and the whole appearance of the goods was as attractive as that of the French fruit. The enormous expansion which has taken place in the trade during the past season has led to many abuses. While some of the best brands have been kept up to their former reputation, a number of new firms have appeared in the market, whose goods are not up to the proper standard. They have attempted to secure trade by means of attractive prices, which could be offered only by packing low-grade fruits, giving short weights, wrong "counts," and cheap and defective packages. Another and serious abuse which has crept into the trade is the selling and branding as Santa Clara prunes fruit which is grown in other districts. This fruit is of an inferior quality, and can be purchased for considerably less than the genuine Santa Clara product. The difficulty of detecting the fraud has facilitated this dishonest trade, but the result will undoubtedly be that the Santa Clara district will not only lose its reputation, but also the premium which its prunes have hitherto commanded. The French buyers, recognizing the impossibility of protecting themselves against these deceptions, will cease to give the preference, at any difference in price, to the Santa Clara product, and the value of the latter will be brought down to that of the poorer qualities.

A careful system of State inspection, the issuing of certificates from the place of production, and an official branding of the boxes would possibly improve the situation. This matter is of the deepest interest to the fruit-growers of the Santa Clara district. If they do not act quickly, and take steps to prevent a disloyal competition, they will find that their trade will slip away from them.

The trade in France in American dried and green fruits depends, of course, to a great extent upon the greater or less abundance of the French crops. The failure of two domestic prune crops in succession led to the exceptionally large importations of California prunes in 1903-04. A normal crop this season would result in a decided falling off in the imports next fall. Nevertheless, the California prune and apricot have obtained a footing in this country, and it is reasonable to expect that even in years of normal domestic production the American fruit will find some sale in France, provided prices are low enough to allow competition with the home product. In such seasons more than usual care will be necessary in the preparation and packing of the American fruit. The Frenchman is under the impression that the native-grown fruit is superior to that which comes from California. The American packer should therefore endeavor, by careful selection, preparation and packing, to reduce the results of this handicap to a minimum.

Dishonest and unscrupulous methods, such as false designation of the district of growth, packing of inferior goods in the middle of the boxes, wrong "counts," short weights, untidy and unattractive packing, poor quality of boxes, etc., will certainly tend to put a stop to the trade in years of bountiful production in France.

From St. Etienne, Consul Hilary S. Brunot writes as follows:

From inquiries as to the condition of the market here in American dried fruits, it seems that for the past year or two the prune crop has been almost a total failure in France, and to supply the ever increasing want the foreign prune has been in great demand.

The sources of this fruit are California and Bosnia, but preference is given to the American product. I have been told by one of the largest wholesale dealers here that the American importation is so considerable that the prune-growers in the department of the Lot and Garonne (the garden for this kind of fruit) are complaining of the foreign competition and are appealing to the Government to have the duty raised, as the foreign product can be sold cheaper in the country than the home growth, in spite of the freight charges and the profits of the middlemen.

The prices of the American prunes vary, according to quality, between \$19.30 and

\$13.03 per 100 kilograms (220.46 pounds) at Bordeaux or Havre. About twenty per cent for freight and profits is added to the above prices before arriving to the retail dealer, and finally the consumer pays from 10 cents to 18 cents per pound.

A considerable quantity of prunes come also to France from Bosnia, but there is a certain drawback to this commerce, as not less than ten tons can be ordered at a time.

Apricots from the United States are beginning to have a market here. Hitherto this kind of dried fruit was regarded with a certain distrust by the public, but the confectioners have always used it very largely. At present, however, apricots are being bought by the public as an article of food, and I have been told that the demand for them is increasing a little every year. On the other hand, dried pears and apples are not known enough to be appreciated.

Canned fruits are in favor during winter and spring, as restaurant and hotel supplies and for use in pie and pastry shops, but none are imported directly.

Benj. H. Ridgely, Consul at Nantes, contributes the following information, which contains some excellent hints in regard to packing our fruit and extending our markets:

About 200,000 cases of California prunes and apricots were received in Nantes during 1903. Of these about nine tenths were prunes. The demand was unusually large, owing to the almost complete failure of the local fruit crop, but in any and all events American prunes are popular here and the demand for them is sure to be steady, nor is there much likelihood that last year's prices will drop materially this year. France can not produce sufficient prunes for her own consumption (to say nothing of the considerable European demand for her fancy confectioned prunes), and American prunes, known here exclusively as "California prunes," may be regarded as a fixed staple of the French grocery trade. Prices during the past year have been about as follows: Prunes in cases, from \$11.58 to \$14.66 per 220 pounds. The \$11.58 quality contains from 60 to 70 prunes to the pound, and the \$14.66 quality from 40 to 50.

The prices of apricots per 220 pounds were: Fancy, from \$22.26 to \$24.24; extra, from \$21.62 to \$24.12; choice, from \$20.26 to \$22.77.

Purchases of dried apples and California prunes are generally made direct from the exporters and commission houses in the United States, though there is considerable buying from the French importers and brokers at Havre. Goods are almost invariably bought *c. i. f.* Nantes, and are generally paid cash against shipping documents, though some sales are made at sixty days' sight. The American exporter of dried fruits who would give his foreign buyer the right to examine the merchandise before paying for it would be popular here, but he might suffer in the long run. French buyers, indeed, insist upon this concession, but American exporters have up to the present time been loath to accord it, though, none the less, some of them who know their customers well do so.

Deliveries of dried fruits from New York are generally made with satisfactory promptness, but there is considerable complaint that California fruits are much too long on the way.

The packing of American fruits is regarded here as very defective and unsatisfactory. This is particularly the case with the dried fruit which comes in barrels. The heads or bottoms of the barrels are frequently stove in on arrival, and as a consequence the fruit not only suffers from the entrance of dirt and dust, but is often wasted or stolen. It is also suggested that the barrels ought not to be packed so full as they generally are, for the reason that the fruit, either from fermentation or other cause, frequently swells and produces very strong pressure. This might be prevented if the barrels were not filled quite so full.

Importers here in any event insist that the heads and bottoms of the barrels be so constructed or supported as to prevent them from being so easily stove in. It is also complained that all the fruits arriving in cases, such as prunes and apricots, evaporated peaches, pears, and apples, are badly packed. Indeed, according to the statement of an importer with whom I discussed the matter yesterday, it is rare that a case of fruit arrives from the United States without some part of the immediate cover missing. As

a consequence the fruit suffers from the contact with the air as well as from dust and dirt. It is recommended that all cases of fruit be girdled with light iron hoops.

As I have said above, the demand for American dried fruits depends largely upon local fruit-crop conditions. Importers and brokers here fully understand now that American dried apples, apricots, and pears will give their clients satisfaction, and since they have already got into touch with some of our importers, largely through the medium of this consulate, they know fairly well how to buy our fruits when they see an extraordinary demand for it. Our importers would of course do well to make themselves known here either by traveling representatives or by direct correspondence, but I repeat that sales will always depend upon local crop conditions and prices. Whenever there is a direct line of steamers from Nantes to New York, in order that shipments may be received here without transshipment, it would be advisable to establish an American fruit exchange at Nantes. Such an exchange must exist sooner or later in France, and with direct communication with New York, Nantes would be the very best port for it. In regard to California prunes, they already hold the French market, but sales could be largely increased through the efforts of traveling representatives speaking the French language. The same may be said of California canned fruits.

An American fruit exchange, operated by Americans, is the thing most needed in France, however.

Consul Lieber, writing from Dusseldorf, Germany, speaking of the tendency to send trashy stuff to the foreign market, says :

Another complaint of importers of American fruit is that, of late, shipments of goods of very inferior quality are becoming of frequent occurrence, and are a cause of annoyance, embarrassment, and loss to importers. These shipments come from that class of unscrupulous elements which is mingling with the honest export trade, and is very apt to spoil the whole business in a country like Germany, where authorities as well as the population are very particular with regard to the quality of any article of food, and where every retailer is personally liable to fines and imprisonment for selling goods proclaimed as adulterated or detrimental to health by the court chemists. German importers propose that in the interest of honest exporters the names of those trash exporters should be made known to consulates and chambers of commerce, so that German importers may be warned against those firms who by their way of business merely promote the interests of those parties in this country who are interested in keeping away any foreign fruit, and are never ceasing in their efforts to discredit any foreign, and particularly American, fruit, and throw all kinds of impediments in the way of importers of those goods.

From Amsterdam, Holland, Mr. Leopold Hertz writes to United States Consul Hill, in relation to California fruits, as follows:

As I handle only dried, evaporated, and canned fruits, I beg to report as follows on these different articles, viz: (1) California dried fruits; (2) Apples (sun-dried and evaporated); (3) Canned fruit.

California Dried Fruits.—During late years the sale of California dried fruits has largely increased in this country. Owing to the failure of the prune crop in France in 1902 and 1903, and in Bosnia in 1903, very large quantities of California prunes have been brought here, considering the limited size of the population of the Netherlands—5,500,000. Besides, the quality of the Santa Clara prune has very much improved, therefore it is a pity that unfair shippers pack outside prunes under the Santa Clara brand, thus hampering business for honest firms. Legal regulations would do a lot of good in this matter.

Apricots are largely bought here. The sale of pears has increased of late years. Of peaches and silver prunes only small quantities are bought. Nectarines and plums are practically unsalable.

Formerly the bulk of California dried fruit was bought from New York commission houses, but lately at least three fourths are bought from California direct.

The packing by the honest shippers is liked, but with some others it is better not to look too far below the surface.

Goods are sold c. i. f. Amsterdam or Rotterdam, three days after document, with one per cent discount, but many buyers prefer to buy on New York sight net, documents against acceptance.

The goods which could easily be here in four weeks take, when they arrive without delay, six weeks, but are often two or three months on the way, and this has a very bad effect on the sale of California goods, especially prunes. These are shipped in October and November, and then there are always such big quantities to be shipped that the shipments take two or three months. I have often written about this to California, and I quote one of the replies:

"As we have previously informed you, we have done everything possible with the railroad company to insure an early delivery of our shipments at destination, but the railroad and steamship facilities are inadequate for the business offered and delays are inevitable. Whenever we raise a question respecting delays with the transportation companies the railroad company places the blame on the steamship company and the steamship company on the railroad company."

The principal way to increase the trade is by arranging that goods shall be here in four weeks. Qualities, packing, etc., are satisfactory enough.

Evaporated or Sun-dried Apples.—Prunes as well as off-grade evaporated apples are largely bought here. The same can be said of sun-dried apples, but this last grade has suffered from the competition of Canada. Sun-dried apples produced in the United States are of three grades, viz: Southern, the lowest; Western, middling; and New York State, the best. Now, especially this year, Southern and Western apples are very difficult to sell, as the Canadian apples were very cheap (\$5.82 per 110 pounds c. i. f.); these apples being of excellent quality, purchasers preferred to pay 40 to 80 cents per 110 pounds more for them than to buy lower grades.

Purchases of evaporated and sun-dried apples are usually made through New York, but of late years some evaporating factories in the interior are working direct and have done a pretty large business. The writer hereof is open to represent a large evaporating plant and can promise a good business.

Terms of payment, three days after documents, with one per cent discount, or New York sight draft, documents against acceptance; price to be calculated c. i. f. Amsterdam or Rotterdam.

The consumption of apples has decreased, I think on account of the method here of canning vegetables in 5-liter tins and selling retail by the pound.

Canned Fruits.—Canned goods are not used largely in Holland, owing to a duty of \$10.95 per 220 pounds. Most purchases are made from Liverpool in 25 to 50 box lots. Payments are made in three days after documents, c. i. f. Amsterdam and Rotterdam.

Shipments by Kosmos Line are three and four months on the way.

This trade could be done direct from the United States if the writer could only get good offers, but till now the offers made direct from California in canned fruits were such that it was cheaper, or at least as cheap, for purchasers to buy 50-box lots in Liverpool. If offers were made of a good brand in canned fruits at a good price I might be able to sell from 2,000 to 3,000 boxes to one firm. The same can be said of salmon shipment by Kosmos Line. Only red salmon is salable here.

Owing to the failure of the apricot crop in France in 1903, California apricots were bought here for the first time. An objection, however, is heard against the packing in 1-gallon tins, as here the people are accustomed to 5-kilo tins (11 pounds). Further, the French article is much preferred, because it contains more half apricots and not so much water.

REPORTS
OF THE
COUNTY BOARDS OF HOR-
TICULTURE.

REPORTS OF COUNTY BOARDS OF HORTICULTURE.

ALAMEDA COUNTY.

NILES, CAL., October 25, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The output of fruit for this county has been considerably below the average this year; the long-continued rains in the months of February and March while the fruit trees were in blossom proved disastrous to many varieties. Apricots, almonds, pears, and peaches were the varieties that suffered most, many orchards having only one tenth of a crop; but as a general proposition the good prices partly compensated for the reduced quantity.

The amount of nursery stock handled at this station annually ranges from 900,000 to 1,000,000 plants, both fruit and ornamental, nine tenths of which is produced by the California Nursery Company.

The appearance of the orchard trees and the fruit has as usual been very satisfactory in this district, which comprises two townships. Since 1893 there has been no spraying done in any of the orchards, the scale being kept in subjection by beneficial insects.

We have but two kinds of scale to contend with (the San José scale and the cottony cushion scale are things of the past, having each succumbed to its parasite), viz., the black scale and the brown apricot scale. The first is, however, controlled by the *Rhizobius ventralis*. It is a beautiful sight to see the grand old olive trees, now about sixty or seventy years old, at old Mission San José, towering from forty to sixty feet in height, with their bright, clean foliage, whereas a few years ago they bore an unsightly appearance due to smut.

Scutellista cyanea, the South African internal parasite of the black scale, has been successfully introduced, and this year uniformly distributed throughout the deciduous orchards of the districts. The insects will no doubt produce good results the coming year. I find them on the sheet while collecting *Rhizobius* in the orange and olive groves. The *Rhizobii* are very scarce this year; in fact, I can not find five where I could collect one hundred last year. They have about cleaned out the black scale on the orange and olive trees, and have emigrated to the deciduous orchards.

The brown apricot scale (*Lecanium armeniacum*) is kept under complete control by its parasite, *Comys fusca*, every orchard having been fully supplied with them, with thousands to spare for distribution in other counties.

I am sorry to again report the appearance this year of the "brown rot of stone fruits," a parasitic fungus known as *Monilia fructigena*. While not as destructive as in 1902, yet there was considerable loss in some apricot orchards. I also found a few indications of it among cherries; but as this fruit ripens early when the atmosphere is dry, no losses occurred. In other stone fruits there was very little of it to be found.

The following figures will show the amount of certain kinds of fruit, etc., raised in this district last year. Not having the figures for this year, I have no hesitation in incorporating it in this report as a means of showing the extent of the fruit industry of Alameda County. The fruit is the product of one township, and the beets that of two:

Variety.	Ellsworth Drier.	Home-Dried.	Sold to Cannerns.	Value.
	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	
Apricots.....	1,548,219	-----	1,032,146	\$31,900 16
Prunes.....	1,701,372	200,000	-----	20,561 78
Prunes (Silver).....	114,504	38,168	-----	2,374 05
Peaches.....	15,629	7,800	-----	1,104 42
Almonds.....	281,516	10,000	-----	23,521 28
Walnuts.....	28,607	-----	-----	2,766 50
Cherries.....	-----	-----	300,000	12,000 00
Beets.....	-----	-----	-----	208,140 25
Total value.....	-----	-----	-----	\$302,368 44

In the previous year (1902) the value of the fruit alone from the same territory was \$135,850.85. There are very few peaches raised in the district and they are getting less and less every year, as the orchardists have found them an unprofitable crop, owing to the demand of the cannerns for large irrigated peaches. The Royal Ann cherries raised here are pronounced by buyers to be the firmest-meated fruit of any locality in the State.

Respectfully submitted.

WM. BARRY, Secretary.

FRESNO COUNTY.

FRESNO, CAL., October 25, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The Horticultural Commissioners of the County of Fresno submit herewith their report for the year 1904.

Fresno County is known quite generally as the center of the raisin industry of California; but while more than one half of the raisins shipped out of the State are grown and packed in this county, yet this great industry does not represent the entire horticultural field by any means. Even grapes, other than those used for raisins, are produced here in quantities sufficient to place Fresno County among the leading

counties of the State in the shipment of table grapes, and the largest producer and manufacturer of sweet wines and brandies.

We have no reliable data from which to give the actual acreage planted in vines, but from the estimates furnished by the California Raisin-Growers' Association and the California Wine Association we are safe in making the statement that at this time there are 100,000 acres in bearing vines and 25,000 acres in non-bearing vines.

Three years ago there was a scare among our vineyardists about phylloxera, but we are glad to report that no harm has been done and that the vineyards reported infected are in better bearing condition than ever before.

At the beginning of the packing season our vineyards promised the largest crop in the history of the county; but owing to the early rains and continued showers later on, the raisin crop was damaged about one half, and a crop of 2,000 cars is a conservative estimate of what has been saved.

We have at this time about 6,000 acres of peach trees in bearing and about 4,000 in non-bearing trees. The crop this season has not been over sixty per cent, owing, we believe, to the heavy rains at the time of blooming. Our orchards have not been able to supply in sufficient quantities the demands of the canneries for early and late cling peaches, and the canneries, as an inducement to growers to plant more of these peaches, are offering remunerative prices on long-term contracts.

The fig industry is in a prosperous condition. The acreage is increasing rapidly, and the curing of this fruit bids fair to be one of our leading industries in the near future.

A conservative estimate of the value of the green and dried fruits shipped from this county is fully \$2,000,000 annually.

The orchards of the county are generally well cared for and reasonably free from insects and diseases.

Respectfully submitted.

C. W. CHAUNCEY, Secretary.

HUMBOLDT COUNTY.

EUREKA, CAL., October 25, 1904.

To the Honorable State Horticultural Commissioner:

SIR: We beg to submit herewith the annual report of the Humboldt County Board of Horticultural Commissioners.

The principal fruit crop of this section, and the only one that attains commercial significance, is apples. For a period of years there has been a constant but slow increase in new settings, which have been partly offset by the uprooting of old and neglected orchards. The total yield,

which would under ordinary conditions show an increase, will this season fall short of previous averages, owing to a light crop. The quality is excellent and the condition of orchards generally is very satisfactory, showing a continued improvement.

Insect Pests.—Nothing serious in the way of insects is affecting our fruit. This applies especially to the sections producing the fruit that is marketed and shipped. The Eel River Valley orchards are almost entirely free from pests of any kind. Woolly aphid is found to a limited extent. In the remote sections San José scale had taken quite a hold, but under proper treatment it was found to yield readily and has been rapidly decreasing. Heretofore it had been difficult to induce those who had orchards which yielded no pecuniary benefit to apply proper remedies, but during the past year good progress has been made.

The distillate spray has shown good results and has gradually displaced the washes heretofore applied.

Codling-moth exists to some extent among the few scattered orchards in the Hoopa and Orleans sections, but careful vigilance is maintained to prevent infested fruit from entering the valley belt.

Fungus.—Fungus prevails in the entire apple section, causing more or less apple scab on the varieties susceptible to this growth. It has of late decreased rather than increased, due probably to greater care being bestowed on the growing trees. In some cases Bordeaux mixture is being applied.

Quarantine.—Three quarantine guardians are maintained; one permanently at Eureka to inspect fruit incoming from San Francisco and other sections and to prevent the marketing of home-grown fruit that is infected. Considerable fruit is condemned during each shipping season, mostly pears. A system of reports is adopted which shows each day's receipt of fruit of all kinds, with the name of shipper and consignee, also stating what was found on such fruit as did not pass inspection. These reports are presented monthly to our Board.

Fruits.—Pears are grown to some extent, also peaches. The former are very much subject to scab. The latter are considerably affected with curl leaf, but in the warmer belt fine peaches are grown and with the application of Bordeaux mixture the quality will improve. Plums and certain varieties of cherries thrive well. Prunes are being neglected, because unprofitable to raise in this section. It can be safely asserted that Humboldt fruit is far above the average as to freedom from infectious diseases. The apple crop for this season while considerably below the average in quantity is of exceptionally fine quality.

Respectfully submitted.

J. E. JANSSEN, Secretary.

LASSEN COUNTY.

JANESVILLE, CAL., October 27, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The County Board of Horticultural Commissioners for Lassen County beg to submit the following report:

We have had an exceptionally favorable year for all kinds of fruits grown in our county; but we are a long distance from market, our apples (our main fruit crop) have been greatly injured by the codling-moth, and the transportation charges have been excessive, so that the combination gives but very small returns to the orchardist. We are looking forward to the time when better railroad facilities and a better market will make the fruit business a matter of great importance in the aggregate business of our county.

Respectfully submitted.

G. W. MEYLERT, Secretary.

LOS ANGELES COUNTY.*To the Honorable State Horticultural Commissioner:*

SIR: In accordance with the provisions of Section 4 of the Act relating to County Boards of Horticulture, we herewith submit our annual report regarding the condition of the orchards of Los Angeles County.

The preceding year has been one of unusual favor to the growth of citrus fruits, the season just closing having produced the largest orange crop in the history of the industry. Apples and peaches were poor, apricots of diminished yield, grapes, berries, and walnuts of fine quality and abundant quantity. In the cultivation of vegetables, cantaloupes, and melons great progress has been made, the business passing largely into the hands of American growers and consequently leaving the Chinamen; or, at least, the increased demand is being supplied by our own farmers. The rainfall of the year, while somewhat below the average, came late in the season, giving the effect of a much larger precipitation for the maturity of cereals and unirrigated crops of fruit. In all, the season has been favorable to the fruit-grower, the stress of water scarcity being relieved early by a series of mountain rains and the consequent early rising of the surface flow of the mountain streams.

With the heaviest crop of oranges ever produced in the State, prices for Navels at the beginning of the season and during the first months of the year fell far below the average of other years, rallying materially in April and closing far more profitably with the later shipments. In certain localities in the county where organic nitrogenous fertilizers have been applied too freely in the last few years, Navel oranges have shown a decided tendency toward early decay and poor carrying qualities, even

when marketed in the first part of the season. This tendency was increased, also, by the shallow cultivation given in some cases and the consequent hardpanning of the soil. In many instances our reports show that in groves otherwise given the best of care the roots of the trees below this crust have not been reached by irrigation during the entire season. Our Board has thought this condition of such importance as to justify calling the attention of the orchardists thereto as the cause of much inferior fruit. With the exception of the small ratio of orange groves in each neighborhood that have not been properly cultivated and irrigated, the orange trees of Los Angeles County never before looked so vigorous, nor were in better fruiting order than at the present time. The Commissioners and Inspectors, while going about their official duties, have made note of the apparent deficiencies in cultivation and fertilization, and the results of these observations have been published. These reports have had influence on the methods employed in the care of orchards, and show that treatment good for one variety of oranges is not necessarily good for another, especially as between the Washington Navel and the Valencia Late—the two principal kinds grown in the citrus fruit centers. They show that over-fertilization of the former orange with raw nitrogenous manures will induce puffiness, poor keeping qualities, and general inferiority, while the same amount of these fertilizers has little or no bad effect upon the Valencia Late. Other cultural questions have been considered and all the reports filed for the use of individuals and the fruit-growers' organizations that meet in the office of the Commission.

The production of lemons has been abundant and the fruit of finer quality than usual, with the industry profitable where the lemons are handled by large organizations from the orchards of large growers. There has been no particular advancement in the cultivation of other citrus fruits, which are of small importance compared with the growing of oranges and lemons.

The condition of the apple orchards has not improved during the year. For three years the apple-growers of the county have met with the Commissioners six or eight times annually, at which meetings insect pests and remedies, quarantine regulations, and methods of culture have been discussed and systematic efforts made to better the condition of the apple orchards; but with all these efforts last season's crop was very unsatisfactory, the quality and yield falling far below the average of former years. This is largely owing to the unusual abundance of codling-moth and the prevalence of extreme heat during the past summer.

Owing to the heavy attack of the peach-twig borer and the climatic visitations inducing sour sap and other maladies, a general debility of the peach trees of the county has been noted during the season, making

the peach crop a failure, with a few exceptions where care and conditions have prevailed and given exemption from pests and disease.

Many fine crops of apricots have been grown the past season, followed by very satisfactory prices and leaving the trees in good form for another crop.

The berry-growers and small-fruit producers have had a profitable year, the retail trade demanding practically all the fruit the local growers could produce. Some of the largest strawberry-growers have found market for the entire output of their fields through one retail agency.

The grape crop was abundant and of exceptionally fine quality; but the prices for wine grapes have ruled so low that the business of vine-growing has assumed a very discouraging phase. There has been no change in the status of the California vine disease during the year, a few specimens being affected in almost every vineyard, but in no case has the malady assumed an alarming form.

An enormous yield of walnuts is now going to market, of a quality never so good before. Contrary to expectations the blight has done very little damage to the nuts, and none to the spurs that are to produce the next crop, this condition promising a great crop for 1905. The prices for nuts are very favorable, and altogether the walnut business is in a flourishing condition.

The vegetable men, especially the growers of melons, cantaloupes, and cucumbers, suffered materially from the depredations of insect pests during the first part of the year, but the usual climatic vicissitudes and the presence of predaceous insects controlled the pests effectually as the fruiting season advanced. The year has marked a heavy advance in the acreage of vegetables grown throughout the county, the industry passing largely into the hands of the American gardener. A heavy increase in the population of Los Angeles and suburban towns has stimulated the production of fruit and vegetable crops and enhanced the value of the land where they can be grown.

INSECT PESTS.

Generally speaking, the past year has been one of unusual activities of insect pests upon the fruit trees and vegetable fields of Los Angeles County; yet in some cases there has been a marked diminution in the damage done by pests usually prevalent. It has proved a season of great immunity from the attacks of the red spider; a year of remarkable destruction of the black scale by parasitic insects; a period of good work of beneficial insects both native and imported, and a time of the trying-out of methods of artificial control. The season has witnessed the multiplication of the greedy scale upon the shade and park trees and its prevalence in the citrus orchards. No uneasiness is felt over the attacks of this scale upon fruit trees, but it has become a serious menace to the

health of many umbrella trees and palms. There has been a bad outbreak of the mealy bug in many of the greenhouses and nurseries of the city of Los Angeles. It has injured many valuable vines and is especially troublesome where miscellaneous plants have been grown for a considerable time. Orchards to the eastward of the San Gabriel River are entirely free from red scale, except in one small locality, and it has decreased in places where it has heretofore prevailed in other portions of the county. In all places where fumigation has been applied regularly this scale has not secured a hold. This insect and the purple scale are kept confined to the area that has been contaminated with the pests for the last fifteen years, there being only one tree infested outside of this territory, so far as the most careful inspection can determine. Black scale has hatched in a remarkably even way this season and is on the wane all over the county.

The crop of apples has been sadly injured by the codling-moth this season, and will not amount to a yield of fifty per cent of the normal crop of merchantable fruit. On the other hand, a rapid decrease is noticeable in the other great apple pest, the San José scale, and we may hope that this immunity may be permanent. There are many minor insect pests such as the elm scale, cutworms, an occasional bunch of white scale, the various species of plant lice, borers, etc., none of which have been of sufficient importance to require special mention. Fuller's rose beetle, the peach-twig borer, and the melon aphid have done a great deal of damage in certain localities. The Board has an effective system of inspecting all incoming and outgoing trees and plants, and note with satisfaction that not one new pest has secured a hold in the county during the year.

War against the black scale has assumed an entirely new aspect during the past year, with the practical assurance of the final control without resort to artificial means. For years fumigation and spraying have been necessary throughout the county to insure citrus fruit crops reasonably free from black smut, and to maintain a healthy condition of the trees. The expense of this treatment has been enormous. In one locality containing 1,230 acres of full-grown trees the growers paid for fumigation in the fall of 1903 the sum of \$24,600, and this heavy tax upon the industry afforded only enough immunity from the scale to produce one or two crops commercially free from black smut. It is estimated that this locality has spent, upon an average, \$15,000 per year for fumigation, ever since the trees came into full bearing, about eight years ago, or the aggregate of \$120,000, in attempting to control this, the most destructive of our citrus fruit pests. We have no means of knowing the cost of fumigating or spraying the total area of orange and lemon groves, but it would be appalling if the whole cost could be determined for all the years in which these fruits have been produced in southern California.

But this inordinate expense bids fair to cease altogether through the introduction of the *Scutellista cyanea*, the chalcid fly that is so well known to our fruit-growers for the last twelve months as the most destructive foe of the black scale ever introduced. The work of the *Scutellista* in this county during the year has been so remarkable that it is deemed profitable to give some account of the increase and distribution of this great insect in this report. In the fall of 1902 a small colony of the fly was received by the Commission from the State Board of Horticulture through Alexander Craw. It was placed upon a young pepper tree in Pasadena on which an enormous lot of scale had located. For three or four months no indication of the fly could be discovered. In February, 1903, a few of the larvæ were found under the scale and an occasional exit hole made by the mature fly. The Commission soon found that the pepper tree afforded the best medium for breeding the *Scutellista*, and colonization followed upon a row of these trees from the flies of the original tree. In a few weeks the insects began to multiply more freely, and by midsummer they literally swarmed in the breeding jars filled from this source. By the first of August the work of distributing the flies was well under way, resulting in twelve months ending last August in the sending out of hundreds of thousands of mature flies to the communities of the county. By the fall of 1903 the demand from the farmers became so great that additional breeding facilities had to be provided, requiring the attention of one man practically all the time in gathering material, mailing and recording the distribution. So great was the increase from individual jars that one would sometimes produce one thousand flies in a day. The work is still being continued at the time of the writing of this report. The result of this systematic distribution is, that so far as the Commission can determine there is not an orchard, citrus or deciduous, in the county that has not been supplied with this most effective parasite.

The colonies sent out in the fall of 1903 seemed to find the greatest opportunities, getting a good start before the cold weather, and by early summer of this year convincing the most conservative that at last an effective parasite for the black scale had been secured. In one large district the Commission has just made a careful examination of the work of the *Scutellista*, resulting in the report that the scale has become so reduced that the growing orange crop will need nothing more than dry brushing, there being no black smut to require the washing of the fruit, even where the trees had received no treatment whatever. The proprietor of one of the largest citrus groves in the State estimates that the fly has saved him \$3,000 this season, the trees needing no other treatment than that given by the parasite. The Commission has its own report upon this orchard, verifying the completeness of the work of the fly. In an olive orchard of 80 acres south of the city the destruc-

tion of the scale has been so complete that two clean crops of fruit have been harvested where heretofore the crops have grown too smutty for use. The owner has relied solely upon this insect for this happy result. Six large groves have lately been inspected by the Commission in conjunction with a committee of growers to determine whether fumigation will be necessary this season. The decision was that the fly had become so active upon the June and July hatch that no expense would have to be placed upon the owners this year to produce clean fruit. Such reports are obtainable from every part of the county, and the outlook justifies the expectation that the *Scutellista* will become a controlling factor wherever it is introduced.

In regard to the enemies of the *Scutellista*, the Commission has one important phenomenon to report. In December, 1903, a large number of dead and decrepit flies were found inclosed in the black scale of the breeding jars. Upon more careful examination the flies were found covered with minute, translucent globules, very much resembling pearls, when the globules were placed under a strong glass. The Commissioners at once began correspondence with authorities on entomology and plant diseases, but found no explanation as to what the appearance might be. Soon the mortality of the imprisoned flies ceased and the globules were not observed again until last June. During this month the breeding jars failed absolutely, none of the maturing flies or larvæ surviving. A closer examination proved these globules to be the abdomens of gravid mites, and numberless progeny were found breaking out of the depositories and attacking the helpless flies, honeycombing the larvæ, and destroying every vestige of life. Through the finding of an old work on entomology containing a drawing of this curious mite, the Board determined it to be *Pediculoides ventricosus*, a creature never before discovered in the State, so far as your Board is aware. When these mites were in full activity last summer, the breeding jars that had given out several hundred flies every morning became dormant, and orders for *Scutellista* accumulated so fast that the last one has just been filled. The mites did not confine their ravages to the material in the breeding cases. They were soon found in scores of orchards, in one ten-acre grove of orange trees killing millions of flies and is fast exterminating them in that orchard altogether. In twenty-two groves that had been colonized with *Scutellista* on boughs of pepper sent by mail from the originally infested trees at Pasadena, every grove was infested with the mite. In about thirty orchards in the same neighborhood colonized by sending the mature flies in boxes, no indication of the mite could be discovered. Since August the mites have all disappeared except in two or three places, and the ravages of this strange visitor seem to be over for this season. How far they will prove a handicap only time can prove, but our experience has shown that the creature can destroy myriads of *Scutellista* in a short time under favorable circumstances.

In the destruction of Fuller's rose beetle the Commission has made many experiments during the year. This insect is proving a most destructive pest in the strawberry fields, and in fact gives its attention to almost every form of vegetable life. In the strawberry fields its work reached the point where steps had to be taken to curtail its operations. In the latter part of April the grubs attack the plants by boring into the roots or stems one or two inches below the ground. Here the work is continued until the plant is killed. Upon the death and drying up of the plant the grub returns to the soil, being found in great numbers surrounding the plants and remaining near the surface where the soil is moist, by burrowing five or six inches deep where the soil is dry. The pupæ appear early in June and the mature beetles about ten days later. The remedy used was carbon bisulphide. Before applying it the ground was irrigated and allowed to dry off before the application. One third of an ounce of the carbon bisulphide was used as a dose, and the injections made as follows: One injection every linear three feet in the row, one every two feet, and one every eighteen inches. Twenty-four hours afterward an inspection of the treated rows was made and the following methods employed to determine results: The soil was removed from a width of twenty-four inches and to a depth of eight inches and carefully sifted. All the insects were removed and placed in a shallow box and allowed to remain in the sunlight for fifteen minutes before the count was made. The count resulted as follows:

Doses.	Grubs.			Pupæ.	
	Total.	Dead.	Alive.	Total.	Dead.
One third ounce to 3 feet.....	56	43	13	1	1
One third ounce to 2 feet.....	42	35	7	0	0
One third ounce to 18 inches.....	36	34	2	2	2

This is perhaps the first recorded instance of this insect's attacking the roots of berry plants. However, from the evidence gathered it seems that unrecognized it has for some time been working upon the roots of the strawberry plants in different parts of the country. Fortunately the natural spread of this insect will be slow, owing to its inability to fly, and every effort should be made to take advantage of this condition and to prevent its spread by other means.

In the control of red and purple scale the Commission has been hindered by the orchardists using distillate spray and other washes. During the incumbency of the members of the present Board scores of spraying outfits have been placed in the field for the application of distillate, in many communities entirely displacing the old and reliable remedy of cyanide fumigation. This change has caused the increase of the scale instead of its control, and there might be a new epidemic

of these scales were it not for the fact that the ranchers are returning to the use of fumigation. The area infested with purple scale is limited to three communities in the county, one of which, however, is of considerable importance as a citrus-growing territory. In that locality the trees have been sprayed so persistently that their vitality is seriously impaired, and the trees would have been ruined had this method continued in use. Through all this contest between spraying and fumigation the Commission has held to the latter method as the only effective and safe means of combatting the red and purple scales. The tide has now turned in favor of the use of cyanide and the question as to the efficacy of each of these remedies finally settled.

Good work has been done the past season in the colonization of the convergent ladybird upon the infestation of the melon aphid and kindred pests. In one very large melon-growing district the reports show that these pests were completely exterminated by the introduction of three or four thousand of these ladybirds from a distant locality. This work will be continued by the Board another year. An extensive outbreak of the mealy bug has occurred in the citrus groves of another section. The remedies used were cyanide and bisulphide, the former being applied in both the liquid and gaseous forms. The use of cyanide in the liquid form was an experiment which the Board is not ready to indorse, though it is highly spoken of as a remedy for the subterranean form of the mealy bug. This insect is very active upon the ornamental plants of Los Angeles City. The attacks have been met in every case by thorough treatment.

A few of the apple orchards of the county were badly infested with *Pulvinaria innumerabilis* about a year ago, and we have to record the strange fact that this scale was attacked by the *Rhizobius ventralis* and completely wiped out. So numerous were these ladybirds in these orchards that the Board had no difficulty in gathering *Rhizobius* in unlimited quantities, many large colonies being sent to Illinois to work upon the same scale there. The bugs failed to become acclimated in the East and no favorable results were obtained. Whether the *Rhizobius* attacked this scale here on account of the scarcity of other food may be demonstrated the coming year. It may be one of the natural enemies of the maple scale.

In the control of the codling-moth in this county no new experiments have been made, and the growers are depending upon the old remedies for the reduction of this pest. The apple men would have tried the arsenites and other newly approved applications, but the material was difficult to get. They have ceased to regard the San José scale as a serious pest in this county, on account of parasitic enemies and other causes unknown to this Board. Experiments upon the extermination of this scale have been tried during the year with more than one remedy

not in general use. Very positive results were obtained by the use of pure kerosene, 124 gallons of oil being used in this extensive test. But the danger of injury to the trees has again been demonstrated in the use of kerosene. In another test upon 300 large apple trees a four per cent mechanical mixture of distillate was tried, costing but $2\frac{1}{2}$ cents per tree, but it proved entirely ineffective. Our experiments in this line covered six orchards containing from 200 to 1,000 trees each, resulting in the return to the old remedy of sulphur and lime. It is assuring, however, that we can begin to depend upon the natural enemies of the San José scale, and not have to spray continually to keep this pest in subjection.

The Commissioners have on file a special report upon the ravages of an insect that destroys the apple blossoms seriously in this section. The insect has been identified as *Archips rosaceana*. The report is a complete life history of this local pest, embracing an account of its work, its natural enemies, and the application of arsenite and other poisons in its elimination. The Commission has made many careful experiments in the destruction of the woolly aphid, and while this insect is not increasing, no effective means of ridding trees badly infested has been determined.

In closing this report the Commissioners wish to make more emphatic the fact that the work of beneficial insects has assumed great proportions in Los Angeles County. Parasites are very active upon the red and yellow scales, to some extent upon the purple scale, the mealy bug, plant lice, San José scale, cutworms, codling-moth, and upon almost every form of destructive insect life. Too much praise can not be given to the *Scutellista*. The *Lecaniums* other than the black are under control, and the outlook for a continuation of this good work is very hopeful indeed.

Respectfully submitted.

J. W. JEFFREY, Secretary.

MENDOCINO COUNTY.

UKIAH, CAL., September 28, 1904.

To the Honorable State Horticultural Commissioner :

SIR: I herewith submit my report for the First Horticultural District of Mendocino County.

We have 304 acres of Bartlett pear-trees in this district, which produced a full crop this year. We used arsenic sprays and paris green, and saved ninety-five per cent this year against forty-five per cent last year. I tried a little experiment here which convinced me that climatic conditions have a great deal to do with spraying, laying of eggs and hatching of the codling-moth. I find that June 1st is early enough for spraying here, and about three sprayings between the 1st of June and the 20th of July will save the crop.

We have 1,150 acres of prunes in this district. There was not more than a fourth of a crop this year, but the quality was good. We have the San José scale under control here, having used the lime, sulphur and salt remedy. We also have the brown apricot scale under control.

Our county has about 400 acres of wine grapes, all in good condition and bearing fine crops. We have also 400 acres of apples, 150 acres of peach trees, and 185 acres of olives. The latter bear well, but are a little late in ripening. Cherries do well along the foothills; about 50 acres are set out to this fruit. Figs are somewhat of an experiment, but do well, being prolific bearers and ripening early. French and English walnuts also grow here; we have 80 acres planted to these varieties. About 60 acres are planted to loganberries, blackberries, raspberries, dewberries, strawberries, and currants, all being of first-class quality. We have produced about 3,000 bales of hops from 500 acres this year.

Respectfully submitted.

J. R. BANKS, Commissioner.

MONTEREY COUNTY.

DUNBARTON, CAL., November 7, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The apple crop in Monterey County this year was almost a failure. This is the main fruit crop in the county and was a serious disappointment to the orchardists, as apples are considered a sure crop. The trees were slow to bloom in the spring, and the abundant rains, coming just at blossoming time, apparently blighted the blossoms. The prospects were for a good one-third crop until the extreme hot weather of early September burned the fruit. A remarkable feature of the injury was that fruit well covered with foliage was injured as well as that which was exposed to the sun. The percentage of fruit left uninjured was very small. The amount of apples shipped abroad was light. Apricots were a good half crop and the quality good. Berries of all kinds did well and proved a profitable crop to the growers.

We still have the San José scale, greedy scale, and black apricot scale. As a remedy for the last named, through the kindness of Alexander Crow, formerly of San Francisco, and William Barry, of Alameda County, two colonies of the *Scutellista cyanea* were introduced into the Pajaro district and placed on apricots infested with the black scale. The introduction of the *Scutellista* as a remedy for this persistent scale will be determined better another season. For the San José and greedy scales we are using distillates, and find them effective. Lime, sulphur and salt spray is also effective; but owing to the great amount of labor in its preparation, and the unpleasantness in handling it, this spray does

not find much favor. The codling-moth is with us as usual, but owing to the lightness of the apple crop not much attention was paid to it. So far nothing new has developed to check it beyond the experiments conducted by the Experiment Station of the State University last season.

Following the extreme heat, came some rain, as much as five and a half inches in Pajaro, which had the effect of starting a new growth on many of the trees. Many apricots, prunes, and apples blossomed.

Respectfully submitted.

D. W. ROHRBACK, Secretary.

ORANGE COUNTY.

ORANGE, CAL., October 29, 1904.

To the Honorable State Horticultural Commissioner:

SIR: I beg to submit herewith the report of the Orange County Horticultural Commissioners, on the condition of the fruit industry of the county, with respect to pests and diseases.

Black scale must be considered most troublesome, as it is most numerous. Spraying with the various distillates is the most generally adopted artificial means for its subjection, since it is cheaper than cyanide fumigation, although not as effective. But with the marvelous increase and distribution of *Scutellista cyanea*, and with its other enemies both predaceous and parasitic, we have faith that the black scale will soon be in complete subjection.

Red scale is slightly more numerous than last year, while its enemy, the golden chalcid fly, can always be found wherever the scale is present, so we may expect to see the balance easily maintained.

Purple scale, the only one which has no effective enemy in our county, has been found in limited numbers in a very few new places.

In the mite family, the six-spotted mite is destined to be a greater cause for worry than the commonly called "red spider," since seemingly small numbers cause the trees to drop their foliage badly.

Fuller's rose beetle is also quite troublesome in rebudding as well as in replanting.

As to diseases, scaly bark of the orange is increasing in the older orchards, though I think never appearing until trees are more than twelve years old. This, together with the foot-gum disease of the lemon, is a cause for some discouragement.

Respectfully submitted.

A. D. BISHOP, Secretary.

PLACER COUNTY.

AUBURN, CAL., December 16, 1904.

To the Honorable State Horticultural Commissioner:

SIR: I have the honor to forward this, the report of the County Horticultural Commissioners of Placer County, for the year 1904.

Most of the orchards in this county have been regularly inspected by the County Commissioners from time to time, and they report as follows: The fruit crop of all kinds was below the average. This has generally been attributed to continued rains during the months of February and March.

Our Commissioners have repeatedly inspected the orchards in their several districts, as well as all nursery stock coming into or going out of the county.

In some sections the "pear blight" has appeared, but by the constant vigilance of the Commissioners, and the hearty coöperation of the orchardists, we have kept it under control.

The peach moth, which at one time caused serious loss, has in a very great measure been checked by spraying with the lime, sulphur and salt mixture, and it has been clearly demonstrated that it is a waste of time and material to do this spraying during the winter, as the insects are then buried in the bark of the trees. Experience has taught us that the time to spray for this pest is when the trees are coming into full bloom.

The following table shows the horticultural conditions of Placer County during the years 1903 and 1904:

	Trees in Bearing.	Non-Bearing Trees.	Total.
Apples	19,400	6,770	26,170
Apricots	12,300	7,480	19,780
Cherries	15,900	9,040	24,940
Figs	5,100	3,840	8,940
Olives	33,410	20,900	54,310
Peaches	793,200	601,200	1,394,400
Prunes, French	6,400	3,000	9,400
Prunes or Plums, other varieties	104,200	182,300	286,500
Pears	108,300	42,900	151,200
Lemons	1,500	1,800	3,300
Oranges	26,400	23,400	49,800
Almonds	5,900	3,400	9,300
Walnuts	1,520	700	2,220

Grapes: Table, 1,540 acres; raisins, 380 acres; wine, 625 acres; total, 2,545 acres.

It may be of interest to state that there are 195 miles of main ditches for irrigation purposes in Placer County.

Respectfully submitted.

W. J. McCANN, Secretary.

RIVERSIDE COUNTY.

RIVERSIDE, CAL., October 1, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The Horticultural Commission of Riverside County has the honor to submit herewith its report for the year 1904, as provided by law.

The horticultural industry of Riverside County has increased, in spite of the lightest rainfall ever known, and considerable litigation over "water rights," above as well as below ground.

New orchards of citrus and deciduous trees have been planted throughout the county, the greatest increase being in Riverside and Corona districts, where the taxable property has gained in value nearly \$411,000 in Riverside and \$96,000 in Corona.

The Banning, Elsinore, Coachilla, and Mecca districts show a gain of taxable property, which has been caused chiefly by the general development of the fruit and vegetable industry.

On account of the very light rains during the past season, the "dry" farming was almost a failure except in the Beaumont district, where fair crops of grain were raised. Plenty of seed has been carried over, however, from last year's crop of 500,000 sacks of grain, so that the prospects are that there will be a greater acreage seeded this fall and winter than ever.

The apricot and peach crops were small and the fruit inferior, on account of late frosts and lack of the usual spring rains, except at Banning, where they had a fairly good crop, and the horticulturists have demonstrated that they can control, and in some orchards have actually eradicated, the red spider of the almond (*Bryobia*) by the application of the adhesive "sulphur spray."

There was a large yield of pears, but the quality was not up to the usual high standard. This change has been brought about largely by the ravages of the "codling-moth," which was assisted no doubt by the unusually long hot season for this section.

In the Corona district the horticulturists disagree in their methods of treating scale pests, as between spraying and fumigating; but the Commission is unprejudiced, and allows a choice of remedies, and spares no labor or pains to see that the spraying or fumigating is carefully and thoroughly done.

The Commission has distributed 734 colonies of *Scutellista cyanea* in the orchards infested with black scale, and reports a large percentage of scale destroyed by the parasite. The black scale finished hatching about September 1st, when the parasite disappeared and will not appear again in this section until about June 1, 1905. So that it seems safe to conclude that there is no danger of destroying the *Scutellista* by spraying or fumigation between October 1st and June 1st, the hibernating period in this section.

In the Riverside district the majority of orange-growers favor spraying with distillate emulsion, as results show that spraying with power machines by experienced workmen under the supervision of a Horticultural Commissioner has been very successful in eradicating a large amount of black and red scales. The Commission stands ready, however, to assist any who prefer to fumigate, as the county owns first-class fumigating outfits and has experienced men to operate them. The county never bought and does not own a spraying outfit, but the horticulturists did buy and are now operating over thirty power spraying machines, under the supervision and instructions of the Horticultural Commission, by request of the machine and orchard owners.

In spite of unsatisfactory market conditions for citrus fruits during the past season, the increase of about 1,000 cars over last year's product shows an increased confidence in the citrus fruit industry. With the completion of the Salt Lake railroad the fruit-growers hope for better facilities in marketing their fruit than they have had in the past. The shipments of citrus fruits for the season just closed were about 6,000 cars from Riverside, 975 cars from Corona, and 40 cars from Hemet.

Banning shipped 1,305,750 pounds of green fruit, 453,000 pounds of prunes and other dried fruit, 53,000 pounds of almonds, and 44,000 pounds of honey.

On account of the scarcity of deciduous fruits, the cannery at San Jacinto only had about half the pack of last year.

Coachilla, on the "desert," shipped 113 cars of melons, the land being irrigated by artesian wells owned by the settlers.

The "date farm" of $6\frac{1}{2}$ acres, at Mecca, with 400 thrifty date trees, under the efficient management of Mr. B. Johnson, is looking well, and is constantly watered from a fine artesian well.

Some of the apple-growers have succeeded in producing fruit nearly free from codling-moth by spraying the trees several times with arsenical insecticides.

The Commission is maintaining strict quarantine regulations against trees and all kinds of nursery stock from outside the county, and has succeeded thus far in preventing the introduction of any new pests or diseases. In this work we have the hearty support of the Board of Supervisors, the press, and all the progressive horticulturists throughout the county, in which we are exceptionally favored.

Respectfully submitted.

H. K. SMITH, Secretary.

SACRAMENTO COUNTY.

SACRAMENTO, CAL., October 1, 1904.

To the Honorable Horticultural Commissioner:

SIR: The Horticultural Commissioners of Sacramento County submit herewith their report for the year 1904.

Scale.—We can report that in the orchard districts insect pests are being kept in check, codling-moth as usual being the most difficult to handle. In the city we find more or less of all citrus scales, most noticeable being the black and yellow scales. Since early in the spring we have been using the distillate wash with a power sprayer. Trees sprayed early show a marked improvement, sending out new growth.

Olive Knot has made its appearance in a light way in some of our olive orchards; where found the tree is destroyed root and branch. Fair Oaks and Orangevale being planted to a large acreage, the olive groves now coming into bearing bring Sacramento County forward as an olive-producing county.

Pear Blight has made its appearance so pronounced this spring as to clear all doubts there may have been last season. We note that it appeared in different parts of the State where never before known, which raises the question of climatic conditions. We find the blight most severe on the Sacramento River. We have kept an inspector in the orchards along the river during the past season, noting the conditions and enforcing the cutting-out of the affected parts. We might safely say at this time that the disease spreads over a larger part of the tree where the cutting was left to be done at the fall pruning. In some cases it made great inroads on the trees. Very few pear trees will be planted this season.

Phylloxera having been with us to some extent for many years has caused a very large acreage to be planted to resistant vines. As these vineyards are young, their merits as grape-producers have not been thoroughly tested.

Flea Beetle.—The work of the flea beetle is very noticeable in some of our vineyards, which has been attributed by some to sunburn. Mr. E. F. French of Florin was the first to note the difference, and he has been making a careful study of its habits for several years, but as yet can not offer any other remedy than a hand method of killing. The insect punctures the stem of the bunch, making weak circulation, and causing the berry to burn more easily.

Asparagus Rust has made its appearance in some of the old fields. Growers hope to keep it in check with the free use of the Bordeaux mixture.

Fruit Conditions.—As a fruit season this has been a very unsatisfactory one to the growers—a light fruit crop, excepting pears, which were a full crop, but returned poor prices for those that were shipped. All fruit sold to the canneries brought good prices. The early rains damaged the grape crop to a very large extent. Taking the season through it has been a very poor one for the grower.

Sacramento County has suffered heavily by the floods, which not only caused the loss of the use for one year of thousand of acres of land, but killed a large acreage of peach, plum, and cherry trees.

After a careful canvass we can report Sacramento County as having 300,000 bearing and 20,000 non-bearing pear trees.

Inspector L. C. Chisholm has had charge of inspecting the work of pear blight and olive knot. Inspector Jesse Aiken has charge of the city to inspect nursery stock and the spraying that we have caused to be done within the city.

Respectfully submitted.

GEO. H. CUTTER, Secretary.

SAN BERNARDINO COUNTY.

SAN BERNARDINO, December 24, 1904.

To the Honorable State Horticultural Commissioner:

SIR: I have the honor to report as follows for the year 1904:

We have in the past year found the black scale (*Lecanium oleæ*) about normal as to quantity and condition. Very little spraying and fumigation have been done for this pest during the past season, for the reason that inspection has shown plentiful evidence of the presence of *Scutellista cyanea*, the South African parasite. If the parasite holds its own during the coming year, the black scale is doomed in this county.

With the white scale (*Icerya purchasi*) it is the same old story. Where it shows up in the orchards the *Vedalia cardinalis* also appears in numbers sufficient to cleanse the trees.

With the yellow scale (*Aspidiotus citrinus*), we have an entirely different story to tell. The reputed parasite, *Aspidiotophagus citrinus*, has been repeatedly placed in infested orchards, but the scale has gone on increasing in numbers, extending its territory to an alarming extent. In one portion of our county, power spraying machines have been at work trying to hold the pest in check, but with very indifferent success. Until we are furnished with a successful parasite, the only method that will prove satisfactory is fumigation with hydrocyanic acid gas, and I wish to add here that even with this remedy, it must not be used in homeopathic doses. We could cite cases where contract fumigation has not seemed to affect this scale to any appreciable extent on account of light dosage.

With the red scale (*Aspidiotus aurantii*), the case is very similar to that of the yellow scale. Our method at present is to endeavor to inspect orchards affected with these scales as often as every two months (that being the length of time necessary to produce a new generation) and immediately follow with the tents after orchard is platted, and fumigate enough of the trees to include all trees marked as infested. In this way we expect eventually to stamp out these very serious pests.

In the matter of grapevines, we have in this county a very large acreage of healthy vineyards, and to protect this interest we have a county ordinance quarantining very strictly against the introduction of vines from points known to be infested with *phylloxera*, for the very good and sufficient reason that in the localities affected with this pest, they are not even able to stay the progress or spread of the pest, which in some sections is wiping out the wine and raisin industries. In this case an ounce of prevention is worth a pound of cure. Our ordinance is equally strict against the introduction of citrus stock or plants liable to bring in *Aleyrodes citri*, or white fly, and other serious pests that have not as yet found their way into our county.

In our apple districts some work has been done to reduce such pests as woolly aphis (*Schizoneura lanigera*), codling-moth (*Carpocapsa pomonella*), and *Bryobia pratensis*. In some localities apple trees from four to six years old have died back to a limited extent, caused by a parasitic fungus which girdles the tree under the bark just at the surface of the ground. This, however, has not prevailed to such an extent as to cause any serious alarm. In the past season, a few hundred acres have been set to citrus trees, and several thousand acres of dry land have been set to wine grapes, which are in a thrifty condition.

A number of enterprises worthy of note are at present being pushed ahead in our county, among which may be mentioned the Arrowhead Reservoir Company, which is building extensive reservoirs in the mountains to the north of the city of San Bernardino. We may also add Kenwood Heights, which is a large body of land in the Cajon Pass, owned by Chicago parties, who have developed sufficient water for their tract, constructed buildings, and are setting out vines and trees which will make it one of the attractive beauty spots in the county.

Respectfully submitted.

S. A. PEASE, Secretary.

SAN DIEGO COUNTY.

SAN DIEGO, CAL., September 30, 1904.

To the Honorable State Horticultural Commissioner:

SIR: In complying with the law governing County Boards of Horticulture, I herewith submit my annual report.

The present condition of the Escondido citrus orchards is the same as in past years—vigorous and fruitful, with abundance of water for irrigation.

Our vineyards as a whole have produced good average crops during the past dry years, and have shown no signs of drought before this year. Vineyards located on shallow soils are not quite up to the average, but those located on deeper soils are producing nearly average crops of choice grapes. The mountain districts have produced good average crops of apples, cherries, pears, and plums.

The olive crop of this county this year is very light, probably not more than ten per cent of last year's crop. This I attribute to the effects of drought and the exhausted condition of the trees after last year's heavy crop.

At present the insect problem in our county seems to be nearer solution than ever before, as we have every reason to believe that in the *Scutellista cyanea* we have the true parasite of the black scale. From one small colony which I received over two years ago from Commissioner Craw, it has been fully demonstrated that this insect is superior to all other beneficial ones in exterminating the black scale. I have succeeded well in propagating the *Scutellista cyanea*, taking as many as twenty-four colonies in one day from my breeding jars. They have been mailed to all fruit-growing districts of the county where the black scale's presence was known.

The great battle fought by the fumigators and sprayers for years has quietly calmed down, and the work of eradicating the purple scale (*Mytilaspis citricola*) is at present better done by the little brown-necked ladybird (*Rhizobius toowombæ*) than by all other combined efforts. In fact, but very little fumigating and spraying will be done this fall in San Diego County.

With regard to the different species of mites in the orchards, I would say they are best controlled by dusting the trees with sulphur during the early summer months.

The codling-moth in the Julian apple district has been well controlled this year by giving three well-directed applications of paris green solution, commencing at the proper time.

A close watch has been kept of all steamships arriving at the port of San Diego and all fruits and plants have been inspected.

Seven consignments of apples and pears from northern dealers to San Diego commission houses, on inspection were found to contain codling-moth, and were condemned. At present all fruit arriving at the San Diego port from northern dealers is of excellent quality and practically free from pests.

Respectfully submitted.

F. AUSTIN, Secretary.

SANTA BARBARA COUNTY.

SANTA BARBARA, CAL., October 25, 1904.

To the Honorable State Horticultural Commissioner :

SIR: The fruit industry of our county is, in many respects, the same as it was one year ago. All crops are below the average in quantity, being from one half to three fourths of normal amount. The quality will not quite equal that of last year, owing to climatic conditions. Insect pests have been controlled by the beneficial parasites to a great extent, and by spraying with distillate. The apples and other deciduous fruits of Lompoc and adjoining valleys have done fairly well, and also in some portions of the Santa Maria district, while other interests are superseding fruits in the latter.

The grape crops have been good, but in a few places the Anaheim disease has made its appearance and the owners have destroyed the diseased vines.

Citrus fruits have done well ; the pests have been cared for by using the rhizobiids, the *Orci*, and by spraying and the introduction of the *Scutellista*. This has not shown the success we expected, but we hope to report favorably in the future.

Lemons have brought fair prices for shipment. Walnuts will furnish a large crop, but there will not be so large a percentage of *first-grade* nuts as in last year's crop — which was phenomenal ; yet the higher prices this year will counterbalance to some extent the other deficiencies.

The walnut blight has shown some peculiarities; only a few orchards not known to be affected last year have been found diseased this year, while many orchards that were diseased last year are reported as free from blight this year. We are unable to give the reason for this, and opinions differ.

We beg leave to state here that the specimens of fruit sent from Santa Barbara County to the World's Fair at St. Louis attracted great attention and won widespread and favorable comment.

The late rains give promise of much planting of trees during the coming winter.

Respectfully submitted.

T. N. SNOW, Secretary.

SANTA CLARA COUNTY.

SAN JOSE, CAL., October 13, 1904.

To the Honorable State Horticultural Commissioner :

SIR: As Entomologist and Horticultural Commissioner for Santa Clara County, I respectfully submit this report for the year ending September 30, 1904.

My appointment was not made until August 10th, on which day Mr. Ehrhorn's resignation was accepted, but I have been able to cover the whole year's work, partly from records left by my predecessor, partly from other reports, and largely upon my own observations.

Through the courtesy of the Board of Supervisors much better accommodations are to be furnished. A small, well-lighted front room in the Hall of Records is being fitted up with desk, table, bookcases, breeding cages and other furnishings, so that the opportunity for work, especially for propagating beneficial insects, will be much better than during the past.

This year the people have experienced conditions much out of the ordinary. An unusually cool summer, with short periods of extreme heat followed by severe showers, has caused considerable apprehension among fruit-growers, though the damage actually done has been slight. The very deplorable condition of the prune market is generally known. The ravages of insects, especially thrips, have been severe.

Nursery stock shipped into the county during the past year has amounted to 146,023 fruit and nut trees of various kinds, 9,097 ornamentals, 93,190 grapevines, and 6,600 berry plants. There were 1,500 assorted fruit and ornamental trees received from Oregon, and 30,000 grapevines and 95,000 seedlings (mostly myrobolan, cherry, and pear), came from France.

The increase in orchards (computed from records submitted by the County Assessor, hence conservative) is approximately 2,000 acres. The French prune has been the tree commonly planted. A decrease in vineyards, largely of the wine-producing varieties of grapes, amounts to 450 acres.

The common insect pests are thrips, codling-moth and woolly aphis on apple, the grape phylloxera, black and brown scales on apricot and prune, the peach-root borer, the peach worm, the flat-headed apple-tree borer, cankerworm, and pear scale. Other injurious insects, tent caterpillars, cherry slug, squash bug, leaf and vine hoppers, and the diabrotica, have appeared in such numbers in places as to cause considerable trouble.

Wherever the two parasites, *Comys fusca* and *Scutellista cyanea*, have been carefully distributed, orchards appear quite clean from scale and their accompanying fungus, while in other places the scales are still doing their destructive work unchecked. None of the best fruit-packers care to receive spotted apricots either for canning or as a dried product; in the latter case, if scabbed, the price is depreciated two or three cents per pound.

People who have worked carefully and intelligently on the peach-root borer do not now consider it at all dangerous, while to the careless, negligent worker the injury done often becomes fatal to the infested

tree within a year or two. Several efficient remedies, if applied at the proper time, have been used with great success. The first adult moths and by far the larger number fly early in May, and if the larvæ are carefully cut from the tree in April and a heavy wash applied the damage will be reduced to a minimum. By scraping away the old bark and thoroughly applying the wash, or, as many have done, using instead a heavy crude oil having an asphalt base, the tree is put in a very unnatural state to the moth, and not being a suitable place for depositing eggs, naturally it is passed by. If this care is repeated a second year no borers will longer infest the tree. In some orchards a plain whitewash has been used, applied intelligently, and the trees are almost absolutely free from borers. The crude oil has come largely into favor the present year, but many people are afraid to use it. Providing oil of the right grade and kind is used there seems to be no danger. If applied on a warm day the fumes of the oil penetrating into their burrows draw out many, if not all, of the larvæ, and immediately on coming in contact with the oil they are overcome. The lighter oils and those having a paraffine base usually injure the tree.

While the cankerworm has not been a severe pest the past year, it is here and must be watched, as at any time it may appear again in destructive numbers.

The flat-headed borer has done damage to seventy-five per cent of the trees in certain young apple orchards. These trees were planted with care, carefully cultivated, and as the owners thought properly protected from the sun. Paper was wrapped about them, but being tied loosely it afforded a good means of entrance and protection for the adult beetles. These young orchards are on the hills near to old forest trees, where the borers find an especially good breeding ground.

Thrips have been the most destructive pest in the valley during the present year, and their work the most exasperating. One could gather hundreds from a small blossom cluster at blossoming time; see them at work, but could not lift a hand to stay their injury. They enter the flower while the bud is still closed or just opening and feed on the petals and young fruits. If the fruit is not killed outright, injury is done to the pistil so that fertilization can not take place. If the fruit is fertilized, injury is done so that scarring occurs on the mature fruit. In some orchards blossoms blackened before they had a chance to open. Later the insects feed on the leaves, causing them to dry and curl up, looking much as though they had been touched by fire. It is highly probable that the insect has been doing damage for several years from the reports of growers, but we have attributed scarred fruits, browned leaves, and poor crops to other causes or other insects, especially the cankerworm. The writer thinks that with more careful investigation other injuries will be attributed to this same pest. The past two seasons with very

mild winters have been especially favorable to the increase of thrips, and probably with a severe winter these may be so checked that nothing need be done. While widely scattered the infested area is well defined, but is spreading gradually to the south, the insect being carried by prevailing north winds. The infested area includes some of our best and most productive prune orchards. The insect has taken largely to hibernating under the old shells of the black and brown apricot scales, where they are well protected from the storms, and because of this fact winter spraying has proved useless. If these insects appear again next year a spray will be used a week or two before the blossoms open.

Respectfully submitted.

DUDLEY MOULTON, Entomologist.

SANTA CRUZ COUNTY.

CORRALITOS, CAL., November 5, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The Board of Horticultural Commissioners of Santa Cruz County herewith submits its report for the past year, showing the condition of the fruit interests of this county as they appear at the present time.

The past season has been rather a trying one to the fruit-grower of Santa Cruz County, and it was the exception instead of the rule where a good crop of fruit was harvested. Especially is this true of the apple crop, which is the principal industry of the southern end of the county. This shortage was partly brought about by a cold rain just at the critical time when the apple trees were in bloom, preventing the proper pollination, although some orchards that came under our observation put forth but a small fraction of the amount of bloom usually seen on those same trees. Then as a climax to an off year we were visited by a hot wave of three days' duration, which burned large quantities of apples as they hung on the trees just ready to gather in September.

Owing to the very limited amount of fruit in sight, few of the apple-growers had courage to make the usual fight against the codling-moth, although some kept up the good work. Quite a number in the hill district in the central portion of the county used the dust method of applying poison to the trees during the summer, and nearly all, so far as heard from, report excellent results and seem quite enthusiastic over that process, as they consider it more effective, cheaper, and easier to apply than in the liquid form. The University professors are still carrying on the codling-moth investigation in this county, with the view of determining on some remedy which has good killing powers and yet will not injure the trees. Most remedies which have been used successfully elsewhere control the worms here, but seriously injure the foliage

in our damp coast climate. When it is determined how to make an insecticide which will not break down or disintegrate under our trying coast fogs the problem will be solved. In the meantime we are hoping for the parasite of the codling-moth.

Aside from the codling-moth, insect pests have done no great amount of damage to our fruit interests the past year.

While winter spraying in the northern end of the county was not entirely satisfactory on account of weather conditions, where the spraying was done after the rains, with lime, sulphur and salt, the San José scale is hard to find.

Phylloxera is quite prevalent in the vineyards in some sections, and the grape crop was also shortened by the effects of hot weather and early rains.

About the only real happy men were the apricot-growers near Corralitos and Watsonville, where the crop was fair and the prices good.

Respectfully submitted.

F. W. HITCHINGS, Secretary.

SHASTA COUNTY.

ANDERSON, CAL., October 31, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The orchards of the county have yielded in general about one half a crop. Apples, pears, peaches, plums, prunes, cherries, and all kinds of berries are grown. There is some San José scale in different parts of this county, but this is pretty thoroughly kept under control with the lime, sulphur, and salt remedy. The codling-moth is very bad in all sections, and does great damage to the apple and pear crops. During the past two seasons it has been worse than usual. Some are using arsenical sprays to reduce the pest, but nothing in a general way is being done. The peach moth or worm is very bad in the peach sections, and causes much damage to young orchards by retarding the growth, and also to the fruit by causing inferior fruit. Observations this fall show that large numbers of the worms have gone into their winter quarters and will be very destructive during the coming season. Where the lime, sulphur, and salt wash has been used in accordance with the instructions given by the Board of Horticulture, the results are highly gratifying and reduce the loss to a minimum. Our Board strongly recommends this wash to all growers; but so many are careless and indifferent that it seems impossible to get the best results. The pear slug does considerable damage, but is easily kept in check. This season we noticed a great deal of leaf blight on pears, particularly on young trees, also a few cases of the genuine fire blight of the pear. We

are watching these very closely and will endeavor to prevent any spread of the same. The Bordeaux mixture is used by a good many of the orchardists with good results, many combining paris green with this in cases of codling-moth, and for the saw-flies. Some few cases of blister mite on the pear have been noticed. Some aphid on the apple (green aphid) and white rose scale (*Diaspis rosæ*) on blackberry have been discovered, but both are controlled by the kerosene emulsion. The thrip, or vine hopper, was quite destructive on the grape in some sections this season. There has not been much planting of young trees for the past three or four years.

Respectfully submitted.

GEO. A. LAMIMAN, Secretary.

STANISLAUS COUNTY.

MODESTO, CAL., October 24, 1904.

To the Honorable State Horticultural Commissioner:

SIR: I beg to submit the following report: I have inspected all trees and vines coming into my district and have disinfected all that I suspected of being infested with any disease or injurious insects. I had forbidden the shipment of any pear trees into our county from any district infested with pear blight, thinking that our county was free from the blight, but later I discovered several orchards slightly affected with the blight. The owners of these infested orchards were immediately notified to cut out diseased branches and burn them.

With each year I find a greater interest manifested on the part of the fruit-growers to learn of the different fruit diseases and injurious insects, and their treatment. The letters and personal inquiries I receive are more numerous each year, and I give out hundreds of formulas for the treatment of diseases and injurious insects, where formerly I gave but few.

Our success in stamping out the codling-moth is not very satisfactory, but I think the apple-growers do better work each year, as they are beginning to realize the benefit of clean fruit. As for scale, it is decreasing very rapidly; in fact, there is very little of it in my district, which fact should make us more careful and persistent in keeping infested stock out of our county, as Stanislaus County is destined to be one of the foremost fruit-growing sections of the State. There have been over 1,000,000 trees, vines, and cuttings received at Modesto, Ceres, and Turlock during the past two seasons, the greater part of which are growing and doing well.

Peaches, apricots, almonds, walnuts, pears, smooth-leaf plums, olives,

figs, grapes, and apples (on roots resistant to woolly aphis) do well here, make good growth and are prolific bearers.

Respectfully submitted.

A. L. RUTHERFORD,
Horticultural Commissioner.

TEHAMA COUNTY.

RED BLUFF, CAL., November 3, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The Board of Horticultural Commissioners of Tehama County beg leave to submit the following report for the year 1904.

Tehama County is gradually coming to the front as a fruit producer. We have produced about 2,000,000 pounds of dried prunes, besides about 1,000,000 pounds lost by early rains; about 1,000,000 pounds of dried peaches; about 1,000,000 pounds of green peaches, apricots, and plums; also 350,000 pounds of dried pears, 700,000 pounds of green pears, 150,000 pounds of pitted plums, 90,000 pounds of dried apricots, 600,000 pounds of green apples, and about 240,000 pounds of olives.

Our oranges and lemons are just beginning to bear. About one car-load will be shipped. Trees are thrifty and indicate a fine prospect for the future.

The deciduous fruit has been well handled by our packers—proof of which is shown by Messrs. Stice and Gardner, packers of Red Bluff, having received a gold medal for dried fruit at the St. Louis Fair.

The condition of the orchards throughout the county is generally good—some few exceptions where owners neglected to spray, or spraying was done in a careless manner.

The pear blight, which has just made its appearance in the county, has been held in check by cutting out the affected twigs and burning them.

We are bothered so little with scale that it is hardly worth mentioning. Our most troublesome pests are the codling-moth on the pear and apple, and peach worm on the peach and apricot. These we have combated by using paris green for the codling-moth, and salt, sulphur, and lime for the peach worm.

The planting of fruit trees this season will no doubt be heavier than usual.

The fruit industry in Tehama County has every indication of a bright future.

Respectfully submitted.

A. W. SAMSON, Secretary.

TULARE COUNTY.

VISALIA, CAL., September 30, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The horticultural interests of this county, despite adverse conditions, have steadily increased. The orange and lemon orchards are in first-class condition, and last season's shipments were of fine quality and brought fair prices. The orchards are nearly free from scale, the result of close inspection and distributing colonies of *Vedalia cardinalis*, which has kept the scale from spreading. Special care is taken in inspecting all orange nursery stock shipped into this county. Several thousand new orange trees were planted last winter and all young trees have made a fine growth this summer. It is expected by all citrus-growers that the shipments this fall and winter will be the largest ever sent out from this section.

The peach crop was large and brought higher prices than last year, both fresh and dried. Many orchardists are planting clings, owing to the demand from the canneries. Last year 11,000 Philipp Clings were sold by nurserymen for planting in Tulare County, and the demand is large for this variety to plant this winter, canners offering long contracts at good prices.

The apricot crop was very light and the fruit seemed to have very little sugar—dried away very much more than other years.

The prune crop has turned out the poorest in quality and price that was ever grown here. Many trees died, owing to lack of care, overloading, lack of moisture, black knot, root rot, etc. The prune grown in Tulare County can be made to equal any, but more care must be given to cultivation, the care of the trees, and the handling of the fruit.

There was a very large planting of seedless varieties and wine grapes last winter. Owing to the low prices, the planting will be light this winter. The crop was the largest ever grown in this county and the quality good. Several large vineyards lost heavily by the rains, but still large quantities have been sold to the wineries. We are using great care in inspecting, hoping to keep out the phylloxera. This county has a special ordinance against all rooted vines. It is our only hope, as we are so near the dread disease.

We find the yellow scale in different parts of the county, but so far none in the new citrus orchards.

The Commissioners of this county are especially proud of the cleanliness of our orchards and vineyards, and believe this to be the result of the careful distribution of the colonies of *Vedalia cardinalis* and *Comys fusca*.

Respectfully submitted.

C. S. RILEY, Secretary.

VENTURA COUNTY.

VENTURA, CAL., October 20, 1904.

To the Honorable State Horticultural Commissioner:

SIR: The Board of Horticultural Commissioners of Ventura County have the honor to submit herewith their annual report for the year 1904.

On account of the light rainfall last winter fruit crops on unirrigated land have been short. The prune crop was almost a total failure. The apricot crop was below the average in quantity, but the quality of the fruit was good. The citrus fruit crops have been spotted; some orchards have borne heavy crops, while others have not paid expenses.

The walnut industry is taking the lead in the orchard business in this county. The crop and prices are both good, and walnut men are happy. The walnut blight has done very little damage in the county and good walnut orchards are held at from \$500 to \$600 per acre.

The olive crop was heavy last winter and the olive mills made a large quantity of oil, but the crop now on the trees is very light and the oil on hand is being held to supply the trade next year.

As previously reported, the black scale is still the worst pest in this county and the principal work of the Board this season has been the breeding of *Scutellista cyanea* and distributing colonies over the county. These parasites have increased and spread with amazing rapidity. In some orchards nearly all of the old scales have had parasites in them, and the *Scutellista* are now commencing to work on the oldest of the young scale. The Board is pleased to report that the *Scutellista* are also at work on the hemispherical scale and apparently thrive on it as well as they do on the black scale. No mites or other parasites have been found preying on the *Scutellista* in this county, and this Board has perfect confidence that this parasite will make the black scale as harmless as the *Vedalia cardinalis* has made the cottony cushion scale.

The local inspectors have just finished inspecting the citrus orchards, and no red scale has been found in the county; but some purple scale was found in Santa Paula Cañon, where it was thought to have been entirely eradicated. Red and purple scales have been introduced into the county several times, but the inspectors have always found it, and the Board has destroyed it with fire, with the owners' consent, before it had spread to adjoining trees. In this one case, however, the inspectors overlooked the purple scale until it had spread through a two-acre orange orchard owned by H. Crumrine. This orchard was fumigated and at first it was thought that all of the scale had been killed, but later live purple scale were found in a larger number of trees. Mr. Crumrine was then persuaded to grub up and burn the two acres of seedling orange trees, and it was supposed that all were killed this time, but on the next inspection the Board was horrified to find the scale in an adjoining orchard of valuable lemon trees just in their prime.

This orchard was fumigated, and for six months no live scale could be found, but the inspector has just found a small amount of live scale in this and the two adjoining orchards. Another fumigation has been ordered, but it is feared that our old remedy, fire, will have to be used, if the last one is to be gotten rid of.

We still have plenty of codling-moth in the county, and orchardists are anxious to get some of the new parasites which Mr. Compere is reported to have found.

Respectfully submitted.

J. F. McINTYRE, Secretary.

YUBA COUNTY.

MARYSVILLE, CAL., November 1, 1904.

To the Honorable State Horticultural Commissioner:

SIR: Since the last report made to you the Commission has, at a stated meeting, divided the county into three districts, viz., Camptonville district, comprising the northern end of the county; Wheatland district, comprising the eastern and southern portions, and Marysville district, comprising the middle part of the county. Each Commissioner has been appointed to look after the horticultural interests of the district in which he resides, and occasional meetings are held to discuss matters in connection with insect pests and the general condition of the fruit industry.

In Yuba County the business of fruit-growing is progressing favorably and there are no serious outbreaks of insect pests or tree diseases to report. There are isolated cases of pear blight and San José scale, but they are being carefully looked after, as well as the yellow scale on orange trees in the Marysville district. Some years ago the chalcid flies—parasites of the yellow scale—were introduced into the Marysville district, and the scale is now well in check. Colonies of the chalcid flies are now being supplied to the State Quarantine Officer.

Respectfully submitted.

G. W. HARNEY, Secretary.

TRANSACTIONS

OF THE

Thirtieth State Fruit-Growers'
Convention,

HELD AT

SAN JOSE, DECEMBER 6-9, 1904.

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PROCEEDINGS

OF THE

Thirtieth Annual Convention of the California State Fruit-Growers.

SAN JOSÉ, CAL., December 6, 1904.

Pursuant to a call, the Convention met in the Unitarian Church, San José, Cal., at 9:30 A. M.

President ELLWOOD COOPER, State Commissioner of Horticulture, called the Convention to order.

REV. ANTHONY MILLS of San José opened the proceedings with prayer.

ADDRESS OF WELCOME.

HON. GEORGE D. WORSWICK, Mayor of San José, delivered an address of welcome, as follows:

Mr. President, Ladies and Gentlemen, Members of the State Fruit-Growers' Association of California: It is with sincere pleasure I welcome you to our city. We have had many prominent bodies of business men of importance among us for a few days, and these, so far as I know, have gone away with warm feelings in their hearts not only for the beauty but for the hospitality of the Garden City. I trust that the impressions that may come to you, gentlemen, may also be of such a character that you, too, will become the friends of our little city, which lies so deep in the affections of all of our people.

As you are aware, we are all in this county very deeply interested in fruit, and if as a result of your deliberations some solution of the greatest of California's problems, the profitable production and shipment of the fruitage of our orchards, is found, your Convention not only will have accomplished its purpose, but will have made us all your lasting debtors.

Give us some practical plan by which our orchardists may be enabled to produce and market their prunes with a margin of profit to themselves, and our beautiful little valley, from the glades of Gilroy to classic Palo Alto, will remember you with gratitude so long as the pure, white

blossoms come and go, and so long as the sun warms us with his bright rays of hope and cheer. And if you succeed in solving the same deep problem for the rich Sacramento valley, for the picturesque vale of San Joaquin, and for the golden groves of the south, the whole State will rejoice and call you blessed.

Ladies and gentlemen, I am not here to make an extended address, nor is it my purpose to enter into a discussion of any of the grave problems which confront you to-day. I am here simply to welcome you, and this I do with all the enthusiasm of which I am capable. Again, gentlemen of the Convention, I bid you welcome, thrice welcome.

H. P. STABLER and W. P. LYON were nominated as Vice-Presidents of the Convention.

JOHN ISAAC was appointed Secretary of the Convention.

ADDRESS OF STATE COMMISSIONER OF HORTICULTURE, ELLWOOD COOPER.

This is the thirtieth State Fruit-Growers' Convention, and the third held under the auspices of the State Horticultural Commission. We have met here to discuss the fruit problem, and to better organize the fruit-growers, in order that we may realize a fair compensation for our expenditures and labors. Many no doubt look forward to this meeting with a hope that something may be evolved that will eliminate the want of harmony among several branches of the business, and unite the different or antagonistic feelings or opinions that now keep us from uniting to protect our labors.

One of the most important subjects which will come up before this Convention for consideration is that of finding a market for our products. I need not call your attention to the present demoralized condition of the prune, raisin and orange growers, and the dried fruit market generally, for you are already well aware of the fact; but the remedy is in our own hands. If we can organize, combine ourselves together and work harmoniously, we can control our own markets and secure fair profits for our products. This is a matter which will come up before the Convention for its consideration, and it is to be hoped that out of our deliberations some successful method of coöperative marketing for our fruit products may be decided on. There is no reason why so intelligent a body of men as the fruit-growers of California (and there is no doubt that, as a whole, they combine in their ranks the greatest intelligence of any men in the State) should not be able to work together in their own interests. We have organizations among laboring men of all classes, men far below the scale of intelligence of our fruit-growers, and they are working together for their own personal interests, acting as one man, and yet with all our efforts we have not been able to secure a permanent

organization of the fruit-growers of the State. We are now offered the alternative of combination or ruin. With prunes at $1\frac{1}{4}$ cents, raisins at 2 cents, and other fruits at similar ruinous prices, there is nothing left for the fruit-grower but a choice between organization and starvation.

In this address, I will follow the plan that has generally been adopted, by treating the various subjects under different heads and thereby prevent confusion.

Panama Canal.—Work on this gigantic enterprise will soon be in active operation, and it is to be hoped will be completed before many more years go by.

New York Obelisk.—Nothing has been ascertained regarding the preservation of this ancient relic of civilization. It is necessary, however, that we keep the subject active. If the Central Park Commissioners fail to protect it from disintegration, on account of the severe climate, their negligence in its preservation should be held up to the lasting disgrace of our American people. Their reply to my request to have it moved to California was that they would build a house around it to preserve it. It has not been done, and it is our duty to keep informed concerning it.

Consular Reports.—I am pleased to state that during the present season we have been in receipt of a number of interesting consular reports, forwarded by our consuls in the different fruit-growing sections of the world, and relating to such fruits as are produced in California. I have improved the service and these reports are being forwarded to the various fruit interests which may be entitled to receive them. They are distributed from the Sacramento office, and any fruit-grower not now receiving them can get them by forwarding his name to the Commissioner at Sacramento.

Russian Thistle.—Reports have been received from different parts of the State during the past summer, to the effect that the Russian thistle has obtained a foothold in some of our counties. This has been reported especially from Merced and San Joaquin counties, where it seems to have a very strong hold in some of the alfalfa fields. This pest, so far as I have been able to learn, has been introduced in alfalfa seed purchased in Utah. It is one of the worst of known weeds, and if once established thoroughly in our State, it will cause our farmers and fruit-growers to lose hundreds of thousands of dollars annually, in the destruction of their crops and lands. While it is still new to our State, every effort should be made to extirpate it, and prevent it from becoming permanently established in this State.

Exhibit at St. Louis.—Acting on the request of the World's Fair Commissioners, I caused to be prepared and forwarded an exhibit of our

beneficial and injurious insects, illustrating our California method of fighting insect pests with their natural enemies. This exhibit, although small, was handsomely prepared, and formed an attractive feature of the horticultural building in St. Louis. It has caused much comment and many communications have been received regarding it. It was purely an educational exhibit, and served to show what California is doing in this direction. The same exhibit, perhaps extended in size, will be forwarded to the Lewis and Clark Exposition, which is to open at Portland, Oregon, during the coming summer.

Nursery Stock.—As a great deal of nursery stock has been finding its way into this State from Oregon, and many complaints have reached me of peach stock coming from Eastern points through that channel, and there being danger of such stock reaching us from districts infested with peach yellows, peach rosette, and other diseases which we do not have in our State, I caused an investigation to be made, and sent an agent to ascertain to what extent Eastern stock found its way into Oregon. His report shows that the greater part of the peach stock received in this State from Oregon is of Eastern origin, but, so far as could be ascertained, it was procured from healthy sections, and while there is some danger to be apprehended from this source, that danger is not very extensive. However, every effort will be made, with the aid of the various County Horticultural Commissioners, to prevent Eastern stock from reaching us without some guarantee that it is produced in a clean section. The leading nurserymen of Oregon express themselves as willing to do all they can in this direction, and to work with us in keeping out infested stock.

Forest Tree Pest.—Another pest which is close to our borders, but has not yet obtained a foothold in our State, is the elm scale (*Gossyparia ulmi*), which is very prevalent in Salt Lake, and has also reached as far west as Nevada. This scale was introduced into the East some ten years ago from Europe, and has gradually been working its way west. Its attacks so far have been confined to elm, alder, and kindred trees. The elm is a favorite shade tree in very many of our towns, and it would be a very serious matter if this pest should obtain a foothold here. Every effort will be made to prevent its entrance, and in this we shall rely largely upon the efforts of our County Horticultural Commissioners.

Entomological Work.—I regret to state that, owing to the lack of proper compensation, we have lost two of our best entomologists and the men to whom California horticulture is very largely indebted. California is the pioneer in the work of fighting bugs with bugs. We have met with brilliant success in this line of work, and directed the attention of other nations of the world, and they have been keen to

follow our example and take from us the men who have achieved our success. It is desirable that we should continue in this work and widen its scope. Arrangements should be made to keep at least two men constantly in the field searching for beneficial insects in different parts of the world. California is almost cosmopolitan in its products. We have the fruits both of the North and of the South, and with them we have the pests of the tropics and the temperate zone, and for this reason, we should search in various fields for our beneficial insects. To this end, we require more help, and the means to give better compensation to able men than has heretofore been accorded to the Commission.

I regret to state that we have recently lost one of our best men, and one of the most capable entomologists and most faithful officers that California ever had. Mr. Alexander Craw has been weaned from us by offers from the Hawaiian Government, and the inducements offered were so vastly superior to anything California will allow, that he felt compelled to give up his connection with our Commission, and to accept the liberal offers made him by the Islands. In the departure of Mr. Craw, the fruit-growers of California have sustained an irreparable loss, and the Hawaiian Islands have been the gainer. However, we have not altogether lost him, for in the performance of his duties in our island territory, he will ever bear in mind his California home, and, working harmoniously with our Commission, will continue to help our fruit-growers to the extent of his ability.

The subjects of Irrigation, Forestry, and Rainfall, I pass over at this meeting, referring to the address at the last Convention held at Fresno.

Food Adulteration.—The State Legislature will meet in January next. It is of the utmost importance that our pure food laws should be amended and the power delegated to some organized body, or to one created, to prosecute violations. Other States have taken up this question and are prosecuting offenders. In the formation of a new true label law, we should profit by the experience of other States. In the Philadelphia Public Ledger of August 17, of this year, referring to that subject, I find the following: "There are now over one thousand cases pending in the courts of Philadelphia, a good many over one year old." The people of California desire no such delay or uncertainty. I have also noticed in the public journals, fines of \$50 being imposed for conviction. Such penalties will not prevent false labeling, and I doubt if they will improve very much the present deception practiced in our foods. What we want is a law similar to the German law. I quote further from the journal mentioned above:

Shortly after the formation of the German Empire, Parliament established a Department of Hygiene, and appointed a commission to draft a pure food law. The chairman of that committee was the late Rudolph Virchow, with scientists, doctors, lawyers, manufacturers and others having experience in that line. They drafted a pure food law which is as nearly perfect as laws can be, passed it in Parliament, and secured its

approval by the Emperor. The good results in passing these laws can best be demonstrated by the fact that while they had a great many prosecutions and convictions in the first years, very few cases of importance were brought into court in late years, owing to the strict supervision and heavy punishment meted out to the offender. When heavy fines, and imprisonment of from two to five years for repeated offenses are given to the violator, he will not take the risk.

In a Philadelphia paper of September 28, 1904, I saw a statement that four cases of serious adulteration were pending against one of the most fashionable and prominent stores in that city. Chemists analyzed more than fifty samples of ice-cream, and found several adulterated with formaldehyde, while others showed mixtures of aniline dyes, gelatin, corn starch, and other foreign substances. Some of the highest priced ice-cream manufacturers were found in the list.

In the San Francisco Chronicle of October 10, a report from New York stated that twenty-five persons had died from drinking bad whisky, supposed to have been made from wood alcohol, which is the cheapest form of alcohol, is kept by all druggists, no doubt enters into many prescriptions, and is largely used in many of the patent medicines.

From the Los Angeles Times of October 13, I find that a statement was made that a consignment in bond, labeled "cherry color," was found to be nothing less than coal-tar dye, though declared to consist purely of vegetable matter, made up to color fruits. This is known to be a poisonous substance.

I recommend that a pure food law, or rather a true label law, be passed, after the pattern of the German law. For the first offense, a fine of \$50 and imprisonment for six months, and for each subsequent offense an increased penalty. The national law imprisons counterfeiters of money. Counterfeiters of food products are a thousand times worse.

Insect Pests.—By and with the advice of the Governor, an arrangement was made with the West Australian Government by which we have an interest in the services of George Compere in his search for parasites. In this arrangement or agreement, his movements are directed by the Horticultural Commission of California. It was, however, stipulated that Mr. Compere should first proceed to Brazil to obtain the parasite of the West Australian fruit-fly. This required several months for the search after the parasite, and for collecting and carrying the same to the Australian Government. I am happy to report that his voyage was a great success, and that the ravages of the West Australian fruit-fly will soon end, and be practically harmless in that country.

George Compere was then ordered to Europe to investigate the codling-moth. It has been known for many years that this, our most troublesome pest, was not considered dangerous to the apple and pear industries in England, Germany, Spain, and France, hence the natural conclusion that there was an enemy keeping it in check. The discovery of parasites was not so difficult as many would suppose, especially to

one of the ablest and most competent experts in this line of work known at the present time. Two parasites of the codling-moth have been sent over and are now being propagated in our office, No. 11 Ferry Building, San Francisco, to be sent to apple and pear growers throughout the State. We have also received a valuable ladybird, that keeps the red scale in complete subjection on citrus trees in parts of the Mediterranean coast. With reference to the codling-moth parasite, I beg to refer you to my opening address in the Fourth Annual Report, 1893-94, "Importation of Parasites," page 242. It is incomprehensible, in the face of known facts and constant urgings, how this search could have been delayed until this late day. If these parasites prevent any serious destruction to the apple and pear industries in the countries mentioned, why should they not prove equally valuable in California, or any other part of the United States, and save the loss of millions of dollars annually?

It is the duty of fruit-growers to see that the Horticultural Commissioner is amply supplied with funds to carry on parasitic work. The pear blight is increasing. The walnut blight is also alarming. It is my intention to have an expert investigate these diseases and find an inexpensive remedy. These are two facts to which I would draw the attention of this Convention.

I saw by the press reports during the peach season that canners were paying as high as \$60 to \$65 per ton for good canning peaches. Recently I noticed the following item in the press:

It is the report that the raisin-packers have entered into a combine and bonded themselves to hold down the price to be paid the grower and prevent bidding against each other. The grower will not be offered more than 2 cents for his new goods.

The difference between the price paid for peaches and the price offered for raisins lies in the fact that we had a very short crop of peaches, and the supply was hardly equal to the demand, and to the fact that with the raisin-growers utterly demoralized and wholly at the mercy of the packers, the price of 2 cents was the only offer.

At the last Convention, a motion was made that the chairman appoint a committee of fifteen members, whose duty it would be to devise a plan or plans, and to put those plans into effect, to promote coöperation among the prune-growers, the raisin-growers, and the growers of all other classes of cured fruits, and to report to this Convention. The committee was selected from the different fruit sections of this State, and no doubt will make a report at this Convention. It is not my purpose to take up and discuss this subject at the present time. I, however, beg to call your attention to the investigation before the Interstate Commerce Commission at Chicago, recently, and to the statement made by Mr. Armour, that he had paid to Mr. Watson, manager for Porter Bros., over \$2,000,000 in rebates in eleven years, and to the fact that the Santa Fé representative stated that his company was compelled to make rebates

to compete with the Armour car line. The managers of the private car lines refused to answer questions, claiming that they were not common carriers. None of the rebates were ever distributed to the growers of the fruit shipped. The statement was made that the cost of icing a car was \$10.32.

In any combination that we may enter, we will have to be careful not to do so in the form of a trust. Every political party is now denouncing trusts as a formidable obstacle in the way of progressive development. It is very probable, therefore, that congressional action on this subject will be taken. We want to steer clear of all complications that might occur. It is pertinent to discuss trusts, because they are a menace to our fruit distribution. Regarding this, I refer you to a speech made by Judge Gaynor, of the Supreme Court of New York, before the American Social Science Association, at a convention held in Boston, published in the Boston Evening Transcript, Thursday, May 12, 1904. Judge Gaynor takes for his text a saying of Cromwell: "If there be any one that makes many poor to make a few rich, that suits not the commonwealth." He treated the subject of laws for protecting mercantile transactions from Cromwell's time to the present. Professor Clark, of Columbia University, says that according to the use of the term "trusts," in popular thought and speech, it is "any corporation that is big enough to be menacing." To still quote: "Can you conceive of a greater wrong than the public highways of a country being used by individuals to destroy and drive out their competitors in business. They have their own cars, and have them hauled at rates that make competition against them impossible."

The first commercial trust was the Standard Oil Trust, formed in 1882. The Sugar Trust was formed in 1887. Both of these trusts were adjudged to be illegal by the courts. In the New York Court of Appeals it was decided in brief that while individuals could enter into co-partnership, corporations could not. The Supreme Court of Ohio also decided such combinations were illegal. What the courts did to destroy, the Legislatures undid by enabling acts passed in their favor. The feelings of the people in both States were unanimous against the trusts. Yet in the face of this the Legislatures made it possible for their continuance. This continuance was supposed to have been made possible by corrupting the Legislature.

Another great danger is false capitalization. The combination between the Northern Pacific and the Great Northern railroads has been declared illegal by the Supreme Court of the United States.

The Steel Trust issued in bonds and stocks over \$1,400,000,000. The trust paid out in 1903 in interest and dividends over \$58,000,000. Such an amount would have great power for corruption.

I only mention these things incidentally as they have a bearing on

the private car line. I saw it published in the report of the investigation before the Interstate Commerce Commission at Chicago, that the Commission declared that the private car line had robbed the fruit-growers last year of over \$2,000,000. If the fruit-growers can cooperate in the distribution of their fruits, the difficulties that might occur in a private car line can be obviated. The question of our success remains with ourselves. The difference between cooperation and a trust combination is ably discussed in an essay by A. H. Naftzger, in our Seventh Biennial Report, 1899-1900, pages 127-133.

Upon motion, Vice-President Lyons appointed the following committee to report on the President's address: Professor Fowler, Mr. Woolsey, and Professor Worthen.

REPORT OF THE SECRETARY.

Mr. Chairman, Members of the Convention: It is my privilege to report to you as Secretary of the Twenty-ninth Fruit-Growers' Convention, as follows:

A resolution was offered by Mr. Sprague and passed by the Convention, as follows:

WHEREAS, The system of transmitting money by mail through the present money-order system is cumbersome and unfitted to the needs of present-day commerce; and

WHEREAS, H. R. Bill 1976, recently introduced by Mr. Gardner of Michigan, provides for the issuance of a post-check currency in conformance with the recommendations of previous House committees; therefore,

Resolved, That this Twenty-ninth State Convention of the Fruit-Growers of California does heartily indorse the immediate adoption of the post check form of currency, and that the Secretary be instructed to forward a copy hereof to the Post-Check Currency Bureau, at 825 Vermont Avenue, Washington, D. C.

In accordance with the instructions contained therein, I forwarded a copy, accompanied by an explanatory letter, to the Post-Check Currency Bureau, and received the following in reply:

POST-CHECK CURRENCY BUREAU,
WASHINGTON, D. C., February 10, 1904.

JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: We beg to thank you for your letter of the 4th, and particularly for the copy of the resolutions passed by the State Convention of Fruit-Growers. It is exceedingly gratifying to the friends of the bill to note the active work being done by the farmers and fruit-growers of California, who fully realize the importance of such legislation to all the people.

We trust that you will send copies of these resolutions to the Representatives from your State, as they will undoubtedly be influenced by such an expression from so important a part of their constituency. The bill is now before the Postoffice Committee of the House and we hope for a favorable report in a few weeks.

Trusting that our suggestion will be complied with, we are

Very truly yours,

POST-CHECK CURRENCY BUREAU,
CLARENCE E. DAWSON, Secretary.

The following resolution, introduced by Mr. Berwick, was also passed by the Convention:

WHEREAS, Our postal service is at present lamentably deficient in the matter of an up-to-date foreign and domestic parcels post; and

WHEREAS, The American Express Companies have found it possible to inaugurate for the British postoffice a postal stamp rate on British parcels of 25 cents for 11 pounds to any postoffice in the United States, thus proving the practicability of profitably doing the business at such a rate.

Resolved, That this Convention of the fruit-growers of California, assembled in Fresno City, this 9th day of December, 1903, hereby requests its Senators and Representatives in Congress at Washington, D. C., to introduce and support such measures as shall secure for the American citizen, through the United States postoffice, a parcels post at least as cheap and effective as that now afforded by the American Express Companies to the Briton.

Resolved, That this Convention also requests the President, in conjunction with the Postmaster-General, to conclude postal conventions for the handling of parcels up to 11 pounds weight, with all the nations who are at present members of the International Parcels Post Union; this on as favorable terms as those enjoyed by the citizens of Mexico and European lands.

In accordance with the instructions of the Convention, I have forwarded copies of this resolution to our Senators and Congressmen in Washington, and received replies from them, as follows:

UNITED STATES SENATE,
WASHINGTON, D. C., February 8, 1904.

MR. JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: I am in receipt of yours of the 1st instant with resolutions of the Fruit-Growers' Convention regarding parcels post and post-check system and will gladly give both matters my most careful consideration. I am very favorably disposed to support the measure, believing it to be in the public interest.

Yours, very truly,

GEO. C. PERKINS.

UNITED STATES SENATE, COMMITTEE ON IRRIGATION,
WASHINGTON, D. C., February 10, 1904.

MR. JOHN ISAAC, *Secretary Twenty-ninth Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: Your letter of the 1st instant, inclosing copies of resolutions unanimously adopted by the late Fruit-Growers' Convention, held at Fresno, concerning parcels post, etc., is received.

The matter will receive my consideration.

Yours truly,

THOMAS R. BARD.

COMMITTEE ON THE PUBLIC LANDS, HOUSE OF REPRESENTATIVES U. S.,
WASHINGTON, D. C., February 8, 1904.

MR. JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: I beg leave to acknowledge your letter of February 1st, inclosing certain resolutions adopted at the Fruit-Growers' Convention, held at Fresno recently. I will present the said resolutions to the House of Representatives so that they may be referred to the proper committee for consideration.

Thanking you for your consideration in this matter, I am,

Very truly yours,

J. C. NEEDHAM.

COMMITTEE ON THE JUDICIARY, HOUSE OF REPRESENTATIVES U. S.,
WASHINGTON, D. C., February 8, 1904.

MR. JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: Your resolutions concerning the Parcel Act Bill have been received and placed on file.

Yours truly,

J. N. GILLETTE.

HOUSE OF REPRESENTATIVES U. S.,
WASHINGTON, D. C., February 8, 1904.

MR. JOHN ISAAC, *Secretary Twenty-ninth Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: I am just in receipt of yours of the 1st instant, inclosing resolutions unanimously adopted by the Fruit-Growers' Convention, held at Fresno, relative to parcels post, and desire to assure you that the resolutions will receive my most careful consideration.

Yours, very truly,

V. H. METCALF.

COMMITTEE ON PACIFIC RAILROADS, HOUSE OF REPRESENTATIVES U. S.,
WASHINGTON, D. C., February 13, 1904.

MR. JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: I beg to acknowledge receipt of the resolutions adopted by the Fruit-Growers' Convention lately held at Fresno, and to say that I am in hearty sympathy with the suggestions contained in said resolutions, and will do what I can to secure the much needed improvements along both lines mentioned, to wit: the parcels post and post-check currency.

Yours, very truly,

M. J. DANIELS.

COMMITTEE ON PACIFIC RAILROADS, HOUSE OF REPRESENTATIVES U. S.,
WASHINGTON, D. C., February 15, 1904.

MR. JOHN ISAAC, *Secretary Twenty-ninth Fruit-Growers' Convention, Sacramento, Cal.:*

DEAR SIR: I have the honor to acknowledge the receipt of yours of the 1st instant, together with copies of resolutions adopted by the late Fruit-Growers' Convention held at Fresno, California, and in reply thereto beg to state that I shall give the same my most earnest consideration when the matters to which they pertain are brought to the attention of the House of Representatives.

Very truly yours,

WILLIAM J. WYNN.

A resolution of thanks to the University of California was passed by the Convention for the active interest taken in the work of controlling the codling-moth in the apple orchards around Watsonville. A copy of this resolution was forwarded, according to instructions, to the Acting Secretary of the Board of Regents, and the following reply was received from him:

UNIVERSITY OF CALIFORNIA, OFFICE OF THE SECRETARY,
BERKELEY, February 11, 1904.

MR. JOHN ISAAC, *Sacramento, Cal.:*

MY DEAR SIR: Permit me to inform you that the Regents received with much appreciation at their meeting on February 9th the kind resolutions of the Fruit-Growers' Convention, and ordered them placed on file.

Very truly yours,

V. H. HENDERSON,
Acting Secretary, Board of Regents.

Resolutions of sympathy for the death of Mrs. Elizabeth Shields were passed by the Convention, and your Secretary was instructed to forward

same to the family of our deceased member. In accordance with these instructions, I communicated with Judge Peter J. Shields, of Sacramento, and in response received the following letter:

SUPERIOR COURT, STATE OF CALIFORNIA, COUNTY OF SACRAMENTO,
SACRAMENTO, CAL., January 19, 1904.

MR. JOHN ISAAC, *Secretary Fruit-Growers' Convention, Sacramento, Cal.:*

MY DEAR MR. ISAAC: I received some time since the copy of the resolutions adopted at the recent State Fruit-Growers' Convention, testifying to the regard and esteem in which my mother was held by that body and by her fellow fruit-growers. The resolutions do my mother's memory great honor, and among all the testimonials reaching me since her death I know of none which would have given her more satisfaction than this. The best years of her life were given to horticulture, and she was one of its most enthusiastic, industrious, practical and intelligent devotees. California has reached a horticultural development equaled nowhere else on earth, and to have it said by the assembled fruit-growers that my mother was one of the strong influences which brought about that history-making condition, is an honor of which I am deeply sensible.

Assuring you of my appreciation of the resolutions and of my gratitude to the Convention which adopted them, I am,

Yours, very respectfully,

PETER J. SHIELDS.

Resolutions of sympathy were also passed relating to the death of Brainard N. Rowley, for so many years an active worker in our conventions, and in accordance with the instructions of the Convention, I forwarded the same to Mr. H. C. Rowley of San Francisco, and received the following letter of acknowledgment:

CALIFORNIA FRUIT-GROWER, 320 SANSOME STREET,
SAN FRANCISCO, December 26, 1903.

HON. ELLWOOD COOPER, *State Commissioner of Horticulture, Sacramento, Cal.:*

DEAR SIR: The resolutions of respect and sympathy adopted by the Twenty-ninth State Fruit-Growers' Convention in the matter of the passing away of my late father have been received, and I am acknowledging the same to the fruit-growers of the State through your good self. There is very little that one can say in a matter of this kind other than to express one's deep appreciation and thanks, and this I am doing on behalf of my mother, brother and myself.

Begging that you will properly convey our acknowledgment to the Convention, I remain,

Very respectfully yours,

H. C. ROWLEY.

All of which I respectfully submit to the attention of the Convention.

JOHN ISAAC, Secretary.

PRESIDENT COOPER. I will name the Committee on Resolutions at the beginning of the afternoon session. That disposes of the work laid down for this morning's session; but if any one wishes to make a few remarks, it will be now in order to do so.

MR. BERWICK. If there is nothing before the meeting, I think I see Dr. Anderson of San Luis Obispo, who has charge of the school for young farmers down there. I think we would enjoy hearing something of his success in training young farmers.

PRESIDENT COOPER. We will be very pleased to hear from him. Mr. Anderson will please come forward.

ADDRESS OF PROFESSOR LEROY ANDERSON.

You all know that the State established a school at San Luis Obispo for teaching agriculture, mechanics, and domestic science. Those are the three principal lines of work. The corner-stone of the first building was laid a little less than two years ago and the school was opened for the first time a year ago in September last, so that we are now just in the beginning of our second year, and we feel that we have a very good start indeed, and that with the equipments, the buildings, and the support which the State has extended we are showing that there is a need for the school that is established and that we are in the way of supplying that need.

The great work which we are doing is of a high-school grade; that is, we take the students who have finished the eighth grade of the grammar school; they are admitted to us without examination. And most of the students are of that grade. We have admitted a few who have not passed the eighth-grade examinations, and some of them are having rather hard work. We have some who have had two or three years in the high school, and, of course, they have much easier sailing.

You are no doubt particularly interested in the agricultural line of the work. I feel it is a matter of interest to know that one third of the boys who are with us to-day are out-and-out agricultural students. It is usually the case, and has been the history of all institutions in the East, especially of the agricultural colleges founded under the Act of 1862, that the large majority of the students enter for engineering and mechanics courses, and knowing that rule, and knowing what a struggle agriculture has had in those institutions, I feel very much gratified that one third of the boys go in for agriculture. The first year's work is botany or plant study, the preparation of various lines of the physical sciences, which, as the term implies, is a mixture of elementary physics and chemistry.

Every boy and girl can not know too much about arithmetic. The arithmetic of the school embraces the working out of feeding rations and fertilizer problems, and problems of building, everything which relates to the mathematics of agriculture; and after that, going on into algebra. We also give them about ten periods a week, that is, about three afternoons, of carpentry work in the first year, and freehand and mechanical drawing, and then about one afternoon a week they have to work in the laying-out of the grounds—our grounds being very new indeed—laying out grounds and gardening, or anything which happens to come up and which needs to be done.

The school was established with the idea of making a practical school in agriculture, a school in agricultural practice, but I know that we are not meeting the extreme desires of some, in that we do not give enough actual practice on the farm. I will say that the policy of the work of

our school is very similar to that of the agricultural colleges of the middle west, only ours is of a much lower grade. We take in students at the age of fifteen years, while the colleges will not take them until they are seventeen or so. We do not put the boys to plowing or harrowing, or things of that kind. We do have them prune the trees when they need to be pruned, and we expect them to plant the trees that we have to plant, and so far as dairying is concerned—milking, and making butter and cheese—if a boy does that continually we pay him for it.

The students do a great deal of manual labor in which there is instruction, as for instance carpentry, and of course for that there is no remuneration, but when the manual labor ceases to carry instruction with it, then the American boy thinks he has got to have some pay for it, and so we have to follow that idea. We put up a fairly cheap building, for a blacksmith shop; it was erected last spring, and the building is 40 by 100 feet, one story, entirely of frame, battened, dressed lumber, oiled inside, a building which would cost about \$2,500 or \$3,000. Our students in carpentry did all the framing, and the truss work of the roof, and all of the framing of the timber. The finishing was done by contract, and the carpenter who had the contract said he never saw a better piece of work in framing than that done by our boys.

And so we expect as far as possible to have our buildings put up by the students, and we have them do as much as possible of the repairing, the building of wagon beds and hay racks, and things of that kind that can be done by the students. And much of the furniture of the school buildings is being made by the students in carpentry. We are trying to make the work, so far as agriculture is concerned, of the nature which every boy is apt to run against on a farm, the idea of the founder—Senator S. A. Smith of Bakersfield—being that the work of the school shall be with a view to educating the boys and girls to useful lives in their home communities.

Just a word about the girls, which of course is interesting. We have the girls enter on the same basis as the boys, and give them work in the various lines of domestic work or domestic science, such as sewing, dressmaking, and millinery, so that now we expect they will soon be able to take in sewing from any ladies in town who wish to have work done. And then there are the various lines of cooking and household economy, and along with that, English and plant study, and some dairying and drawing, which naturally goes with it. I thank you for your kind attention.

REMARKS BY MR. EDWARD BERWICK.

If anybody else would like to occupy the floor I will sit down, but if not then I would like to say a few words. The thought just struck me that we fruit-growers of California are not sufficiently proud of ourselves

and our work. It is far more important and far more desirable to know the truth to-day in matters regarding agriculture than it is to know the truths of history. Whether Mary Queen of Scots was a saint or a sinner, or whether Henry the Eighth was a monster of iniquity or devoted to caring for his subjects in the best way he could, are matters of exceedingly little use to us. It does matter a great deal to us to know what bug will eat the scale bugs that are getting into our orchards; it is a matter of far more importance and interest, not only to us but to all the country, and I object, sir, to our being very modest and hinting in the least way that University extension in agriculture is worthy of less attention than lectures on history or anything of that kind. If it is less worthy I would like to know why it is less worthy. I asked this question at the University Farmers' Institute, and all Mr. Wickson could say was—I suppose it was because of his innate modesty—he said, “Yes, that was the only reason.” And now, gentlemen I believe in modesty. It is a fine thing to be modest. I am modest. I do not hesitate to say my opinion before you in public, for I do not believe in being over modest. You know Longfellow says, “Be bold, be very bold, be not too bold.” I would say to you, “Be modest, be very modest, but do not be over modest.” If it is a question of agriculture or history, do not you agriculturists take a back seat. See that agriculture comes before history. Agriculture is of more importance than your history, and don't you people forget it. When I was young they primed me with Latin and Greek. I found myself at the age of 16 with a smattering of Latin and Greek and not fit for anything. I read about history and did not know the first thing of agriculture. Now I want to have you all feel proud of yourselves and your University; I want you to feel that you own that University and have a right to say what you want taught there. Now the acme of education in my day was this: to make a poetical speech and put in a piece of Latin or Greek, and the bigger the piece of Latin or of Greek the bigger scholar you were. Now if I made a speech in San Francisco and began throwing Latin or Greek, the audience would say that man was no good. But if you learn to do things—the doing of things is always fashionable. The raising of wheat is fashionable. Men must live. If you want to learn Latin, it is still taught. If you want more schools in agriculture in preference, you have a right to say so. Why that thought came about was this: Years ago the ecclesiastics practically had a monopoly of what they called culture. They knew something of Latin and Greek. They said their prayers in Latin so that the common folks could not understand them. You have to mystify the common folks to keep them down. Now we do not believe in mystery.

What is the object in preparing yourselves in the high schools? For life? No, sir; not for life, but for the university! There are men in the

university who have Latin to sell. If they can not make a demand for their Latin they can not sell it. Your prunes are the same. If you can not make a demand for your prunes you can not sell them. Some might say that your boys should learn Latin, but many of you do not like to interfere and say that it is all nonsense, you don't want your boys to study Latin any more. We will teach them the things that are useful in life, such as agriculture or horticulture. The people of the University do what you want done and what you are paying money to have done. If you do not run it to suit you, the bosses will run it to suit them and not to suit you.

At this time a recess was taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FIRST DAY.

TUESDAY, December 6, 1904.

The Convention was called to order at 1:30 o'clock P. M.
President Cooper introduced Dr. David Starr Jordan.

THE THEORY OF SELECTIVE BREEDING.

By DR. DAVID STARR JORDAN,
President of Leland Stanford Junior University.

Ladies and Gentlemen: I have been shut in for the last ten days with tonsillitis so that I have not had any chance to talk. Ordinarily I have refused every chance recently in order that I might hold my voice for you who have the very great advantage of letting me talk in the middle of the day without keeping me up late at night, and letting me run away as soon as I get through, which I shall have to do to-day.

I want to speak very briefly of the theory of selective breeding of plants. You know, of course, that here in California we have one man who understands a theory that is open to all in the matter of selective breeding and has carried the practice very much farther than any other one man living. Luther Burbank stands easily first, and all in a class by himself, in the matter of the practical study and the evolution of plants.

The theory is very simple. I have been interested in the development of the theory instead of in the actual practice, and what I have to say—I have not done anything myself particularly in the breeding of plants, but I have done a great deal in the breeding of theories, so I bring that up first.

We very much need in this country lap elephants—elephants of a size suitable for being held in the arms; so that their tusks would not be at

all dangerous, so that it would not be in any way disagreeable to deal with them. Now the ordinary commercial elephant of Africa or India is altogether too big and clumsy and too likely to be ferocious; his disposition is bad, and his skin is rough and hard and ought to be softened up.

Now this is not exactly nonsense. If this want were a very great one, one that we all have felt, and one that we have continued to feel through several generations, there would be nothing simpler than the production of lap elephants. We would take the ordinary breed of elephant; we would take a rather small one, if we could find one—but even that would not be all important—and we would cross it with another elephant sufficiently different—the more different the better. Now the crossing of elephants, or any other crossing, is something of a hybridization. There are no two elephants alike, no two of the higher animals alike. Nature makes all sorts of variations among animals as among plants. Each animal and each plant has to have two parents. There are some things that are alike, but I think the animal and the plant kingdoms have practically none; there are none at all when we come to the higher animals. The fact that each individual has two parents and each of those parents has another separate line of ancestry is a very strong factor in bringing about variation in the offspring. You know that each one of you has twice as many ancestors as your father and mother had, so that one generation sets you a great ways farther along in the matter of ancestors. In this way you are certain to draw different individual lines of descent, so that no two men are alike. No two elephants are alike. If we take two elephants very much alike, their progeny would be very close to them; but if we take two quite different, one quite large and one smaller, then we would have progeny more or less different from either. Some would be larger, some smaller. A few would be larger, perhaps, than either parent. Some would be smaller, perhaps, than either parent. We would take these smaller ones and cross them with other small elephants, and in that way get another pair of elephants, and some of these would be smaller, and some larger, than the original ones occasionally. Now steadily working along that line, crossing with individuals quite far apart so as to get variations, it is possible to get elephants considerably smaller. We could develop a breed of small elephants, and in time gradually work the elephant down to the required size. It might take two or three thousand years, but it could be done if we kept at it for a sufficiently long time.

You know all dogs are descended from wolves. In Mexico there are dogs that are only three or four inches long, without any hair on them, not much larger than a good-sized mouse. If you pinch their tails their eyes bulge out, and yet they are descended from wolves. They are not only lap dogs, but lap dogs reduced almost to their lowest terms.

Now this supposititious way of dealing with elephants is what Mr. Burbank has done and is doing with plants. He took the ox-eye daisy that is such a nuisance in the fields of the East; it is wild there and very destructive to the fields because the roots are so hard to eradicate. He took one of the largest of these and began to save the seeds from it, and in that way, by what is called selection, he got some that were a little larger than the common variety. He crossed these with a daisy that is quite different, with the common wild Japanese daisy. Crossing those two together he got a good many varieties — some of them larger, some smaller. From these various kinds he chose those suited to his purpose, and the result is a daisy much larger than the original one. Taking one of these large daisies and crossing it with one a little more yellow, breaking up the amount of yellowness, and getting the plant in a way broken up so that among the different seeds there will be quite a variety among the different plants, it is possible to gradually extend this yellow, and in time it may be possible to get the base or ray that will be red. If that is done he has only to go on building onto that red and we shall have what we have so long needed at Stanford, a cardinal-colored daisy.

In the same way Mr. Burbank has taken our ordinary poppies, the ordinary wild poppy of California (*Eschscholtzia californica*), and found one of these which, instead of being orange in the usual way, had a little bit of deeper orange, real red in the base of it, as though there had been a little cardinal thread caught there. Taking that exceptional one he saved the seeds thereof, and some of them had a little more than the others, and by pure selection, without any crossing whatever, he has gone on until finally he has now about fifty cardinal-colored poppies, pure crimson, deep rose-colored, without any of the original yellow or orange in them.

Now I have touched two or three different principles to which I ought to refer again. The egg of any animal or the seed of any plant is originally a single cell, set apart for reproduction. This single cell will not develop until it is united with another cell, a male cell. That is true in nearly all cases; practically true of the whole animal and plant kingdom. The female cell, the ovule, needs to be united with the male cell. We have found, as a matter of fact, that the egg or seed differs from a single cell of the ordinary kind in having only half of the amount of hereditary material, only half of the substance in it which determines how the resulting animal or plant is to be built up, and we find that the pollen grains, which are the male cells, or the male cells of animals, are also single cells, which at the time they are ripe contain only half the original material which determines as they grow how the plant or animal shall be built up. Now in the formation of any new individual we have these two new cells united to form a new

individual, and out of the mixed hereditary material the new creature is built up. Now take two plants or two animals that are a good deal alike, and the hereditary material in the two cells will fall right together and the resulting animal or plant will be built up without any difficulty. But when you take, as Mr. Burbank did, the raspberry and the strawberry—take the raspberry plant and fertilize it with the pollen of the strawberry, and you have a resultant fruit that is half raspberry and half strawberry, and when it attempts to develop it has got to make an effort to develop along both lines. It is hard to work them together. It starts out all right, sends out roots in the usual way, sends out strawberry stems, but by and by it has a raspberry vine coming there, as it were, with a raspberry tendency. Then it begins to send out a higher stalk and then it has a flower. Now it is comparatively easy for it to bloom, because the flowers are very much alike; but when it comes to making fruit then their plans disagree. There are two hereditary principles that are opposed to each other.

The point of all this is that nature takes great pains to see that no two of her germ cells, either male or female, no two pollen grains, and no two ovules, are ever exactly alike. And then she takes pains to see that no individual can possibly have the same parents that its father had. Now the whole principle on which Mr. Burbank works is, in the first place, selecting the individuals that fit most easily into his scheme, whatever it may be, and selecting from the progeny more or less like them. And secondly, in crossing pretty widely separated individuals so as to get material quite different, and working with them.

I have here two or three pictures copied from Mr. Burbank's photographs. Here is one of the walnut, an experiment in crossing the Japanese walnut with the English walnut, so called because it does not grow in England. He has about five thousand little trees that have sprung from the tree formed by crossing the European with the California walnut. Now this cross of the European and California walnuts is quite different from either. The tree grows to a larger size, has not very much fruit, is quite different from either, and the growth would be very much more rapid. From this first cross we have a new tree; in the second generation we see the character all broken up. There are some of these very much like the parent walnut; some of them have many leaves, some have very few; some of them involutes; some of them have very broad leaves, and some have leaflets with smooth edges, and some of them regular and some rough. Some of these trees grow only about four inches in a couple of years, and some grow four feet in the same time.

Sometimes considerable variation is made by the crossing of two pretty widely separated trees of this kind. Now this is for the purpose of making the species "wabble," as Mr. Burbank calls it. That is, get-

ting the two plants, one of one species and another of another species, mixed up, so that the individuals of some may have the qualities of one and some of the other. Knowing that, it is possible to have all sorts of variations. Here is the case of a cross between the Japanese walnut and the so-called English walnut. When we begin to break up the species, sometimes individuals will go farther away, and when they get far away in the direction you want them to go, then you have one that it is worth while to perpetuate.

There is a little plum growing half wild in France that has almost no seed. The seed is not inclosed in a stone, but is soft, the stone being itself very fragile. Crossing that with the French prune, these are all seedlings as a result of that cross. Some of them are very much like the French prune and some like the original plum. What we want to get is one that has the virtue of the French prune, or the sweet prune, and the seedlessness of the other. This plum can be used to cross with the French prune; this is not very good yet as a fruit. When we get a prune that is without any stone, like the wild plum, we will have a prune as much better than the old one as the navel orange is better than the original ones. We will have a prune that is meat all the way through.

Some time ago Mr. Burbank, by crossing different walnuts one with another, got a walnut that he regarded as very nearly perfect. But it has one vice. The birds can get into it because it is so soft. It is a good thing for a walnut to have a soft shell; it is a good thing to have a good deal of meat inside of it, and it is a good thing for that meat to be of good quality without any oil therein to turn it rancid; but it is a detriment for a walnut to be so soft that the birds can get into it. Now here is another walnut that was perfect in its way, except that it was a little too easy to get into it, and certain birds of California, the bluejay and some others, learned very quickly that it was desirable. Now by giving it another turn, crossing it with this big walnut that has a good thick, tough hide on it, it is possible to start a new combination that will have some of its members having a very thick skin and very little meat, and some of them a thin skin and much meat, and some having just the right amount of shell and meat. I have lately received from Mr. Burbank two kinds that are produced by the crossing of this ordinary walnut with the walnut with a thicker shell. These represent pretty nearly perfection in walnuts up to the present day. The fashions change with walnuts as with everything else, and by the time these trees are fully grown they will be very likely out of date. Something better comes on. Or it is possible, as you know, to force these trees very rapidly by taking the desirable kinds and grafting them on a tree so that the limb becomes, instead of the top of a small tree, the limb of a large one.

The point that interests us in all of these matters is that, in the first place, every grain of pollen and every ovule is separated from every other grain of pollen and every other ovule, so that starting right we have no two individuals quite alike. Then in the formation of a new plant we have to unite one of these ovules with another. We find that in a flower like those it is possible sometimes for a grain of pollen from here to fertilize an ovule over there. Nowhere in nature is it desirable that the parentage should be very close together. And so we have in the human race a prejudice against the marriage of cousins, or between brothers and sisters, which is simply prejudice and custom, apparently. Nevertheless, there is a provision in nature to prevent the ovules of plants from being fertilized by the pollen from the same plant; just as there is on a machine a device to prevent the machine from going too fast or too slow. Very often it is arranged that only insects going from one flower to another will be able to carry the pollen.

Now within the same species, as we call it, no two seeds are just alike, no two ovules are just alike, and no two pollen grains are just alike. In some species they are a great deal alike. Now by simple selection, that is, by selecting those that come most nearly to what we want, as in the case of those poppies that have the most red on them, it is possible in a long time to make a great deal of change in any species. It is possible for us to develop lap elephants, as we have developed lap dogs. If we want to get along faster, the crossing of one species with another, as Mr. Burbank has done in the case of the French prune and the little wild plum, or as he has done in the case of these new walnuts, we can cross one species with another. Now if the plants are very different, as in the case of the raspberry and strawberry, we get no fruit because the plant can not agree with itself as to how it is going to develop. If you could imagine a cross between a horse and a cow, we would find that in developing the horse-cow creature it could not agree on one line of policy; it would not know what to do; it would not develop horns or get along without them. Now it is possible to help this process of forming new kinds, new races of animals and plants, along very rapidly by judicious crossing. While these walnuts are of the first generation, they are very different one from another; yet it would, by selection, or following along some one of these lines and keeping at it, be possible by and by to develop a species which should breed true, just as the loganberry, which is the result of a chance cross, has come to breed true as though it were a genuine species. It has, nevertheless, been brought into such unity with itself that it develops into a new, distinct, and recognizable species.

But what it would take ages by ordinary selection to accomplish, could be accomplished in three or four years by expert work. It requires just

as great skill in manipulation to do this properly as it does to make the finest kind of a watch. I understand the theory of watch-making, but if I undertook to make one I am sure it would not keep very good time. And I am sure if I should try to improve on Mr. Burbank's walnuts by going back to the original stock, it would be a great while before I got one that would compare with those which I have passed around. I thank you for being so patient.

Upon motion, a vote of thanks was extended to Dr. Jordan for his able and interesting address.

PRESIDENT COOPER. I have just received the following telegram from Governor Pardee:

SACRAMENTO, CAL., December 6, 1904.

I regret that, owing to illness, I am not able to attend the Fruit-Growers' Convention, as I had expected to do. Please say for me that I recognize how much the future welfare of California depends on the prosperity of the great horticultural industry, and that anything which promises to promote this is good State policy. I trust that the present convention may be productive of large benefits to the fruit-growers.

GEO. C. PARDEE.

VALUE OF POLLINATION IN THE CULTURE OF THE APPLE, AND SOME OF THE REASONS WHY FLOWERS DO NOT SET.

BY A. N. JUDD, OF WATSONVILLE.

All fruit-growers have seen their trees full of bloom, and yet have but a small amount of fruit set. To know the causes of this loss, and the prevention thereof, would perhaps save many from digging up what is now a profitless orchard.

Nature seems to make an extra effort in the production of bloom. The question arises, is this effort for the purpose of supplying pollen for the less than twelve per cent of the flowers that set when you have a full crop, or is the extra eighty-eight per cent a superfluity? We think not. The short space of time in the life of a blossom (see Plate 4 on page 216) when it is susceptible of pollination demands more pollen than the twelve per cent supplies, hence nature makes up the deficiency that would arise if only one eighth of the blossoms were produced by adding the extra eighty-eight per cent; but, however, it is the recurring short crop that worries and causes us to reflect and study causes, such as unhealthy fruit buds, or injured pistils by rain, fungi, frost, or blighting winds, and the main cause of self-sterility, which is, that the pollen of a variety is unable to pollenize the pistils of that same variety, so where there is a general short crop for a number of seasons, self-sterility is most assuredly the cause.

The grower, in order to be certain of self-sterile varieties, has only to

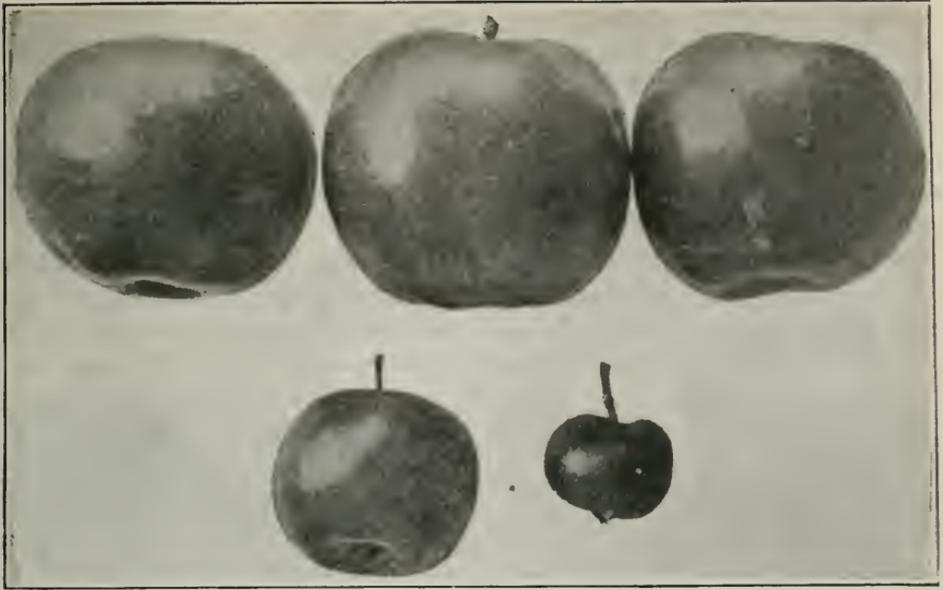


PLATE 1. STARK.

From Wagner pollen above; from Stark pollen below. Marked benefit from cross-pollination.



PLATE 2. LONGFIELD.

From Greening pollen below; from Longfield pollen above. Marked benefit from cross-pollination.

closely observe the following conditions: If you have a block of say five or ten acres, and the outside trees around the block have more fruit than the center, self-sterility is surely indicated. Other proofs of sterility are the falling of young fruit when partially grown, or any radical change of shape and size when the trees are getting old, or the lack of seed or their fertility.

It is useless to discuss the scientific reasons, even if we know them, of defective pistils or the lack of stamens; suffice to say that there are over fifty species of plants that are sterile with their own pollen.

While Darwin was not the first to find the value of cross-pollination, his "origin of the species" certainly gave a great impetus to the study. Mr. Waite, under the direction of the United States Department of Agriculture, published Bulletin No. 5, Division of Vegetable Pathology, in 1894, which caused many other investigators to make practical use of the information imparted, and yet none of them seemed to put sufficient stress upon the fact (if they knew it, which I doubt) that varied variety will do better, whether they are fertile or sterile, if planted together, provided of course they bloom together.

For instance, a Bellflower and a Wine Sap, if growing together, the very early flowers of the Wine Sap will fertilize the last flowers of the Bellflower, while the pollen of the Bellflower seems to be overripe to be of service to the Wine Sap; yet alone, both are self-sterile, unless under the most favorable conditions; and yet two varieties can be sterile alone, but will fertilize each other if blooming together, as will the Newtown and Bellflower, and while not only greatly increasing the crops of each, will also influence the size and shape. (See Plates 1, 2, and 3.)

To illustrate: In 1888 the writer planted an orchard. Among the varieties was a block of Newtown Pippins. Climatic conditions were unfavorable, and after a few years the fruit lost its long, corrugated, or five-crown shape, and very perceptibly flattened, besides growing much smaller each year. Not desiring to lose the trees at once, a Bellflower tree was put in the center of each vacant square between the rows. When the Bellflowers began to bear, the intention was to dig out the Newtowns; but results, however, prevented. With the shelter of the larger-growing Bellflowers and the cross-fertilization of each other a radical change was brought about and also a revelation to the owner. First, both varieties were greatly improved in crop, and also the character of the fruit; particularly was it so with the Newtown Pippins. They regained their original size and shape as when the trees were young (see Plate 3), while the shape and size of the Bellflowers were not so marked. The disposition of the latter tree is to *overbear*, while a solid block adjoining, of four hundred trees, of the Bellflower variety, are still *shy bearers*, and especially is this so in the center of the block.

To again illustrate: That much neglected family orchard of its many

varieties together, pruned and cultivated by loose stock, never fails to have a crop, and some specimens are even superior to those in the much-petted orchard that was planted later in solid blocks for commercial purposes. The cause is lack of pollination. Cross-fertilization will prevent deterioration of the true type and will also stimulate each other. This is proven in the whole animal and vegetable kingdom; why not in fruits? If one were to plant an orchard he should mix even self-fertile varieties, if they happen to be the varieties desired, and *bloom together*. If this be true, how much more would it be necessary to mix fertile with self-sterile varieties?

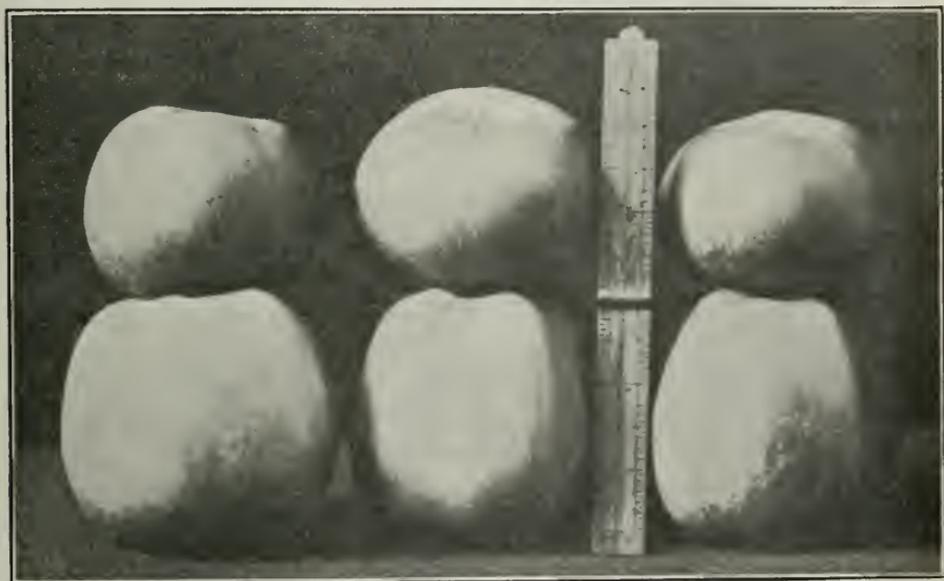
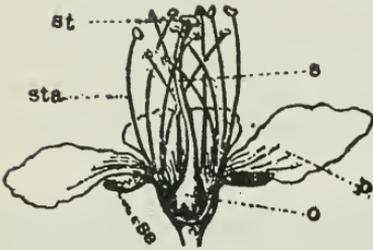


PLATE 3. FROM 15-YEAR-OLD NEWTOWN PIPPIN TREES.

Restored from shape above by its own pollen to the shape below by cross-pollination with Bellflower in three years.

The matter of selecting pollenizers depends wholly upon the individual's immediate locality. Study well the different varieties you wish to plant, their time of blooming in your neighborhood, and especially their natural affinity. (You will note the varieties in Plates 1, 2, and 3 have that affinity for each other). Experience no doubt will prove other varieties as valuable pollinates. But let us not jump at conclusions because a rift in the cloud of ignorance discloses a valuable fact, and do not too hastily condemn until you have made exhaustive experiments with a view of getting greater additions to what we already have; but to more thoroughly interest you, we suggest a perusal of articles from recent investigators, such as Waite, Goff, Waugh, Craig, Kerr, Crandall, and Hideman, on orchard fruits; Beach, Earle, Munson, and Whitter on grapes; and the Oregon State Board of Horticulture, to which we are indebted for Plates 1 and 2.

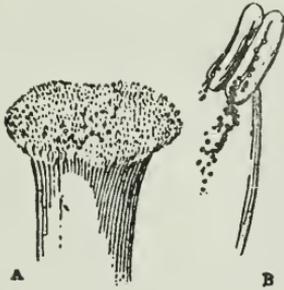


At 7 A. M.

The structure of a Plum blossom. *se.* sepals; *p.* petals; *sta.* stamens; *o.* ovary; *s.* style; *st.* stigma. The pistil is comprised of the ovary, style and stigma. It contains the female part. The stamens are tipped with anthers in which the pollen, or male part, is borne. The ovary *o.* ripens into the fruit.

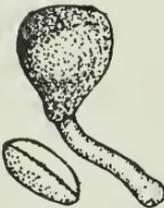


At 10 A. M.



At 3 P. M.

B, pollen escaping from anther. A, pollen germinating on the stigma. Enlarged. The transfer of pollen to the stigma is called pollination.



Pollen grain germinating. Greatly magnified.

DETAILS OF A FRUIT BLOSSOM.



At 8 A. M. the next morning.

The Opening of a Flower of Kieffer Pear. The flowers of pears and apples have five styles and stigmas. All natural size. (Courtesy of *American Gardening.*)

Final Suggestions.—In planting an orchard alternate each variety *both ways* in the row; then the varieties will row on the angle so that the picking of the fruit in separate varieties is not interfered with. But if you have planted in solid blocks, and get only partial crops, top-graft an occasional tree in the rows with fertile varieties and put a few stands of bees in the center of the block while the trees are in bloom; this will partially relieve you of the continual short crop.

In conclusion, it is proper to mention some of the known varieties of apples that are nearly or quite self-sterile and are considered risky to plant; among them are the Bellflower, Newtown Pippin, Spitzenberg, Willow Twig, and Wine Sap. Self-fertile are Baldwin, Ben Davis, White Winter Pearmain, Rhode Island Greening, Red Astrachan, Smith Cider, and Arkansas Black Twig. But it is well to here reiterate, that regardless of their fertility, two varieties planted together in alternation in the rows will improve each other, if *blooming* at the same time.

NEEDED LEGISLATION.

BY FRANK E. KELLOGG, OF GOLETA.

A hundred years ago Thomas Jefferson wrote that "laws and institutions must go hand in hand with the progress of the human mind." These words are just as true to-day as when written by "the sage of Monticello." And if they are true, then there never before was a time which demanded such rapid changes in our laws and institutions as the present, for without question the progress of the human mind to-day is more rapid than ever before.

The discoveries of science, the creations of inventive genius, the wonderful widening of the field of human activity, and the rapidly shifting economic conditions of the modern world, have forced upon mankind the imperative need of legislation that is adapted to the new conditions. So pressing is this need that on every hand you hear able and progressive men calling for a more equitable system of taxation, for municipal ownership of public franchises, for government ownership of railroads, for direct nominations in place of our present primary system, for restriction of the power of the great corporations, for better police and sanitary regulations in cities and counties, for the teaching of agriculture in our public schools, for insect control, for inspection of nursery stock, for quarantine regulations for plants, fruits, and cattle, and for a hundred other things made necessary by our rapidly expanding civilization. In fact, a very large percentage of the papers presented at our farmers' clubs, institutes, and State fruit-growers' conventions are written to call attention to needed legislation.

It is not my purpose, on this occasion, to advocate any of the needed measures already indicated; but I shall undertake to illustrate a means

by which all really necessary laws may be speedily secured. Our government is composed of three departments—the legislative, the executive, and the judicial. The needed legislation which I shall endeavor to point out is in regard to the legislative department.

As at present constituted, the legislative department is chiefly in the hands of the Legislature, composed of representatives elected by the people. The proposed reformation is not to abolish the representative feature of our legislative system, but only to supplement it with what is termed “optional direct legislation,” commonly known as the “initiative and referendum.”

The initiative means the proposing or starting of a law. That is to say, when the Legislature fails or refuses to enact a law which the people want, then they shall have the right to initiate or propose a law themselves by a petition signed by a given per cent of the voters.

The referendum means the vote of the people on a measure. That is to say, when the Legislature passes a measure, before it becomes a law, the people shall have the right, on a petition signed by a given per cent of the voters, within a specified time, to have the measure referred to a popular vote for ratification or rejection. The word “referendum” simply means referred to the people. It also includes the vote of the people on any measure which they themselves have initiated or proposed.

Optional direct legislation is simply an enlargement of the principle of democratic government.

The fundamental idea of our government is that the people themselves constitute the only sovereign; that all authority resides in them, that power belongs not to the individual, but only to the office which he may hold; and that the official is not a ruler, but only an agent of the people.

The original legislative plan instituted by our colonial forefathers, the first settlers of New England, was a pure democracy. That is, the people voted directly on all measures; and in their town meetings they have preserved this plan down to the present hour. And so dear to them is it, that oftentimes they have refused to incorporate their towns, even after they have reached the unwieldy size of ten or fifteen thousand inhabitants, because in so doing they must give up self-government and pass into the hands of representatives.

Originally all the laws of the New England commonwealths, as well as those of the towns, were made by the direct vote of the people at great mass meetings. But after a while the body of free citizens became too large and too widely scattered to meet and enact laws in this way, and so the pure democracy gave way to the system of the making of laws by delegates or agents, elected by the people, which proved to be more convenient for large and widely scattered communities.

The representative system would have been a great improvement in every way, if the people had retained the privilege of exercising the power of direct legislation whenever they saw fit to use it. That is to say, if they had safeguarded the representative system with the optional initiative and referendum, which reformers are now advocating, then the representative system would have been truly representative, and would certainly have been a very progressive measure.

But when they changed from legislation by the people, to legislation by delegates without this precaution, it became a dangerous measure, fraught with momentous consequences. It was, in fact, a change from a real democracy to an elective aristocracy.

Under the former system no laws were passed that the majority of the people did not want, and all laws were passed that they did want. But under the unrestricted representative final-vote system, many laws are put in force that the people do not desire, and the legislatures often neglect or refuse to make laws that the people do desire.

Without the initiative and referendum, the representatives, so far as legislation is concerned, are as truly the rulers of the people during their term of office as are hereditary monarchs during their terms of office.

The only legislative powers the people reserved for themselves were the management of their local affairs in their town meetings, and the adoption of their constitutional laws, and amendments thereto, leaving the wide field of statutory law entirely to their delegates, or representatives. And the only punishment for the misuse of the power thus conferred upon their delegates was their possible refusal to reëlect them to office. In other words, they retained the privilege of choosing a new set of masters every two or four years, as the case might be.

The first section of the first article of the Constitution of the United States declares that "all legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and a House of Representatives"; and the State legislatures, and county boards of supervisors, and city councils were naturally instituted on the Federal plan—the representatives from the top to the bottom of the system being entrusted with the final vote in all statutory laws.

It was exactly the same as though a farmer should employ a crew of men to run his ranch for a term of years, and then not only relinquish the power to discharge them for any misconduct during that time, but in addition give them complete authority to run the ranch just as they saw fit, regardless of the welfare or the wishes of the owner—with the only incentive for good and honest management, pride in their work or the fear of not being reëmployed when the term expired. How long do you think a farmer in our day would be in business on such a plan as this? And how long do you think our Government can prosper, doing business on exactly the same plan?

With all the unwisdom inherent in this plan, still, in its early application, no evil consequences were apparent. For it was instituted in an age when there was little or no incentive for legislative wrongdoing. And in those simple, primitive days the high sense of public honor was a guarantee that the legislator would make laws in the interests of all the people.

Since then more than a hundred years have rolled away. How changed the scene! What has happened?

Gigantic municipalities have taken the place of the little villages of our ancestors. And these great cities are lighted by gas and electricity owned by private corporations. More than two hundred thousand miles of railroads have been built by private companies. Gigantic private trusts have gained control of the oil and coal fields, and of the iron, copper, silver and gold mines; and thousands of streams of water are owned and controlled by private syndicates. As a natural result there are giant private corporations, and multi-million dollar trusts seeking special legislative favors by means of bribery.

At our mother's knee we all were taught to pray, "Lead us not into temptation," yet we are sending men to our legislatures where the very power we have conferred upon them invites unbounded temptation to fraud, and because they yield to temptation, greatly needed reforms are prevented.

At the present hour nearly all the leading nations of the world have postal telegraph systems; and wherever they have them the service is marvelously cheap as compared with the United States. For example, in England they have a uniform rate of twelve cents for twelve words, for all distances. Why have we no postal telegraph system? Is it for lack of understanding, or lack of public sentiment? By no means; for the people everywhere are in favor of it. Its value is too evident to admit of any questioning whatever. Is it because there is something in the charters of the telegraph companies which forbids government ownership or competition? Not at all. The fact is, the charter of every telegraph company provides that they shall sell out to the Government whenever it shall so demand, at a price to be determined by Government appraisers.

Then, if the Government has the power to immediately establish a postal telegraph system, and the people generally desire it, why is it not established? There is just one reason why. It is because the telegraph companies, with their hundreds of millions of dollars, and the vast revenues from their valuable franchises, are able to purchase the legislation necessary for their perpetuity, and until the people have the power to vote directly on the issue, we may expect to go on indefinitely paying for our telegraph service ten times what it is actually worth. Exactly the same conditions prevail with regard to the parcels post.

For 60 cents the German farmer can send 110 pounds of produce by mail to any part of Germany or Austria, and it will reach its destination as promptly as a letter. Why have we not a parcels post as cheap and efficient as this in the United States? You find your answer in the express and railroad lobbies, whose money controls legislation along these lines, and until the people have the power to adjust this matter by direct vote, we may expect to go on paying six or eight times as much for the transportation of small parcels as the service is worth.

We, the people, who call ourselves sovereigns, have at present absolutely no means whatever by which to secure the legislation we so much need. We can only petition, that is, humbly pray, that our legislative masters grant our requests,—and experience has proven that they are not very likely to do so if they are well paid for denying our petitions.

What would you think of a man who would appoint an agent with power to defy the authority of the man who appointed him? Yet this is exactly what we do in the case of our legislators.

By conferring upon our representatives the power to cast the final vote in statutory laws, we have invited the worst of men to make politics a profession, and have well nigh driven from political life the ablest and best of our citizens. It is almost impossible to elect an honest man to a legislative office, or to keep him honest after you have elected him. And under the baneful influence of legislative bribery and fraud, all the way up through the city councils, the boards of supervisors, the State legislatures, and to the Congress of the United States, you may find startling examples of corruption, and no man can wonder at it, for to obtain some special legislation, or a valuable franchise, a rich corporation could often afford to give a hundred thousand dollars for a single vote—a temptation too strong for any ordinary mortal.

Under this evil system, franchises of incalculable value, which ought to forever belong to the people, are given away to private corporations.

Although called a representative system, it is the most unrepresentative system imaginable, for oftentimes the strongest remonstrances and petitions of the people are utterly unheeded, and their most sacred rights are ruthlessly trampled in the dust.

The solution of the problem, as already indicated, does not lie in the utter abolition of the representative system and a return to the pure democracy of our colonial ancestors, for not only would a pure democracy be unwieldy and impracticable in our day, but also there is as great need of expert service in lawmaking as in any other department of human activity. We can no more dispense with the legislator's services than we can do without the physician, the teacher, the mechanic, or the inventor.

But the remedy for our legislative evils will be found in supplement-

ing our representative system with a provision for the use of the initiative and referendum whenever a reasonable percentage of the people shall by petition demand it.

Their use in reference to statutory enactments should not be obligatory as is the case of the referendum in regard to our State Constitution and amendments thereto, but should be optional only. We are persuaded that the necessity of calling them into exercise would be exceedingly rare. And whenever the power should be invoked, it could usually be done in connection with some general election, thus obviating extra expense and annoyance.

Under such a system, legislative corruption would entirely cease, for who would bribe a legislature or municipal council to grant an unjust charter, give away a valuable public franchise, or pass an unrighteous law, knowing that the people reserved the power to reject them by popular vote? Who will buy from a man who has not the power to deliver the goods? And to bribe all the people, would be a physical impossibility.

The third house in our legislatures, known as the "lobby," would go out of existence, and legislative corruption would cease, for its very cause would be removed.

We are not advocating any new principle, but simply a wider application of a very old principle. Ever since the foundation of our government, the two extremes of our legislative system, the New England town laws and our State constitutions with their amendments, have been subject to the referendum vote of the people, and these have always proven to be our purest and best laws. If direct legislation works so admirably at the two extremes of our system, why will it not also give satisfaction in the great intervening field of statutory law? For more than a hundred years we have had the two systems side by side, the one always giving us pure, wholesome, and satisfactory laws, invariably founded on the public welfare, and the other often giving us impure, unwholesome, and unsatisfactory laws, and all too frequently founded on private interests. Is not a hundred years time enough for experimentation? Let us therefore accept the truth which our experience has demonstrated, and at the earliest possible moment engraft the power of direct legislation into our statutory system.

For more than two score years the Swiss Republic has had the initiative and referendum in full force, and they have not only long outgrown the experimental stage, but have given to that people the reputation of being the most enlightened politically, and the best governed nation of the world, with the fewest and simplest laws—and perhaps the smallest percentage of lawyers, having only one seventh as many as we have in proportion to population. As for the comparative number of laws introduced, Prof. Frank Parsons informs us, that in a recent

Swiss national legislative assembly of usual activity, sixty-five measures were introduced, twenty-four of which were passed, while at about the same time the United States Congress introduced twenty-four thousand bills!

Finally, and most important of all, direct legislation would open the gateway to all other needed reforms.

Why take ye thought for the parcels post, the postal telegraph, and the long list of needed legislation? Seek ye first the initiative and the referendum and "all these things shall be added unto you."

The man to whom this world has ever been the most indebted is the agitator. He is the man who, all along the ages, has blazed the way for the onward march of civilization. While he lived he was ostracised, persecuted, banished, crucified; after his death, monuments were built to his memory.

The chief opposition to him has always come, not from the common people, who often heard him gladly, but from those high in civil or ecclesiastical authority, who feared that the new ideas would interfere with their prerogatives, or disturb the established order of things.

Exactly the same thing is true in our day, and our legislatures are used to defeat or retard the great reforms for which the world is ripe and waiting. The initiative and referendum will render legislative bodies powerless to obstruct human progress. The reformer will make his appeals directly to the people, who are to be the beneficiaries, and at the American ballot-box the principles which he lays down will be crystallized into law. And the reformer, for the first time in American history, will find roses instead of thorns strewn in his pathway, and will for the first time be appreciated by the generation in which he lives; and for the first time will the dream of Jefferson be realized, when "laws and institutions will keep pace with the progress of the human mind."

Direct legislation is a non-partisan issue, having received the sanction of men of every shade of political belief. It can be secured only by creating a public sentiment in its favor so strong that no party will dare to omit it from its platform.

The law providing for it should be in the form of an amendment to our State constitutions. And when it becomes a part of State constitutional law, a way can easily be found for introducing it into the United States Constitution.

Several of our sister States have already adopted it, and it is gradually being introduced into the charters of our great municipalities.

To the boodler, the machine politician, and the party boss, it is the handwriting on the wall, proclaiming their certain doom. But to the world it is the harbinger of a grander civilization.

AGRICULTURAL EDUCATION IN THE PUBLIC SCHOOLS.

BY JOHN S. DORE, OF FRESNO.

The first public consideration and action by California farmers looking toward the teaching of scientific agriculture in the public schools of the State that has come to my notice was the introduction, discussion, and passage of the following resolution by the State Farmers' Institute held at Berkeley recently, and concerning which the San Francisco Chronicle editorially said:

WANT MORE INSTRUCTION.—The resolutions which the institute adopted this afternoon were hearty in their approval of the work of the agricultural college, earnest in the desire to have the work increased and properly supported, and urgent in their desire for the widening of the scope of agricultural instruction throughout the State. They were passed exactly as the committee had submitted them, as follows:

WHEREAS, We consider nature study with special reference to agriculture of great value to all children of school age; and,

WHEREAS, It is, in our judgment, imperative for the best good of the children that all the teachers in the public schools be qualified to present such truths in the best possible manner; therefore,

Resolved, That we ask the Legislature to take immediate action requiring a thorough course of elementary training in agriculture as a prerequisite to graduation in all our several normal schools.

The State Farmers' Institute was the most notable and representative body of farmers I have ever seen assembled in California. The adoption of the above resolution was by the most hearty and vigorous vote given any of the several resolutions adopted by the institute.

The purpose of this paper is to call the attention of the fruit-growers and farmers of California, assembled in this their thirtieth annual convention, to the importance of this subject and desirability of proceeding in a logical and proper way to secure the desired results by first getting the needed legislation to include in the curriculum of all our normal schools so much of scientific agriculture as to qualify their graduates to properly teach this branch. When we have provided for properly qualified teachers, then we can give nature study with special reference to agriculture a legitimate standing in all our public schools. I would not increase the work of the pupils or teachers in our public schools, but would change from cramming the memory to cultivating the perceptive faculties of the children.

In support of this change I find many leading, thoughtful citizens and educators. I believe, as Mr. Berwick has told you from this platform to-day, that the greatest curse of the public school system of California is the shaping of the course of study from the primary school up through all grades to graduation from the high school, all with the special and sole purpose of preparation for entering the university. Mr. Berwick, himself a Greek and Latin scholar, told you this course of

study was prepared in the interest of professors who had Greek and Latin to sell, and that the farmers and fruit-growers without protest allowed the great injustice to their sons and daughters to go on, while only three per cent of those who attended our public schools ever enter the university. He expressed deep regret for such time spent by himself as well as by the children of California, not wisely and without reference to the life work, the special preparation for which is so pressing in this strenuous age.

President Burk, of the San Francisco Normal School, in a gathering of teachers in that city recently, said he would cut out much from the courses of study in the schools in the endeavor to avoid the learning of matter which would be of no practical use in after life.

The National Grange of Patrons of Husbandry, an organization of upward of 700,000 farmers and farm laborers in this nation, has shown full appreciation of the importance of this subject. In his address of welcome to the National Grange in Portland, Or., a few days ago, Governor Chamberlain, of the State of Washington, called attention to the subject of agriculture in the public schools, as follows: "Greater attention ought to be paid in the public schools of the State to instruction along the line of field and farm. The trend of public thought is in this direction, but until concentrated effort is put behind it to force this thought to the front and cause it to be put into practical operation, not much can be expected at the hands of those in authority."

In the same line of thought Governor Batchelder, of New Hampshire, who by the way is Lecturer of the National Grange, in a lengthy report to the National Grange at its recent session in Oregon, said: "No feature of educational work in which the Grange can exert an influence is more promising than that of introducing the principles of agriculture in the curriculum of public schools. It is well for the mental development of the child that the origin, composition, and uses of the objects by the roadside between its home and the schoolhouse be understood, and far better for its success in life than to be taught the heights of mountains that will never be seen, or other intricate problems in the higher mathematics or the dead languages. Whatever the occupation or profession of the child in after life, it will be of advantage to him or her to know something about the common things of life with which he comes in contact every day. It will strengthen his interest in the soil and the occupations connected therewith. The State of Missouri has taken advance ground in this direction and provides means for the teachers of the public schools to equip themselves for imparting such instruction. It has become one of the requirements of a State teacher's certificate in that State."

He further says: "The Grange can and should lead in this important matter and require similar regulations in other States, and provide

means for enforcing them. This is one of the leading educational issues of the present time and upon which important results depend."

Again, the National Grange says: "In view of the fact that agriculture is the great basic industry of the nation upon which all other professions depend, we reiterate our previous declarations in regard to teaching the principles of agriculture in public schools, believing it to be for the public welfare to have every boy and girl, whatever their life work may be, instructed in the underlying principles of that which constitutes the basis of all wealth and prosperity."

Dr. A. C. True, an educated gentleman who stands at the head of all the experiment stations of the National Government, is a practical and enthusiastic advocate of the teaching of agriculture in the public schools. Dr. True has written freely on this subject in Yearbooks of the Department of Agriculture for many years past, and I quote much from his writings.

"While there has undoubtedly been a generally increasing interest in public education in this country during the past quarter of a century, various causes have unfavorably affected the rural schools, so that their relative efficiency has notably decreased. Even in communities where educational activity has been relatively great some of these causes have operated to the disadvantage of the schools. There is no doubt that the average rural school of the Northeastern and Central States is as a rule an educational agency of considerably less merit than it was a generation ago. Then these schools were often numerous attended by boys and girls who, in many cases, continued in them until they were full-grown men and women. They were taught by the brightest minds in these communities—often in winter by college students and in summer by women from the academies. The range of studies, while narrow, was fundamental, and in that respect the country and city schools of that time were much alike. In a word, the country schools of that day were much more nearly sufficient for the educational needs of the times than those of to-day. The element of education which is at present most lacking in our common schools is the training of the powers of observation. The children need above all things else to be taught to observe carefully and correctly and to state their observations in clear and terse language. The ordinary child, whether on the farm or in the town, actually sees comparatively little in the world about him. The wonders of the trees and plants in park or meadow, of birds and insects flying about the house, float like shadowy visions before his eyes. 'Seeing, he sees not.' He needs a teacher who can open his eyes and fix his mind on the realities among which his daily life is passed. This accurate observation of natural objects and facts is the only foundation on which scientific attainments can rest. The scientist is chiefly a man who sees better than his fellowmen. But it is also a great help in practical life. Many farmers

acquire much of this power by their own unaided efforts. And these are the very men who most regret that they did not have in early life the help of a trained teacher. The farmer's child lives where he has the best opportunity for such training. It would benefit him in the practice of his art, and it would add an interest to his life which would do much to wean him from a desire to leave the farm for the turmoil and uncertain struggles of the town. With proper provision for the training of teachers in normal and other schools, it would be entirely feasible to have this nature teaching in all our common schools within a few years. It is such teaching that the child-mind craves. With it the school becomes a delightful place and the teacher an angel of light. Is it not likely that a child who is thus taught will soon begin to see a new value and dignity in farm life and to be less envious of the boy or girl who is shut up within the narrow confines of city streets most of the year? And if the farmer's boy learns how to accurately observe the processes of nature with which farm practice deals and the foes with which agriculture has to contend, are not the chances vastly increased that he will be successful in managing nature so as to get the greatest favors from this coy mistress of his life and fortune?"

The United States Commissioner of Education, in his last official report, shows 16,930,061 young persons enrolled in the public schools of the nation—fully twenty per cent of our entire population.

If agriculture could be generally taught in the schools it is obvious that the effect would be widespread and far-reaching. One effect of this would be to open the mind of the pupil to the wonderful progress which is being made in agricultural science and practice. It would enable him to take more thorough advantage of the information furnished through books, bulletins of experiment stations, farmers' institutes, the agricultural press, and the many scientific discoveries relating to the varied industries of the farm which now find a place in many of our leading magazines. It will come, too, at a time in his life when he is making choice of his life occupation, and it is believed it will be a powerful incentive to keep those boys on the farm who are fitted to get the most in every way out of a farmer's life, and at the same time to become the most useful citizen.

This would bring agriculture well into line with the great commercial and manufacturing enterprises of our day, which owe so much to technical education.

One result of our school life to-day seems to be a distaste, if not disgust, for honest toil and an effort to escape the only way by which happiness and usefulness in this world can be had.

In this connection I have great interest in Booker T. Washington's school. A clipping from a recent publication says: "The Tuskegee Institute is the most useful educational institution in America, because

it teaches that which is the best practice for all to the very people who not only most need such teaching but are best situated to profit by it. It has turned out during its twenty-three years more than six thousand men and women fitted for honorable and remunerative employments. All its graduates are in demand before they graduate. Just now it is doing a more necessary work than any other educational institution in the world. It is doing more than any other human agency to solve the race problem of the South."

We do not ask for any neglect of the general education of the pupil while receiving instruction in agriculture and other industrial studies, nor do we complain because mechanical and manufacturing interests have been pretty well cared for and fostered, especially in the manufacturing centers of our country, realizing and believing as we do that the only opportunity the boy or young man of the future will have to obtain technical instruction must be in some kind of public school, for even to-day there is little chance for the American boy to learn any trade of his choice without consent of those who believe their craft would be injured by addition to their numbers; but we do urge and insist that agriculture shall at least be placed upon an equality with other industrial instruction in the public schools, which it has not up to the present time.

Superintendent Langdon of San Francisco has just returned from an extensive tour of the Eastern States and Canada. He was granted a leave of absence by the Board of Education to learn what was being done in other cities in educational matters. He reported that he was struck with what is being done in the important centers of the nation in the way of industrial education in every form in the great manufacturing districts—even to the kindergartens for the youngest children in factory neighborhoods. One of the most marked movements in modern education noticed at once by Superintendent Langdon was the rapid introduction of industrial education in all its varied forms. The greatness of American industry which he saw so clearly shown at the Louisiana exhibit was quite as clearly reflected, he says, in the educational exhibits showing the work of our public schools, the schools of the Eastern States in particular. Germany, which has in the last few years tried to wrest commercial supremacy from America by the widespread introduction of industrial work in the folk schools, is being checkmated, for America is slowly but certainly paralleling the European method of providing school training in the manual arts, so as to maintain her present lead. The result of all this industrial education has helped the manufacturing interests to far outstrip agriculture, which has benefited very little, if any, up to the present time by agricultural instruction in the public schools. The Census Reports show this clearly, as follows: Manufacturers have ten billions of capital invested and they put out thirteen

billions' worth of productions; farmers have twenty billions of capital, and raise five billion dollars' worth of products. In other words, the dollar of the manufacturer yields him \$1.30, while the dollar of the farmer yields him only twenty-five cents. These figures are taken from the 1900 United States Census Report.

Dr. True was sent to Fresno some two years ago by Secretary of Agriculture James Wilson, to investigate and report upon the urgency and need of investigation by the United States Government in relation to the rise of the ground water and alkali in that vicinity, and while there he visited the high school, and in the Yearbook of 1902 writes of that visit, as follows:

"The writer went not long ago to a flourishing agricultural community, in the midst of which was a fine and wealthy city. On invitation of leading citizens he went to the splendid high-school building in that city and addressed the teachers and students. In that school were gathered some six hundred active and intelligent American boys and girls. They were pursuing courses in English and other languages, mathematics, history, political economy, and a number of natural sciences. With much justifiable pride the principal showed his visitor the good equipment for work in carpentry and woodcarving. There was also instruction in various forms of commercial business. But agriculture and horticulture were entirely neglected. The farms and horticultural plantations surrounding that city aggregated millions of dollars in value. The prosperity, if not the very existence, of the city depended on the success of the agriculture in its vicinity. Grave evils afflicted that agricultural region, the removal of which will require much intelligence and expert skill. Hundreds of the pupils attending that high school would naturally, if not necessarily, make agriculture in that region the business of their lives. And yet no pupil of that school was learning anything about the requirements of successful agriculture or the aid which science may give the farmer in his struggle with the forces of nature vitally affecting his business. The whole drift of the education given in that school was away from the farm. Could anything be more unwise? Is it not absolutely certain that, considered merely as a matter of business policy, the taxpayers of that city could well afford to pay all the additional expense which would be required to maintain courses in agriculture in that school? Undoubtedly the farmers of the vicinity ought to share in this expense, and there is good reason to expect they would do so. There are hundreds of American communities where a similar state of things exists. It is not a matter of interest and concern to the farmers alone. The enduring prosperity of cities is inextricably bound up with the success of agriculture. Technical education has proved a sure road to commercial development and greatly increased wealth in connection with every industry which has

received its benefits. It will prove equally so as regards agriculture. The tremendously productive results which have already come from the work of the agricultural colleges and experiment stations may be multiplied a hundredfold by the education of hundreds of thousands of the flower of rural youth in secondary schools in which there is definite and systematic teaching of the technique and scientific principles of agriculture."

THE FRUIT-GROWER AND THE PARCELS POST.

BY EDWARD BERWICK, OF PACIFIC GROVE.

The first time I met with the fruit-growers of California in this city, Mr. Gordon read a paper of very pertinent counsel to all intending planters of prune trees. He proffered them Punch's advice to persons about to marry, viz., "Don't." He foresaw the impending glut which we all so much deplore, yet seem so helpless to relieve.

I remember rising to suggest that it was simply a matter of transportation. Given adequate transportation at rates approaching the cost of service, and not based on the exaction of "all the traffic will bear," and I believe even to-day there neither need be, nor ought to be, any glut in the prune, raisin, or citrus fruit markets. It is absurd to think that with proper distribution, at proper prices, this country alone could not and would not consume two pounds of prunes and one and a half pounds of raisins for each head of population.

Why, just recently when it suited a Sacramento and San Francisco dry-goods house to advertise, in a novel manner, their own wares, and incidentally to benefit the raisin-grower, that house sold in one week 35,000 pounds of raisins in Sacramento city alone. That was one pound in one week for every man, woman, and child in that city, or at a rate of 1,820,000 pounds a year. In San Francisco the same firm sold 130,000 pounds of prunes in ten days, or at a rate of 4,680,000 pounds or 2,340 tons per annum. If this could be done in two cities of California in the very heart of the fruit-growing season, with the markets supplied with an endless variety of fresh fruits, what might not be anticipated in cities where fresh fruits are comparatively rare, and at times of the year when the supply is confined to comparatively few varieties?

How was it done? It was done by letting the public know that these valuable and acceptable articles of food were on sale at comparatively a small margin over the cost of production.

Why was it done? It was done in part, perhaps, from the innate goodness of heart of Weinstock, Lubin & Co.; but, also, it was no doubt done as a "flyer," to draw customers to buy other goods by offering prunes and raisins at close figures. The sale was a positive attraction.

It not only sold the dried fruit, but brought to the store new buyers of other goods.

If one or two merchants can arrange thus to push the sale of the fruit-grower's products, is it possible, or impossible, for the grower to undertake to push the sale of his own products in a similar way? Is there no agency he can devise by which he may convey his goods direct to customers, at something like such living profit to himself as shall enable him to remain in business, and induce the consumer largely to increase consumption by the cheapness of the product?

When Mr. Gordon predicted this impending glut of prunes, I recommended the isthmian canal as a vehicle for the cheap transport of products to Eastern and European markets, and for many years thereafter it was my privilege to be one of your Isthmian Canal Committee. By many, then, the isthmian canal was regarded as an iridescent dream. Now I am glad to say that in this capacity of committee-man my occupation is gone, as the canal is being rapidly realized. But in May, of last year, at Los Angeles, the horticulturists of California commissioned me, as President of the California Postal Progress League, to work with and for them in behalf of a parcels post, an institution that, pending construction of the Panama Canal, and long after its construction, would be an exceedingly efficient agency in the distribution of your products, and be useful not only to you but to the whole community, "an inestimable boon to all classes and an incalculable stimulus to trade."

You heard last year at Fresno, and it has been reiterated repeatedly in the press, what other countries have accomplished in transporting goods through the postoffice, or by special agricultural parcels post by railroads, at exceedingly small rates, say from two fifths of a cent to two cents a pound. You were shown that the American express companies have established for the British public a flat, or postage-stamp, rate of 24 cents on 11-pound parcels, anywhere between New York and San Francisco, or other express offices in the Union. The proof of this I have already forwarded to President Roosevelt and will speak later of the result.

To show the extent to which the parcels post system may be availed of, let me mention that one firm in England, in two days, sent off 70,000 parcels, paying therefor postage amounting to £875, or \$4,300. Supposing these parcels were of ten pounds weight each, we have 700,000 pounds, or 350 tons, or 35 ten-ton carloads. You can see, therefore, that very few prune- or raisin-growers are in so large a way of business that the parcels post might not prove an adequate channel for the marketing of their wares by putting them in direct touch with the consumer. This, of course, means the delivery of an invaluable, health-giving dried fruit, direct to families, at such low prices as would stimulate consumption, and yet amply remunerate the grower. In this connection

the recent development of the rural parcels post in England merits a moment's attention. Mark its availability for all classes of produce and producers.

According to the London Daily Mail, "It will now be possible for those who live in places quite remote from postoffices, to hand parcels to the postman for transmission through the mails. A rural postman, whether on foot or mounted on a bicycle or tricycle, is to accept parcels tendered to him, provided that he is not already fully loaded, and that the weight of the parcels handed by any one person does not exceed eleven pounds. If the sender's consignment is likely to exceed this limit, arrangements will be made for its collection, if a day's notice is given. If the postman uses a horse and cart, he will be allowed to receive any number of parcels, provided he can conveniently carry them in his vehicle. When these conditions do not apply, the sender has yet another opportunity, for he has only to proceed to the nearest country letter-box at the time appointed for emptying it, and the parcels may then be handed over to the driver of the mail cart, who, however, is not required to weigh the parcels or to check the postage. For the accommodation of farmers, market gardeners, and those who are in the habit of regularly dispatching goods by parcels post, special arrangements have been made, and, in cases where a sufficient number of parcels are regularly sent, there will be, if desired, a direct collection from the premises every week day or on certain specified days each week." Obviously these provisions cover shipments of ten pounds or ten tons. Equally obviously such arrangements are of untold convenience to all classes.

Presumably no one here doubts the immense advantage such a parcels post would be to the people of this great republic. Presumably no one doubts the ability of the American government to give as good a public service to its citizens as the German, Swiss, or British governments give to their citizens. Why, then, have we no parcels post? If I may be permitted to quote Scripture, I should say, "Ye have not, because ye ask not!" "Ask and ye shall receive!" But you must "ask in faith, nothing doubting," and lastly, you must "show your faith by your works," for "faith without works is dead."

Are you willing to ask in this way, determined to work for what you want; determined to get what you work for? You are entitled as American citizens to dictate rather than ask, for ours is a government not only "for" but "by" the people.

The California Postal Progress League was formed as a rallying point for workers on these lines. Have you done your share in the rally? Do you know how you want your servants to serve you, and are you prepared to do your share in directing your public service? The League has undertaken a campaign of education. It has enlisted part of the

Press to inform people of the plain postal facts, such facts as this: that while it is claimed by ex-Auditor Castle that the transport of all mails costs the United States government $7\frac{9}{10}$ cents per pound, the American express companies carry for the British government, between New York and any point in the Union, at a flat rate of $2\frac{1}{11}$ cents per pound; that while the British postoffice carries from Ireland to India eleven pounds for 72 cents, we pay a flat rate of 64 cents for four pounds from San Francisco to Oakland, or San Francisco to Boston.

The League has not only appealed through the press, and by distributing thousands of circulars, to the people at large, but it has corresponded with the leaders of both parties, with President Roosevelt, Senators Root and Cabot Lodge, W. J. Bryan, Thomas Watson, and others. It has, through the efficient work of Mr. Raap, Worthy Master of the State Grange, and Mr. J. S. Dore of Fresno, interested the National Grange to work in favor of the parcels post. It has endeavored to convince platform committees of different political parties that if they really wished to do something for the benefit of the people it would be good to embody a parcels-post plank in their platforms. It has held a notable public meeting at the Alhambra Theater in San Francisco, which, through the publicity given the cause in the metropolitan dailies, challenged the attention of all California. It has interested the youth of California by addresses given in the normal and high schools and universities of the State at Berkeley, Stanford, the Lick, Lowell, Wilmerding, Mission High (in San Francisco), San José, Fresno, Lompoc, Lakeport, Arroyo Grande, Pacific Grove, and elsewhere. It has so persistently corresponded with President Roosevelt and the Postal Department setting forth the iniquity of the "free pass" and "frank" system, by which our Senators and Congressmen are placed under such obligations to the great transportation corporations as to preclude them from giving proper attention to the well-being of their real employers, the PEOPLE, that the President has ordered a secret investigation. Here is the announcement thereof, clipped from the San Francisco Chronicle:

NEW YORK, November 10.—A special to the Herald from Washington says: A new investigation of the Postoffice Department is now under way, and is directed against the railway mail service. Half a dozen railway mail contracts are now before the Department of Justice for examination as to their legality, and investigation of charges of collusion by Government officials, some of whom are supposed to be in Congress.

President Roosevelt ordered this investigation before the death of Postmaster-General Payne, but the fact that an inquiry has been going on for nearly two months did not become known until to-day. In ordering the railway mail contracts to be examined secretly, the President has stolen a march on the members of Congress who have always protested against such an investigation on behalf of the railroads.

One reform likely to follow in this Department, applies to the method of weighing the mails on which to base the price to be paid to the railroads. This is done once in four years for a short time, and on this basis a four years' contract is made. It has been charged that the mails were increased during these periods by collusion between the Postoffice officials and the railroad companies.

This investigation was set on foot subsequent to charges of corruption made by the League to President Roosevelt, so that already the League's work has borne fruit.

A parcels post has been inaugurated with China and Japan, and it is said that arrangements are almost completed for conventions with England and Belgium. It is also alleged that Assistant Postmaster-General Madden contemplates a fusion of third- and fourth-class matter into one class at one cent for two ounces for all merchandise. This cuts the present rate in half, and is at least a move in the right direction. The League has done all this with very inadequate support. Its funds have not sufficed to pay its outlay for printing, postage and traveling, and that connected with its public meeting in San Francisco. When I last heard from the treasurer the League was in debt. The League has had no funds even to employ a salaried secretary. While the Anti-Parcels Post League has an organ of its own, the "Pacific Coast Merchant," the Postal Progress League has to trust to the sympathies of such editors as are clear-sighted and patriotic enough to work for this great public benefit. Speaking on this topic, I must do the Anti-Parcels Post League the justice of saying that they have lately opened the columns of the "Merchant" to a fair discussion of the pros and cons of the parcels post system, their president stating their side in one issue, our view appearing in the next.

Probably both political parties would have adopted parcels post in their platforms in this State but for the ill-advised opposition of some few misguided Santa Cruz retail merchants, who had been persuaded that our League was a creature of the Eastern mail-order houses. Traveling last week with a San Francisco jobber of dry-goods there was temptation to laugh in one's sleeve to hear him denounce the parcels post because it would so greatly help these very country merchants, and, as he thought, at his expense. It has been found wherever introduced a universal benefit. No one class holds any monopoly of its beneficence.

Every step in human progress has always met with bitter opposition from some ignorant minority. How long it will take to remove this opposition depends upon how much work you and I, brother fruit-grower, are willing to do toward this removal. Do you ask, What can you do? You can give the League your influence; the weight of your name; the benefit of your dollar to its funds. You can, if you will, easily do a great deal more; you can interest and instruct your neighbors so that they also may go and do likewise; you can circulate petitions to Congress, and personally write to your Congressman, who will be in Washington on purpose to give effect to your wishes. You can prove your title to your proud boast of American citizenship by giving your brain power to make and keep this a government of the people, for the people, and by the people.

What are you going to do about it? What? Why, of course, you are going vigorously to help this movement, knowing that Heaven helps those who help themselves. And, as you are going to help the Postal Progress League, don't put it off till to-morrow. Help us now!

PRESIDENT COOPER. The essays that you have heard read are now before the convention.

MR. KELLOGG. My good friend, brother Berwick, referred to my address, and I wish to say there is no controversy whatever between me and Mr. Berwick on all these lines. But I want to make a suggestion or two. Mr. Berwick is wrong in one assertion that he has made when he says that we are a government of the people and by the people and for the people. That is not correct. We have three departments of our Government—the executive, the judicial, and the legislative. We are a government by the legislature, for the legislature, and of the legislature. We have no power by which to compel these legislators to enact the laws that we ask for.

MR. BERWICK. I take Abraham Lincoln's word for it.

MR. KELLOGG. I know that Lincoln said that; and he was a man of democratic ideas in his time. But it has changed from the government of his time, from pure democracy to a representative legislative government; without safeguarding it with the initiative and referendum, it ceases to be in fact a government of the people, for the people, and by the people. Without it we can petition for this parcels post for years; our legislators may be offered bribes by Wells, Fargo & Co. to prevent the parcels post. They have got money to fight with. Again, how are you going to introduce parcels post without introducing some other things. The railroads for years have charged the Government much more for transporting its parcels than it has for transporting those of the express companies. Now in all municipalities and cities the authorities say what prices shall be charged for certain services rendered by the corporations. For example, the city of Santa Barbara has a wharf, and the city council decided that certain rates should be charged on freight shipments. The Government of the United States should decide what the railroads should charge for the transportation of its packages and parcels. There are other things that must come along with the parcels post, and the foundation of all is direct legislation.

MR. BERWICK. I am willing to admit that a great deal which Mr. Kellogg says is correct; but when I want to do some work, I do not wait for a machine to be introduced. I use the machine already existing. I try to make that do the work I want done. I am quite willing that the referendum and initiative should be introduced along with the other things, but until it does come along I will try to use the best tools that I can get until I have better ones. There are plenty of men left in the

world to go to Washington to do the people's bidding when they are sent for. We send men there frequently who are the creatures of corporations. But if you express your wishes directly to your Congressman I am sure—I am sure Mr. Hayes for one will do your bidding, regardless of the corporations. I am sure in every part of this State and Union, if the people themselves say what they want done, and say it as though they meant it, the people in Washington will do it.

I sometimes think of a little occurrence at the Stanford University when I first went there. I never had heard a college yell before. When I was eating my lunch I heard something like this: "We want our pudding!" The boys got their pudding. If you say that in that same way, that hearty way, "We want the parcels post," say it altogether, they will hear it in Washington and they will give you the parcels post.

MR. JUDD. I thoroughly indorse what Mr. Berwick has said as an educational measure, but I don't know that we have any means now of enforcing our wishes in this matter—absolutely no means. I want to call attention to another matter, and that is we want the direct election of United States Senators. Have we got it? No, sir. And it may be a quarter of a century before we have it. If we had power to enforce it we would get it at once.

MR. BERWICK. My college yell seems to be questioned, whether it would be effective or not. As a college professor I do not highly approve of it. But I have heard of a process called hazing; that might be effective with regard to this question, possibly.

MR. WORTHEN. Where did this movement originate, and how long has it been agitated in this country?

MR. BERWICK. As far as my personal knowledge goes, it began in Los Angeles in May of last year. I read a paper there which was entitled "The Fruit-Growers' Wants and Desires." We held a meeting subsequently and organized the "Postal Progress League of California." Mr. Dore of Fresno was secretary, and they insisted on making me the president. I have spent a good deal of my own money and incurred a great deal of odium, particularly in San Francisco. Some persons there don't want it. They say it would hurt the country merchants. That is the excuse they make. I have tried to show them that it would not hurt the country merchant; that it would benefit him. I wrote to a friend in Europe to ask what the effect upon the country retail merchant was, and he wrote me that if it were abolished it would be a great loss to us; he did three times the business on the same old capital. As I told you in my paper to-day, and the jobber of San Francisco, it would help retail merchants in the country, but it might hurt somebody sometimes; but ultimately it benefits the whole country, and particularly the fruit-growers, and they are a large part of the country here. It would tend to make the whole country prosperous.

I told them this for one thing. I said to them that they speak about sending goods from Chicago here at a small rate, ruining the retailer's business. In San Francisco to-day the principal stores are sending goods out a hundred miles actually free of all transportation charge. San José to-day is a better city; it has better stores than ever before in its history. If free delivery from San Francisco to San José does not hurt San José, surely a two-cent delivery will not hurt San José. If you want a hundred pounds of stuff from Chicago, you can get a rate of \$2.60 per hundred by freight. If you want only eleven pounds you have to pay for a hundred pounds. Supposing I want to send to Chicago for eleven pounds. It can not be sent by mail; they do not admit more than four pounds by mail. By express it would be exceedingly costly from Chicago. The cost of eleven pounds from Chicago, or from the Pacific Coast to New York, would be \$2.35. For \$2.60 I can get a hundred pounds sent from Chicago here. What do I do? I look over the catalogue and I find eight more articles that I want that can be shipped, and instead of one article I have sent nine articles, making ninety-nine pounds, at the same cost. Is not that obvious?

The express companies have arranged to carry for the British public between New York and California, at the rate of $2\frac{2}{11}$ cents a pound. They are carrying for the British public to-day at that rate.

QUESTION (by a member). What is the postal rate for a four-pound package from New York to San Francisco?

MR. BERWICK. Sixty-four cents. And they are carrying for the British people eleven pounds for $2\frac{2}{11}$ cents per pound. The express companies must be making a profit at that figure. If they can do that for the British public, surely they can carry it for the American people for as little as they can for the British. The express companies carry from Great Britain to New York for 72 cents, across the Atlantic, and the same package from New York to San Francisco for 24 cents additional.

MR. BOOTH. Mr. Chairman, I wish to say a few words and give you a little experience of my own. I had a German working for me who wanted to send to Berlin, Germany, for a rifle. It weighed about eleven pounds. They brought that rifle from Berlin to Sacramento for 50 cents, for I received it from the office and paid the charges myself. At the same time, to satisfy myself, I sent to John Wanamaker for a parcels post package to weigh as nearly eleven pounds as possible, and they charged me \$2.68 for carrying it from New York to Florin.

PROF. FOWLER. I want to say just a few words on this subject from personal observation. Following out what Mr. Berwick has said with reference to the cost and this convention with the British government, I lately had a parcels post sent from Manchester, England, weighing eleven pounds, to me at my home in Oakland. It was

delivered to my house by Wells, Fargo & Co.'s express. I happened to live just outside of what we call the dead line. In other words, they do not deliver free of charge outside of certain lines. They usually send me a postal notice to call for my express packages, but in this case they delivered to my house. It cost me \$1.24. It was for the interest of the British citizen, not in the interest of the American citizen. We are paying the express companies for the privilege of carrying our own express a higher rate than they charge the British people. Are they doing it for nothing? No, sir; they are doing it for a profit. It all comes down to just exactly this question of the parcels post, the question we ask here. When the parcels post was first advocated I remember that John Wanamaker was in the cabinet as Postmaster-General under Harrison's administration. He had a bill introduced. That bill was put into a pigeon hole, and it is in there yet. John Brisbane Walker asked the reasons why it could not be passed. Mr. Wanamaker said it could not be passed for four reasons. What are they? Well, first the Adams Express Company; second, the Southern Express Company; third, the American Express Company, and fourth, Wells-Fargo Express Company. These are the reasons why that bill could not pass through the American legislature.

MR. HARTRANFT. I know that Mr. Berwick has been doing a good work in this line of the parcels post, and it was through his efforts that one of the most dangerous men to the interests of the parcels post was prevented from going to Rome to the International Postal Congress. I also know that the Postoffice Department has been forced into a corner and has put itself on record in one of the most untenable positions that it could be expected to hold. The Postoffice Department, in answer to Mr. Berwick, has referred him to the fact that the express companies would give private rates to large shippers of commodities. In other words, our Government tells us—our Postoffice Department writes to us here in California—that that most vicious practice, the giving of rebates, is advisable and available to us. Now the parcels post will bring us a uniform flat rate. And the Postoffice Department is offering, suggesting, and recommending the irregularity, the necessity of the secret rebate proposition which the express companies offer. The parcels post insures us an equitable and just rate.

MR. WORTHEN. I am much encouraged by what has been said here to-day regarding the parcels post. The National Grange has been advocating this matter of parcels delivery, and I know when I was in the State Grange I advocated this, and every State Grange in the United States during the past year has passed resolutions favoring this measure, along with other measures for which they have been working for the last ten or fifteen years. And some of them are about accomplished. They will continue to work for all these measures until they

have succeeded. I was glad when I took up the Grange bulletin to find Mr. Berwick's article in it, and I thought we were having help in California. I was called upon some weeks ago to write to members of the National Grange in this State to pass resolutions favoring this project—to favor those resolutions. I was glad to see that they were all aware how important this subject is. You may rest assured that the Patrons of Husbandry will continue to work for this measure in the same way.

MR. BERWICK. Sometimes I am proud to be an American citizen, but I do not like to be held up at every turn by my own Government. It does not please me when I find the railroads are carrying for the British public at one fourth the rates they are for us. It looks to me exceedingly like what, in plain words, we would call highway robbery. You can say what you like, the thing is being done to-day. There is no mistake regarding it. They actually carry for the British public for two and a fraction cents per pound from New York to any point in the United States. If they can carry for the British for that price they certainly can for us. I dislike exceedingly in being held up at every turn on behalf of my own Government. It is not right. I want to kick myself because I am the people, as I was telling you. We should all realize that we are the people. It is of no use to blame Mr. Roosevelt or any one else. Blame yourselves. It is because you do not do your part in the government of the people and by the people. This would be very soon established if you did your share in the government by the people.

PRESIDENT COOPER. I will now announce the Committee on Resolutions, as follows: John Markley, John S. Dore, B. F. Walton, Edward Berwick, and A. N. Judd.

A recess was then taken until 9:30 o'clock to-morrow morning.

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, December 7, 1904.

The Convention was called to order at 9:30 A. M. President Cooper in the chair.

PRESIDENT COOPER. A gentleman in the audience moves that a vote of thanks be extended to the ladies of the San José Grange for the splendid reception tendered to us last night by them. I declare the motion carried.

We will now hear the report of Mr. Alden Anderson, manager of the California Fruit Distributors.

REPORT OF THE CALIFORNIA FRUIT DISTRIBUTORS.

BY HON. ALDEN ANDERSON, MANAGER.

Mr. President: It is with more than ordinary pleasure that I furnish at the request of the President of this Convention, a statement of Eastern deciduous fruit shipments from California as compiled by the California Fruit Distributors, for the season of 1904.

This feeling arises, first, from the fact that I was out of the State at the time of the holding of the last convention, and was denied the pleasure of attending in person; secondly, because of the fact that there have been some criticisms made, mostly by insinuation, of the organization of which I have been manager, by those not affiliating with or doing business in any way with the same, which were wholly uncalled for. So far as I know, there has been no complaint whatever on the part of any grower, coöperative association, or shipper affiliating with or doing business through the company, on any matter involving a question of honesty of purpose or of detail of management. Therefore, in presenting this report in person, I reiterate all that has been heretofore declared as to its purposes and procedure, and challenge any one to deny the truth of any assertion made in connection therewith. I reiterate what I have stated frankly in former reports, that the association is not connected with and has no arrangement with any transportation or refrigerator company, or with any box factory or paper company; that it does not purchase fruit in any way, shape, or manner, but is a clearing-house for the shipments of associations or shippers affiliating and ship-

ping through it, with the sole aim and object of giving their products an even, careful, and wider distribution to the different markets throughout the country; and also endeavors to secure a fair degree of remuneration for their products. It has not sought by argument or coercion to add to its strength, and all its members affiliate voluntarily.

Regarding the past season and the shipment of fresh deciduous fruits, I regret to say that it has not been a propitious one, principally because of adverse climatic conditions. At the time of the blossoming of the trees, we had continuous and heavy rains which washed the pollen from the bloom and prevented fertilization, with the result that fruit did not set well, and in many of the heavy shipping districts there was the lightest general crop ever had; while in others, some varieties were full and other varieties were a complete failure. This lack of variety of assortment made it difficult to supply and control markets that had heretofore looked almost wholly to California for their supplies. This was particularly true of peaches, there being shipped this year only 559 cars as against 1,867 cars last year.

Peaches.—The quality of the peaches that were shipped this year was not up to the usual standard, and the consequence was that many patrons turned their attention to the peach-growing districts in the South for their supplies, and the scarcity of peaches here for shipment resulted also in a curtailed outlet in outside markets for other varieties of fruit that would have gone in the cars, of which peaches would have been the chief assortment.

Cherries.—The crop of cherries was practically about the same as that of last year. When the season was well under way, a very heavy north wind bruised the fruit remaining on the trees, so that the rest of the shipments did not realize the prices that the market conditions and the quantity of supplies would have justified.

Apricots.—Owing to the marked shortage of this variety of fruit in the early shipping districts, there were only shipped 97 cars as against 241 cars last year. Prices were satisfactory for those shipped.

Plums and Prunes.—There were shipped 1,053 cars as against 1,145 cars last year. On the whole, returns for this variety of fruit were satisfactory.

Pears.—The total number of cars shipped was considerably in excess of that of last season, and the excess was wholly in Bartlett pears, fall and winter varieties being about the same quantity as last year. There was more competition in this variety of fruit than has been the case for a number of years, and the bulk of it was shipped at a time when there were heavy supplies of Southern fruits. The markets became demoralized, and returns generally were not good or satisfactory. However, the greater quantity of this fruit was purchased by shippers and the loss did not fall upon the growers.

Grapes.—There were shipped 1,451 cars of grapes as against 1,804 cars last season. The unusual and excessive rains of September were responsible for a shrinkage of 800 or 900 cars in the total volume of grape shipments that would have been made, and seriously affected the prices received for all the grapes shipped after the heavy storms, as the berries absorbed so much moisture that when they were packed in cars for shipment they developed much decay.

The following statement of shipments beginning May 13 and ending November 26, 1904, gives in actual figures some ninety per cent of the shipments, and estimates of the balance, as gathered for statistical purposes by this company, and same is correct within a very few carloads of all varieties:

Cherries.....	209 cars
Apricots.....	97 "
Peaches.....	559 "
Plums and Prunes.....	1,053 "
Pears.....	2,186 "
Apples (all shipments not included).....	43 "
Figs, Nectarines, Quinces, etc.....	28 "
Grapes.....	1,451 "
	<hr/>
Total.....	5,626 "

Railroad Time.—The time given by the transportation companies up to the point where happened unusual and bad washouts on the southern routes, and occurred the excursions of the Knights Templar and Odd Fellows to San Francisco, was better than last season. After the incidents above mentioned, service was about on a par with that of last season.

This year only five cities were added to the list of carload distributing points, and no greater progress was made in that direction on account of lack of variety of assortment for the loading of suitable cars for the smaller cities.

MR. ANDERSON. I would state that this is the report of the California Fruit Distributors, which has been asked for by the President. I presume it was asked for because it is the only firm in the State which compiles figures, or attempts to do so, regarding fresh deciduous fruit shipments.

PRESIDENT COOPER. Next will be heard the report of the Committee on Transportation, by Mr. Stephens, chairman.

REPORT OF THE FRUIT-GROWERS' COMMITTEE ON TRANSPORTATION.

MR. STEPHENS. I will state, before I read the report, that the committee stands as it did last year, so far as membership is concerned. Upon this committee is Mr. Alexander Gordon, Mr. A. N. Judd, Mr. Alden

Anderson, and Mr. A. H. Naftzger. Drafts of this report were sent to all the gentlemen on Friday last. The outline of the report was not made until then and was sent out at the earliest possible time. It was announced that a meeting would be held at the Palace Hotel in San Francisco on Monday last, any time before two or three o'clock. Then the members were notified that, if they desired, an opportunity would be given here in this city to hear suggestions concerning this report. Therefore, this report represents the sentiments and opinions and ideas of a majority of the members of the committee. Mr. Anderson did not report, nor did Mr. Naftzger. The reasons why, probably, are better understood by those gentlemen than by myself.

To the Honorable Chairman and Members of the Fruit-Growers' Convention:

Your Committee on Transportation begs leave to submit the following report:

We, the undersigned, members of the Fruit-Growers' Transportation Committee, believe the private ownership and control of refrigerator cars used for shipment of California fruit to be inimical to the interests of the fruit-growers and shippers, as affording an opportunity for discrimination and favoritism.

All cars and other transportation facilities should be owned and controlled in every particular by the railroads, and all shippers should have equal facilities and be upon equal terms.

We, therefore, in this public way, record our earnest protest against the renewal or extension of existing contracts with the refrigerator car lines now engaged in this traffic, or the making of any similar contracts with any parties whatsoever.

We make further objection to the private ownership and control of these refrigerator cars, as having the effect to maintain excessive refrigeration rates.

The fruit-growers, those who are not engaged in the shipping and marketing business, are irrevocably opposed to the private ownership and control of the cars in which their products are shipped. They believe the time has come when they should be relieved from paying heavy tribute to this, the worst of all monopolies. The power of such a monopoly is so great as to subordinate all other interests connected with fruit-growing in California, and such that it can at will control the distribution and marketing of a very large percentage of our fruits sold in Eastern markets.

Unless the fruit-growers organize for the purpose of using, and with the full determination to use, all means within their power to bring the necessary relief, they can not successfully counteract the influences of any evils that may have been, or may be inflicted upon the fruit-growers and people of the State by such a monopoly.

Refrigeration has been the bane of the fruit-growers of California. It has done more to retard the progress and prosperity of this State than all other things combined, for the reason that it possesses the power to almost wholly, if not quite, control the marketing of its fruit products.

Profit for fruit transportation should all be included in the freight charges alone, and such charges should be reduced to the minimum, so that no favoritism could possibly be shown to any, thus placing all interested upon an equality.

In regard to the time occupied in the transportation and delivery of our fruit to Eastern destinations, we reiterate all that we said in our memorial upon this subject for the season of 1901, and earnestly pray that the time agreed upon in May of that year between the growers and the railroad companies, six days to Chicago and similar points, and nine days to New York and similar points, be put into full force for the coming season—1905.

The Southern Pacific Company then, through its proper department, informed the fruit-growers of the State that it had arranged with its connections for a time-schedule on deciduous fruit from northern California, as follows:

By the Southern Pacific to Ogden, 60 hours; by the Union Pacific and its connections, 84 hours to Chicago, of which 24 hours would be consumed from Council Bluffs to Chicago; a total of 144 hours, or six days.

East of Chicago, the time would be about 60 hours; the trains would leave Chicago in the afternoon of the day of their arrival there, and arrive in New York on or about 4:30 A. M., third morning, thus giving a nine days' service to New York and like destinations.

Like assurances have been given every subsequent season, although in not quite so formal a manner, but never carried out, with few exceptions, yet sufficient to show that it is within the ability of the transportation companies to make the time promised and agreed upon between them and the fruit-growers in 1901.

Now, it frequently happens, that cars are out from fourteen to sixteen days, sometimes more, before being sold in New York and like destinations.

Give to the fruit industry of California such a service, and eliminate the private car lines, the thing which is paramount to all other things that can be done, and you will promote the interests, not only of the fruit-growers, but also of the State.

The adoption of a reasonably fast regular time-schedule service in the transportation of our fresh fruit shipments is second only to the elimination of all private car lines from the business.

We favor—

1. The application of the provisions of the Interstate Commerce Act to "all transportation of interstate commerce over any or all lines of railroad," and their connections.

2. The establishment of a court of interstate commerce, clothed with powers to enforce summarily the orders of the Interstate Commerce Commission, and the laws forbidding carriers or shippers to give or receive rebates, concessions, or discriminations. Such court is to concern itself solely with interstate commerce cases, and shall have power to enforce its orders by writ of injunction, attachment, or other process. It may act upon the application of the Interstate Commerce Commission, or any aggrieved person, and may punish violation of its orders as contempt of court by a fine of not more than \$5,000 or imprisonment for not more than one year.

3. That when the Interstate Commerce Commission decides that a rate is unjust, "it shall be the duty of the Commission, and it is hereby authorized and empowered, to fix a rate in lieu of the rate that has been found unreasonable and unjust."

4. That "every order issued by the Interstate Commerce Commission shall become effective and be obeyed by the carrier or carriers on and after the dates specified for compliance in such order." That if the carrier appeals to the interstate commerce court from such order, it shall be enforced pending the hearing of the appeal, unless, in the opinion of the court, the order is clearly unjust, when it may be suspended. Also, that when an appeal is made from the interstate commerce court, to the Supreme Court of the United States (which may be made upon constitutional grounds alone), "during the pendency of any appeal, neither the order of said court nor the execution of any writ or process shall be stayed or suspended."

And that this proposed legislation covers private as well as all other car lines. Adopted by the following vote:

ALEX. GORDON,
A. N. JUDD,
R. D. STEPHENS,

Members of the Committee on Transportation.

MR. ANDERSON. I would like to ask who had the appointment of this Committee on Transportation? At the time of the last Convention I was out of the State.

PRESIDENT COOPER. The committee was appointed the year previous by myself.

MR. ANDERSON. No notice of any kind or in any manner was ever given to me of this, and this is the first intimation I have had, when I received this document, which says, "Copy of the report of the fruit-growers' transportation committee." I had never been invited to

attend the committee. Now, Mr. President, I ask that I be allowed to file a minority report. I will do so orally, if the reporter will take it. My minority report is this: That this Convention reiterates everything that we have ever said or done in the way of demanding a regular and expeditious service for the transportation of our fruit to the East. That this Convention directs its President to communicate with our representatives in Congress, asking them, or requesting them, to work for the passage of an act or bill that will make it criminal and unlawful for any private car line, or any other line, to give rebates in any way or manner. (Applause.) I think, Mr. President, that will cover the matter fully in my report.

MR. JUDD. I want to make a motion to adopt the report of the minority as an amendment.

PRESIDENT COOPER. The motions will not be in order now. We will take them up as they appear on the program. The next on the program will be a paper by Mr. F. W. Crandall, on "Cured Fruit Marketing, at Home and Abroad."

CURED FRUIT MARKETING, AT HOME AND ABROAD.

BY F. W. CRANDALL, OF SAN JOSÉ.

The subject of this paper has been handled by so many different people, from so many and varied standpoints, and with so little beneficial results from its discussion, that it seems almost like an idle dream to burden this Convention with anything further on the subject; yet when we consider that at its very door lies either the success or the failure of the great dried fruit interests of California, it seems that at least another attempt to bring about better methods than are now in vogue might possibly be excusable.

One of the strange features of this question is, that those who have been in the business longest and handled the greatest quantity of dried fruits are the very ones who are the most fearful and reticent on the subject of marketing. And well they might be, for unlike almost any other feature of the business, long experience, accurate statistics, and careful planning seem to go for naught.

Take, for instance, the prune crop of last year. Statistically, California prunes never stood in a stronger position, and yet, without any apparent reason prices went to pieces and heavy losses were sustained, not only by those who handled this class of goods on the Pacific Coast, but also by the dealers in the United States and various markets of Europe. Whenever any class of products is so handled that the parties handling same lose money, even though they have been fully paid at the full market price for these products, we will lose in the end, for

these same parties will take good care not to purchase goods unless at prices which are such that no possible loss may be incurred.

This may be better realized when we take into consideration the extremely low price which we received for our prunes this present season; prices so low that I know of many instances where the grower not only failed to receive anything for his investment, but the returns were only sufficient to pay for the picking, drying, and delivering of his products. This can not go on for long, or it would ruin the entire prune business of the Pacific Coast.

It is not my purpose to belch forth a tirade of abuse upon the handlers of our products in our own United States, for frankly I do not think the fault lies with them so much as with our own disorganized and unbusinesslike methods. I do not know of a single product that is handled in such a grossly incompetent way as are our prunes and dried fruits. But no one seems willing to accept the responsibility of our present methods. My own experience is that those who have never marketed a pound of prunes are more profuse with their advice and *absolute sure-go methods* than are those who have had years of experience. In fact, there is scarcely a grower delivering prunes to any packing-house who will not voluntarily give you a panacea which he will swear, if carried out, will rectify the present disastrous results which we have been getting in our markets.

The one-pound package scheme has been quite thoroughly exploited, and while it has many features to recommend it, it has other features which render it entirely impracticable on a large scale. Establishing packing-houses in the various large cities of the East, controlled and operated by California growers' organizations, is another suggestion which, on its face, might seem practicable, but it would, no doubt, bring disaster to our trade should we undertake to carry it out. Frequent suggestions are made to do away entirely with the fruit broker and sell direct to the jobbers. Experience in other lines will tell us that this is not practicable. And so we go from one idea and suggestion to another and are still at sea and apparently no farther advanced in our marketing methods than we were twenty years ago when the business was in its infancy.

I have never changed my mind one iota in regard to the Cured Fruit Association. I believe if this association, which was organized and which went to pieces with such seeming disaster to a large number of subscribers, had been properly supported by the growers, it would have solved the question of marketing our goods. One thing seems quite certain, and that is, that nothing will ever succeed in this direction unless the entire marketing is centralized and passes through the hands of a competent committee, and that every package of our prunes must have stamped thereon its quality, carrying a guarantee to the trade

that if it is otherwise than as represented, the entire prune trade of the Pacific Coast stands back of it and will make it good. This would give great confidence to the trade and would, no doubt, save hundreds of thousands of dollars on losses, rejections, or expense in marketing.

Then again, at the present time no one knows what the other fellow is doing; therefore, instead of distributing our prunes in a reasonable way to the various markets of the United States, sending to each market just what the trade would be able to handle in that locality, we get in and literally jam some of our markets full of prunes, causing a stagnation and oversupply to such an extent that it fairly sickens the trade, so much so that they do not want to see any more California prunes, while other markets have none with which to supply their trade, which legitimately should use carloads.

But, you say, this would deprive each grower or individual packer of his right to do and transact his own business. Granted; but what is business for if not to make a reasonable profit on business done? For my part I would much rather handle business through some organized head and make a reasonable profit on whatever business I transacted, than to sell thousands of cars individually to various markets direct and make a loss.

Then again, in our present disorganized condition it is impossible for us to ascertain in any reasonably accurate way what quantities of fruits we have to offer; that is, to get an estimate of the stock on hand. I have found it almost impossible, when I have been on a committee to get statistics, to obtain such information from the growers that was at all reliable, most of them seeming to be very reticent or afraid to give out any information whatever. And yet such information was absolutely necessary.

In a local way I might refer to one of our coöperative packing-houses—the Santa Clara County Fruit Exchange. I heard some complaint on account of losses sustained by this institution for holding a portion of its product until prices dropped, so that a large loss was the result. Permit me to say right here that had this institution control of the entire product of California instead of the small holdings which are contributory to it, a very different story might have been told.

My long-cherished hope has been that some organization of some kind would come into existence that would include every grower on the Pacific Coast, and through such organization I believe our industry could be placed on a strong, paying, business basis; but until something of that kind occurs we may expect results similar to those which we have been getting from time to time, which are, to say the least, very unsatisfactory, if not such as will eventually prove fatal to our fruit interests.

It has been my pleasure very many times to have visited the trade in

nearly every one of our States, and to study the markets and marketing conditions with a view of obtaining better results than we have been getting. I have also extended my visits across the waters, visiting the principal markets of Europe as well, and I am led to believe by close investigation that if business methods were applied to our prune industry (that is, to the marketing of it), within the boundaries of the United States alone sufficient markets could be found at remunerative prices to consume every pound of merchantable prunes produced on the Pacific Coast.

I will give an illustration of an instance which, from actual facts, might be repeated in every large distributive center. We will assume there are three wholesale grocers, each one under ordinary circumstances able to handle five cars. In July or August one of these concerns places an order, we will say, for three carloads at a 3-cent basis, which is the asking price of the California packers. Within a few days a broker representing some other establishment waits upon the trade, and being unable to place his offerings at a 3-cent basis, draws an offer from one of the other grocers for, say, three cars at a $2\frac{3}{4}$ -cent basis and submits it to his California correspondent. After several exchanges of telegrams a deal is finally consummated whereby the packer sells his three cars of prunes to Grocer No. 2 at a $2\frac{3}{4}$ -cent basis. Then again within a few days a broker representing still another packer on the Coast calls upon the trade, and Grocer No. 3 makes an offer for three cars of prunes at a $2\frac{1}{2}$ -cent basis, and again after several exchanges of telegrams he purchases his needs for this price. Now the result of this is, that Grocer No. 3 can enter the field and sell prunes at a price less than Grocer No. 1 paid for his, and still make a good profit on his investment. This causes both Grocer No. 1 and Grocer No. 2 to be considerably soured and incensed at the prospect of losses, and the chances are that when their purchases arrive, in order to save themselves from financial losses, they will reject the goods on some pretext or other, and the parties selling same from the Pacific Coast are forced to make delivery at perhaps the same price as Grocer No. 3 paid for his prunes, or in some cases, the market having still further dropped, at a still less price.

And who is to blame for this. In a disorganized condition, as we are to-day, we have no strong organization to stand back of these shipments to demand delivery at the price at which they were sold; therefore, we are at the mercy of the Eastern trade. This not only has the effect of losing money on these individual transactions, but it has a more far-reaching effect than this. Where such uncertainty exists the grocers and jobbers are not inclined to push the trade of distributing prunes to any great extent, and in many cases I have been informed by these very grocers that they instruct their drummers to offer no prunes to the retail trade, and to take orders only when the trade calls for

them. Therefore, there is no inducement or argument brought to bear with the retail grocer which will induce him to stock up with our prunes or dried fruits, and, not having a stock, he in turn will not bring pressure on the customers to purchase. This seems to be the general condition all over the country so far as I have seen, and instead of there being a strong prejudice, as many seem to think, against our prunes and dried fruits, the prejudice exists against our business methods of handling them, and you would note a very prompt reversal of this prejudice if we should so change our business system that jobbers in the East could know for a certainty that they would be protected in their purchases, at least until ample time for delivery was given.

Years ago, when prunes were sold at a certain basis price, it meant that a delivery would be made counting each grade on the five point; that is, 40-50's should count 45, and so on down the line. It may be expected at the present time that such shall be, but such expectations will not, in many instances, be realized. There is now a range up to and including the nine and one-half count. The packer offering prunes at a 2¼-cent basis on the nine point may offer a certain combination of sizes for a quarter of a cent less than the packer who offers on the straight five point. This not being understood by many of the jobbers, it is often misleading, and quotations are passed along the line which only tend to pull down the basis price to a lower notch, simply because some packer, with his great anxiety to do business, cuts on the count. Until this and many other kindred evils are remedied, honorable packers are at a great disadvantage in the trade.

At another time the grower often spoils the prospects of doing a legitimate business by consigning a number of cars to some irresponsible firm or broker, who promises great and wonderful results before these consignments are made, but who almost invariably after the goods arrive writes a very nicely worded letter regretting, oh so much, that the market has gone to pieces and that in order to save the dear shipper large losses these goods must be sold for whatever they will bring at the time, and you can always count on their bringing from a quarter to a cent a pound less than the shipper had reason to believe his product would bring when arrangements were being made for shipping same. These goods going onto the market come in direct competition with the legitimate offerings, and being spot goods, from which the smaller trade can draw supplies without the necessity of waiting for shipments from the Coast, have a very demoralizing effect on the market. These examples might be multiplied without number; but so far as the general conditions are concerned, these are some of the more formidable obstacles which we as packers have to overcome.

I found in Europe that the principal complaint was on the part of insecurity of package. Boxes in which the fruits were shipped were

not strong enough and in many instances were badly broken, permitting a portion of the prunes or other fruits to be fingered out by the freight handlers and in many instances causing a loss of very many pounds on a single shipment. Dishonest methods also regarding count and quality are resorted to in some instances, and with the very alert eye of the customs authorities, as well as of the buyers of these goods, any shortcomings on the part of delivery will be taken advantage of. While a large quantity of our prunes are purchased in Europe each year, from the best information obtainable I believe that these transactions are only profitable to us here from the fact that it relieves our local markets of supplies which otherwise would be difficult to place. Not that prices received for these goods abroad fully justify all the additional expenditures necessary to make such shipments and to make the remittances, with all charges which are incidental to such transactions. However, under honest handling, I believe the consumption of our dried fruits can be extended almost beyond our capacity for production. Generally speaking, they are looked upon as very satisfactory in the channels of consumption, so far as I was able to ascertain.

Much more might be said on this subject, but I will not trespass upon the time of this Convention for a further discussion. I trust, however, that something may be done along these lines that will remove the very many obstacles with which we now have to contend in the marketing of our fruits, and I will again repeat that it is my honest opinion, and I believe it will be shared by every member of this Convention, that nothing that will amount to anything can be done until there is some perfect organization having control of the marketing and packing of our California dried fruits. In some cases I know where our prune-growers have agreed to deliver prunes for from \$2.50 to \$5 a ton less than the actual cost of dipping and curing and delivering same.

I wish to call attention to the fact that a machine will be here for your inspection that will pack prunes in boxes in sections instead of in layers, and also a machine for pitting fruit, which seems to be a marvel of perfection.

FRUIT TRANSPORTATION.

BY PAUL SHOUP, OF SAN JOSÉ.

I beg to thank the Convention for the courtesy expressed in your invitation to submit an article on transportation from a railroad point of view.

It is believed that a fair knowledge of one another's difficulties in the work in which we must cooperate will lead to a better understanding. It is keenly realized that our limitations as carriers affect your limitations as producers. If we could lightly waft the sunshine fruit of Cali-

for California from the producer to the consumer's mouth, at an airy trifle of cost, we would gladly do so; for your prosperity is the prosperity of your home railroads. The backbone or the substance of a section lies in the maintenance and increase in wealth and population; and this very prosperity of yours is the mainstay of the railroad's existence, and is expressed in its earnings. In the transportation of your fruit East, the railroads can not provide ideal conditions; the best that they can do is to do the best they can and to submit for your fair judgment their work in overcoming adverse conditions, just as you work in your business against such conditions.

California is geographically isolated. It is hemmed in by the ocean, the mountains, and a half-awakened desert.

You require of your railroads that a peach or a pear or a plum, fresh from the tree, be transported three or four thousand miles over the highest mountains, across the greatest wastes in the United States, and be placed in the lap of the consumer as delicately fresh, and more beautiful and luscious than the fruit that grows in his dooryard. A century ago this would have been a task for Aladdin's lamp; but I am afraid then that some of our friends would have found fault with the lamp—perhaps it *was* smoky!

In a general way, the fruit-growers and the railroads must work together to overcome the difficulties they face. These difficulties are the great distance of California from its fruit markets, the perishable nature of the fruit, and the coincidence of the Eastern demand with the ripening of the crops—as in the case of prunes, making loss of time a loss of market.

The railroad which I serve has been attacked for the things it has not done. I beg your indulgence to point out some of the things it has done, in order that you may know of adverse conditions already met and conditions as they are.

From the official reports of the Southern Pacific, I find that between June 30, 1900, and June 30, 1904, the Southern Pacific spent for equipment, including 362 locomotives and 12,476 freight cars, \$22,979,000. You wanted faster fruit trains, more engines—you have them. The State needed more cars for fruit, for grain, for cattle, for what not—it got them. In reconstruction, chiefly on the highway for green fruit, Sacramento to Ogden, has been spent \$29,000,000. More powerful engines, moving at a higher speed, made a corresponding track and roadbed necessary. They were furnished, and permanently furnished to meet the demands of freight traffic. New yards, new terminals, new steamers—these were necessary, and they raise the total expense of improvements within four years to over \$72,000,000. Perhaps some of you think this was paid out of the earnings of the road. Then the road would be in the position of a merchant whose business forces him to

put his profits into stock every year. The Southern Pacific did not fare so well. At a specially called meeting of the stockholders, July 20th last, they found it necessary to vote to sell \$40,000,000 worth of preferred stock because of these improvements; in short, to borrow \$40,000,000 more to meet these expenditures. Red-ink returns are not liked by fruit-growers, but it is not all one-sided. You see that stockholders of railroads sometimes get red-ink returns, too.

Those of the Southern Pacific had no dividends for years and have decided it advisable to increase their obligations very largely besides; and the present owners paid roundly in cash for their stock, as Judge Lieb, if he be present, can certify. Now, if none of you had received any returns from your orchards for four years, and were now called on for additional money—one half of your first cash investment maybe—you would feel that for a little while you had done your share.

But I am not here to plead poverty for the Southern Pacific, rather to show you in these figures and in pursuit of a wise and conservative policy, that the owners of the road have spent millions upon millions of dollars to better your transportation facilities.

To this, I shall refer once again, later on; but I know that you will be interested in learning what expense the railroad has been put to already in improving your service in connection with other requests you have at hand to consider. Daily contact with shippers for the last three years has taught me that our fruit shippers, above all other things, want service, quick service East—want it above any reduction ever suggested in freight rates.

The principal reason in referring to these expenses is that some of our fruit-growing friends think we should add a line of refrigerator cars to our equipment. I will say that 26,173 freight cars belong to the Pacific Coast service of the company; all told, we had 43,756 freight cars. If the Southern Pacific discontinues present relations with private car lines, it must provide, to be on the safe side and allow for the lame, halt, and blind, 7,000 refrigerator cars to move 17,000 or 18,000 cars of citrus and deciduous green fruits. It is asked to add one sixth to its freight-car equipment of cars not suitable for other traffic to take care of business in citrus and deciduous green fruits. This, though important, because it is through business, represents only one per cent of the tonnage of all kinds of freight handled by the Southern Pacific.

The private car lines now used operate over the majority of the railroad lines of the United States. To replace them on our line increases the equipment unnecessarily. Refrigerator cars are quoted at \$1,200 each. Seven thousand would cost something like \$8,000,000. The interest charges and taxes would be not less than \$500,000. Of course, all these would not be required to handle deciduous green fruit alone, but they would be required, if there was a break with the private car

lines, to meet the wishes of deciduous green fruit shippers—and, gentlemen, the total gross revenue to the Southern Pacific from all the green fruit sent East under ice during the past season would not meet the interest charges, repairs and taxes on this equipment. I do not believe that any fair-minded business man in this audience will take issue with that statement, in view of what has been noted, and what is to follow. .

For I want to say to you here plainly that if we assess to green fruit, citrus and deciduous, moving East, its proper proportion of charges—maintenance of way, conducting transportation, mileage on cars, general expenses and taxes—there would be no net revenue to the Southern Pacific from the movement of green fruit. In this statement I waive all interest charges, all returns to stockholders from their investments. It is profitable to the Southern Pacific to handle green fruit only because its roadbed and engines, supported by other earnings, are present; and green fruit transportation, at the present rates, is thereby made feasible. This is not a wild statement. You have required of us a schedule of sixty hours, Sacramento to Ogden, on your green fruit. Our average time last season was sixty-one hours. In order to make the time, our average trainload from Sacramento to Sparks was twelve cars; from Sparks to Ogden the number was increased about fifty per cent. These trains had to be run on a comparatively fast schedule. They had to be lifted up over mountains and set down again with promptness. Then, because not built to handle other freight with advantage, and because they had to be rushed to green-fruit stopping-points, when returning westward, fully seventy-five per cent of the refrigerator cars were brought West empty. The dead weight or tear of a refrigerator car is about eighteen tons, or four or five tons more than a box car of same space capacity.

The average weight of a green-fruit carload from San José during the last season was 12.15 tons. Then we must secure 12 tons of paying freight, carry a dead weight East of 18 tons of car, 4 to 5 tons of ice, and carry back seventy-five per cent of the 18 tons deadhead, or $13\frac{1}{2}$ tons. If all freight required the movement of the same dead weight over the line, $35\frac{1}{2}$ tons to 12 tons of freight, and that on quick time, what do you suppose the result would be?

In presenting these figures I have no desire to weary you, but I feel that you are interested in knowing why the management of the road, in justice to the owners thereof, must, as they are conscientious and thorough, handle the subject of green fruit transportation, the most exacting freight transportation that they have to undertake, with caution and much careful consideration.

I hold no brief for any shippers, nor for any private car lines in this matter; yet inasmuch as we are considering this matter of green fruit

transportation from every possible point of view, it is not amiss in passing to note something of the total transportation charges on green fruit compared with the gross proceeds. In the "California Fruit-Grower," from the middle of July until the latter part of September, I counted 209 cars of peaches, plums, pears, and grapes, on which the gross sales in Eastern markets were reported; the average per car being a little over \$1,000. I did not include any cherries, as they were so very much higher in returns than any other fruit. The freight charges on these cars ran from \$300 to \$400, the minimum weight being twelve tons. The refrigeration charges would be from Sacramento and points East, including icing and re-icing of car, to Chicago \$80, and to New York \$100, or if under ventilation to Truckee, \$15 less. The charge from San José, if the car is iced here, would be \$15 more. If, for example, a car containing twelve tons, moved from Sacramento to Chicago, and it paid the full refrigeration charge of \$80, and the freight charge of \$300, and sold for the average named, over \$1,000, then, after the transportation charges were deducted, there would remain \$620, or over \$50 per ton, out of which to pay the balance. The total freight and refrigeration charge would be less than \$33 per ton, or, on a box of peaches, for example, about 34 cents. The refrigeration charge alone would be a little over 7 cents. An inspection of returns indicates to a layman that the great governing factor in the prices of California green fruit in the Eastern markets depends upon the weather, the condition of the fruit upon the arrival, and the demand. Variations in cars only a few days apart in the same market are quite often as great as the freight and refrigeration charges combined.

I do not find that the green-fruit interests of California are harshly dealt with by the transportation companies when comparison is made with their competitors. For example, the green-fruit rate from Atlanta to Chicago is 63 cents for a distance of 733 miles. From San José to Chicago, a distance three times as great, the rate is \$1.25. Further, the Atlanta rate quoted is on apples, and other green fruits are higher. From Little Rock, Ark., to St. Louis, the green-fruit rate is 65 cents, for a distance of 345 miles. From Jacksonville and Taylor, Texas, to Chicago, the rate is \$1.19—almost as great as from San José. Nor do the Georgia peaches have any great advantage in refrigeration charges, distance considered. It costs for refrigeration per crate from Georgia to Chicago, $12\frac{1}{2}$ cents, or \$68.75, as against \$80 from Sacramento to the same market, though the distance is nearly three times as far. For refrigeration, the charge from North Carolina points to New York and Philadelphia is practically the same as from Atlanta to Chicago. The charge for refrigeration from stations on the Frisco system in Missouri, Arkansas, and Indian Territory to Chicago is \$60 per car. I merely cite these instances to show you that Califor-

nia fruit-growers are not alone in having to pay refrigeration charges. Ice in San José is worth wholesale about \$6 per ton, and as four or five tons are put in a car at the start, and it is re-iced as necessary on the road, it is plain to be seen that a very goodly share of your money goes up in vapor.

In the foregoing I have demonstrated to you that the shipper of green fruit pays far less per mile for either freight charges or refrigeration than his Eastern brother does to reach the same markets, though the transportation difficulties are far greater with us than with the railroads in the East. That you are entitled to the most favorable consideration is true. You are a long way from your market, and accept great risks in sending fruit thereto; but, gentlemen, don't you think that as a business organization, interested in the welfare of the people supporting it, because their welfare is its own, the railroad has some troubles as well as the fruit-grower, and that if service is to be maintained to the standard required by you, rates must have some consideration to the end that the necessary money may be forthcoming?

Briefly, then, to recapitulate: The transportation of green fruit East is to us the most expensive freight transportation that we handle, because the quickest time is required; it is necessary to hire cars, each of which can average little better than two trips East per year for us; these cars are of such construction that it is not economy to load them with other freight; they weigh several tons to the car more than the ordinary box car; seventy-five per cent of them have to be deadheaded empty westbound in quick time; the minimum carload of green fruit is the least minimum we have in any California product of any importance; we are required with each car to handle an average of several tons of ice all the way; and yet our rate to Eastern markets, compared with the rates of your competitors in the East to the same markets, are, mileage considered, very much lower indeed.

In passing from the subject of green fruit to dried fruit, I beg first to call your attention to the fact that the freight earnings of the rail lines of the Southern Pacific Company, during the last fiscal year, were 1.014 cents per ton per mile; while on transcontinental movement, via the short line from San José across the continent, our earnings per mile to Ogden would not reach eight mills per ton; and if all of our freight were reduced to the same earnings as dried fruit East per ton per mile, our gross revenue would have been reduced a good many millions of dollars. I mention this because I have heard the statement, which is to me amazing, that out of \$20 per ton revenue for transporting dried fruit across the continent, the railroads clear, above expenses, \$11. I do not know how it is with your connections, but I think that any gentleman who could show our management how to operate at such a magnificent profit would be received with open arms, and be a cause of a

jubilee meeting of stockholders. The conditions governing the movement of dried fruit are only less binding than those that govern green-fruit transportation East. We must, in the fall of the year, bring trainload after trainload of empty cars West from our connecting lines; our shippers require prompt service to reach the market while it is ripe. As many a shipper here can testify, dried fruit is perishable.

It has been declared that we should make the same rates on dried fruits as on beans, lumber, sugar—these are not in the same class at all. They have no such average value per pound, as the dried fruit shipped from California. We know, because we have to pay the claims on loss and damage to freight. Nor would dried-fruit shippers be content with the same service that satisfied the shippers of these other commodities; and on some of these commodities we have connections in the East that consider the rates too low to justify them in participating, though they can operate much more cheaply than the Western road. We do not consider that these lower rates yield us fair revenue; they are forced upon us by market conditions and water competition and we accept them as a by-product. It can be demonstrated to a certainty just how far, and under what rate, we can force the lumber and sugar of California in the Eastern markets. And as yet these products of California have not been able to get into the larger part of the Eastern market. Is this true of dried fruit? Are your troubles due to freight rates, or to something else.

You pay \$20 per ton to get your dried fruit into Boston or New York. The apple-grower in Sedalia, Mo., pays \$12.90 per ton for much less than half the haul. You pay \$20 on dried fruit in boxes to get it to St. Paul. The Sedalia fruit-grower pays \$9.80, though but a comparatively short distance from this market. The dried-apple shipper up in Watertown, N. Y., pays \$4.80 to get a ton of fruit into the New York market, though he does not cross one State. I could multiply these instances endlessly, but it is unnecessary. I think that you will all agree that, distances considered, your Eastern competitors have none the best of it in dried-fruit rates. Further, the California fruit is in a class by itself. The prices are not governed by the prices of the Eastern dried fruit; if so, the prices on prunes this year would not be so low in comparison with the prices on peaches and apricots. The basis price for prunes this year has been less than that of last season, considerably more than the entire freight charge East per pound. Therefore, if the railroad companies carried your products East free this season, they would not be able to put you on last season's basis. The trouble is elsewhere, and I think your advertising committee has the right idea in believing that the great trouble is that you attempt neither to create nor to control the demand, but produce and market your fruit without reference thereto.

Further, every prune in the valley is free, you might say, to compete

in the Eastern market with every other prune. I think I am right in saying that the growers do not even attempt to check up the growing crops, as the Government does the wheat or cotton crops. We are all agreed that something must be done to help the dried-fruit industry, but there is no necromancy in railroad rates that will bring about the desired results. The reduction suggested in the bag rate on prunes from \$1.30 to \$1.00 would, if it accomplished the purposes that the author desires, simply reduce the rate about one third of a cent per pound on each pound of prunes shipped, if they all went in sacks. Prunes in boxes pay about one tenth of a cent per pound less than prunes in bags in freight charges. The statement has been made that the present relations of rates on dried fruit in boxes and bags is responsible for the decrease in prices. When the rate was \$1.40 on both packages, the statement was made that the trouble with the prune market was that a large enough proportion could not be packed at home. Under this rate, prunes dropped in value, between 1890 and 1893, about one half. In September, 1893, the rate was reduced to \$1.20 on prunes in sacks and \$1.00 on prunes in boxes. It was represented in securing this reduction on boxed goods that it was hard to get box shooks in the East; that it did not pay to pack there; and in fact it was impossible to maintain packing-houses in the smaller towns over the country, which would buy one, two or three, or a half dozen cars, if they could get them in boxes ready for the retailer direct from California. It was alleged that consumption was seriously interfered with, because the fruit had to go to the largest centers to be packed, and then pay a local freight rate to reach the consumer. It was claimed that this meant delay, whereas packing here meant getting the fruit to the consumer in the shortest possible time. It was suggested by shippers that the interests of all of the small wholesale grocers over the United States would be increased, if they could get dried fruit in boxes direct from California rather than from a competitor. The railroads were told that any Eastern dealer who wanted his own brand could have it packed here at less expense than in the East. It was stated to the railroads that if the fruit were packed here it would mean protection to the California fruit; that our fruit, being the best fruit, could not be mixed nor made to carry Eastern fruit of inferior quality. Growers claim that Santa Clara Valley fruit should have a premium over all other, or have the preference, and they wanted to maintain their individuality. Growers came with the argument that it was easier to deal with purchasers living here and operating here than if in the East; and alleged that under different conditions the basis price would not have fallen from about 10 cents in September, 1890, to 5 cents in September, 1893, when the rate was reduced.

Gentlemen, which arguments are the railroads to believe? At one time we are confronted with one set of arguments, and later with a different set of arguments, in behalf of the prune industry. Frankly, with the freight rate on dried fruits at the present figures, I do not see how any reduction therein can be your salvation.

We have endeavored strenuously to improve our service to get your green and dried fruit into the market in the best of condition and at the time that the market wants it. I think that therein lies the greatest good that we can do you. The service this year has been superior to any of previous years, everything considered. We promised a schedule on green fruit of 139 hours, or five and four fifths days from Sacramento to Omaha, and the average time was one hour less than that.

In conclusion, I want to take issue with the gentleman who would build a Chinese wall around California. I have said to you that within four years the Southern Pacific Company has spent nearly \$72,000,000 in improving this service, and this has been to take care of business to California. The present owners of the road have not only for four years waived dividends, but have borrowed some \$40,000,000 to improve your service. It is not alleged that this expenditure was for the benefit of California as an asylum in the need of charity, but it was an expenditure made because the owners were strong in the belief in the present and future greatness of California. It does not benefit the State the less for that; in the better service, you as well as the railroad will reap profit. We must not discredit California—that does only harm and no good. There are many interests here, and any newcomer has his choice among them.

Shall you have less faith than the people of the East? Shall you send word to the East that California is a delusion and a snare, and that her present citizens, knowing conditions as they are, should plant unwisely and set up on the hillside and create in the valley thousands of homes amid a dotted paradise, fruit trees that should not be?

F. W. CRANDALL. The citizens of San José, especially the Chamber of Commerce, have arranged for a little side trip over the Interurban Railway, from San José to Los Gatos, by way of Saratoga, for to-morrow afternoon, at 1:30 o'clock. All of those who are visiting this city, if they will report this afternoon, if possible, at the rooms of the Chamber of Commerce, on First street, and show their present transportation, will be provided with free transportation for this side trip over the Interurban. It is hoped that you will all avail yourselves of this side trip.

WIDENING OF OUR FRESH DECIDUOUS FRUIT MARKETS.

BY HON. ALDEN ANDERSON, OF SUISUN.

I have been requested by the Horticultural Commissioner to prepare a paper on the subject of the "Widening of Our Fresh Deciduous Fruit Markets," and I have done so, but in so doing do not believe that I have suggested anything particularly new, but rather have put in sequential form facts and advice, declarations and suggestions, offered heretofore by myself and many others.

To make possible the "widest" and best distribution, it must be presumed that we have normal crops of good average quality of the different varieties of fruit, and in the several and dissimilar growing districts in the State.

There are three essentials, dependent each on the other, and all vital and necessary to the successful handling of fresh deciduous fruit shipments, and, stated in the order of handling in the regular routine of the business and not in regard to their importance, they are: (1st) Growing and packing; (2d) Transportation; (3d) Distribution and marketing.

Growing and Packing.—It is generally conceded that the growers of California, as a whole, give more intelligent attention to this phase of the business than do the growers of any other horticultural district. This, partly because of necessity; our remoteness from the large distributing centers making it imperative that only good fruit, properly thinned, be grown and that it be packed with the utmost care, to the end that it shall arrive at its destination in salable condition, and for the best results, firm enough to stand reshipment. However, as all do not exercise the same care, it is well to state a few general principles always applicable. Fruit for shipment must be absolutely free from blemish or parasitic insect infection, because fruit that is bruised or blemished will not stand transportation, and most all of the other States, and countries as well, quarantine rigorously against *all* infested fruit, and if any of such fruit is found in a shipment, the whole is liable to confiscation. Packages should be firmly nailed and snugly placed, so that there can be no bruising because of jolting in the wagons, bumping of cars, or any other of the incidents of transportation.

In packing fruit, even grade and quality should be packed in packages by themselves and the packages plainly marked with the contents thereof. One of the most improper and unprofitable things that can be done is to pack large and small fruit in the same package. The trade which desires the large fruit does not want the small fruit at any price, and those who are interested in small fruits are not interested in the large fruits, as they desire a commodity numerically greater in a package for their consumers. It will be seen that care, intelligence, judgment,

and constant supervision are necessary in growing and preparing the fruit for market and in placing it on board the cars in proper condition.

Transportation.—Practically all fresh fruits are to-day transported in combined ventilator-refrigerator cars, and no matter what our ideas or desires in the matter, the trade seems to demand that kind of service. Cars for carrying this class of product must be sweet and clean and without odor. They must not, therefore, be used for the conveyance of commodities that would injuriously affect such conditions. Likewise, being highly perishable, it is vital that sufficient cars be always on hand to load the fruit in promptly, as it can not be held over after being picked and packed for market. Great care must be exercised to properly tier and brace the contents in the cars to prevent damage from jolting and constant bumping of long freight trains. The fruit being loaded, the matter of transportation or movement of the cars becomes the element of concern. This essential is probably, at the moment, the most important of all, for without the expeditious, proper, and regular movement of cars, all care in the growing and preparation and all detail arrangements of delivering in good order, sale and distribution would come to naught. Always a vital question, changing conditions make it even more important at this time than ever before.

Many other States have, in recent years, developed horticultural districts where deciduous fruit, notably peaches, are raised in large quantities. While their transportation rates for the shorter haul may be comparatively higher than are those from California, still their nearness to the large distributing centers makes their products more available and practicable to get into quick consumption, which fact enables the growers of those districts to let their fruit mature more thoroughly, thereby increasing its quality and flavor and the value with which it is regarded by the consumer. This increasing competition makes it more imperative that a quick and regular service always be had at the lowest rates possible. With a quick and *regular* service, our fruit can be matured to the last possible degree, thus adding to its appearance, quality, and flavor, all of which naturally assist in enlarging the demand. On the hardier varieties of fruit, such as pears, especially in the earlier part of the season, cars could be run under ventilation a considerable portion of the route, or head-end iced, sometimes even to destination, with the consequent saving in refrigeration; whereas now, while some cars are run ventilator to the Sierra Nevada Mountains, cars are generally iced full at shipping point as a matter of insurance. Then, too, approximately, one season and another, seventy per cent of our deciduous fruit is disposed of at auction in the various Eastern cities, and as auction sales are held only on five days of the week, *i. e.*, no sales being held Saturday or Sunday, it is necessary to have regular

service so that there will be no "bunching" of cars, especially at time of heavy shipments, at any point over Saturday and Sunday.

Marketing and Distribution.—California, in its entirety, raises a greater variety of fruits than any other horticultural district, and while this is true, it is also true that many different districts here make a specialty of particular varieties of fruit, with the result that almost the entire shipment from some districts, which in the East might mean an area as large as some States, is of one kind of fruit. With the system of disposing of fruits which has grown up because of custom, coöperation on the part of those forwarding the product is absolutely necessary to obtain the best possible results, to the end that the fruits of this State shall not be brought into competition with themselves, and that the utmost evenness of distribution as regards the different varieties can be given, comparatively, to the different consuming centers.

For instance, without any coöperation, practically all the pears shipped on a given day may turn up in one city; nearly all the peaches in another; most all the grapes in another, etc., with the resultant demoralized market on those varieties in those cities and scarcity in others, whereas an even distribution would mean good prices for all varieties in all the cities. Experience has shown that when a market becomes demoralized on perishable products it will not recover so quickly as on any other commodity.

Any scheme of distribution can only be partially successful and can not attain its highest point of efficiency unless there is practically complete coöperation, because the smaller of different interests working in competition with each other, even though one interest has a much smaller percentage of business than the other, if they are disposed to cut prices, can fix the market price at which the whole must sell, unless there is a marked shortage in the volume of offerings, for if the buyer is frightened and timid and will not buy except at extremely low prices, the perishable product will not keep and must be diverted or sold at any offer obtainable. A car of cheap fruit on a market will be the criterion of value long after the fruit is consumed. I have known, in times past, interests shipping two or three cars per day who offered their cars daily to about fifteen or twenty distributing centers, and each of those centers believed these two or three cars were destined for their particular city, all of which has a depressing effect upon the buyer when looking for supplies. If for any reason any market is left bare of fruit for a few days, that time is never made up, for it has been figured, and I believe correctly, that a day lost in the distribution of perishable products is never made up, for the next day takes care of itself, and there is not, in this line, like so many articles of staple products, an average of so much per capita of consumption, but it is rather

a matter of particular time and place and the inclination of the consumer to buy.

The direction of the movement of all cars and the determining of their destination should absolutely be controlled from California, and all consignments whatsoever should be eliminated. Buyers then would know that when they purchased fruit in California, they would not have consigned fruit to come in and cut prices on them, because the tendency of those handling consigned fruit is always to undersell their competitors. With an even price to all buyers, they would have no fear of ordering ahead and of making arrangements for regular supplies, and the very desirable element of stability would be given to the business, both East and West. Buyers would feel that they had complete protection and would not be interested in trying to buy so cheaply to forestall any possible adverse competition, and the grower would know just what he would receive for his product, and if the prices were not satisfactory, he could divert to the drying-ground or the cannery.

All the necessary employés in the larger centers in the East and all brokers in the smaller ones should be under the control of, take their orders from, and be in direct communication with the central agency in California, and they should be advised daily of all shipments and also of probable shipments two weeks in advance at all times. With this knowledge they could constantly keep in touch with the consuming trade at all points and make possible the disposition of the greatest number of cars in each locality. The wider the distribution, the better the average returns, for, while some growers prefer to sell all their fruit at auction, and do not desire free-on-board sales, and others desire free-on-board sales only, it must be remembered that all the fruit which is diverted from the auction rooms lessens the supplies to that extent and increases the probability and possibility of obtaining higher prices for that which sells at auction.

California fruit, as regards superiority and quality necessary to stand transportation and remain firm when placed on sale, is second to none raised anywhere in the United States, and is far superior in this respect to most of it. If it were not for this factor in our favor, because of our remoteness from the great distributing centers, it would be practically impossible to meet competition in the East on some varieties of fruit from their nearby fruit-growing districts.

It is unnecessary for me to say that we must have as low rates for refrigeration and transportation as possible, always keeping in mind the character of the service we must have. This is in the interest of the transportation companies as well as the grower, as the more remunerative the industry, the greater the incentive to increase plantings, and consequently the greater tonnage available to be hauled. With a perfection of transportation service, with the quality of fruit we raise,

and with the ability of our people to prepare the same for marketing; with coöperation in the distribution of it, and with constant effort and study to get as close to the consumer as possible, I can see no reason why our markets can not be constantly extended.

Although the past season was an unusual one, and we had very poor general crops in the deciduous shipping fruit line, it is not presumable that such a condition will occur often. I am not one to argue that any great shrinkage in the volume of shipments of any variety will inevitably enhance the value of that which is left. Experience has shown that where any commodity rises to the point that it can adequately supply at satisfactory prices any given market, that commodity is in a better condition to command remunerative prices, under wise direction, than can those products on which there is a casual or uncertain offering, because when that position is reached, consumers look to that section or district to supply their wants, if its value is on a fair basis, without endeavoring to look to other localities for the same products or to obtain other supplies as a substitute.

The effort should ever be for stability, permanency, and regularity, and to eliminate to the greatest possible degree, by coöperation, the elements of uncertainty, chance, and speculation. The above are the essentials and conditions, in outline, necessary to my mind to bring about conditions that will result constantly in the "Widening of our Fresh Deciduous Fruit Markets."

CO-OPERATIVE MARKETING OF CITRUS CROPS BY THEIR GROWERS.

BY S. P. JENNISON, OF COVINA.

It is not a dream, nor a thing untried, nor of doubtful result. It is a system the practical trial of which for a dozen years in the face of all sorts of competition has justified the faith and satisfied the hopes of those who took the risk of its failure and have reaped the advantages of its success. It was not the preference of some one's socialistic belief. It was the fruit of a condition, not a theory.

The growers of oranges were up against a hard fact. They were raising more fruit than the speculative buyers would take. Somebody's fruit was every year left unsold or else sold at unremunerative prices. The buyers purchased as much as they believed they could sell to good advantage in the markets, which then took oranges to supply the demand which at those dates existed. They had no money invested in oranges or orange property until they chose to buy the fruit, and to induce them to make that choice they must have in every deal such conditions as to quantity bought and prices paid which insured them a good and safe or even an enormous profit.

When this fact appeared, years before the coöperative exchange was thought of, some growers combined to pack their own fruit and then consigned their pack to Eastern commission men for sale. If the growers happened to be wise or lucky in the choice of commission men, the results were often satisfactory; but another fact appeared here, that while some fruit so consigned sold for fair prices, other fruit, owing to lack of push, or skill, or some other quality, brought nothing, or worse. Besides, there were risks of loss in such long shipments of perishable fruit, against which coöperation in marketing would serve as a sort of insurance. To meet these and other conditions as they developed, the system now practiced by the Southern California Fruit Exchange was evolved. Necessity was the mother of invention.

The system is perhaps understood by many of you, but a brief statement of the more important details may be useful.

The membership of all the bodies which, taken together, we speak of as the Exchange, is exclusively of citrus fruit growers. Nobody but growers controls or in any way affects the policy or action of any of those bodies. Nobody receives any money or other advantage from any organization of the Exchange as pay received for his fruit sold for him, or as wages for service rendered. The fruit is packed by bodies of growers usually incorporated under the name of associations. The associations within a district of convenient extent have organized exchanges, as the Riverside Exchange, Tulare County Exchange, etc., each association having, as a rule, one director in the local exchange. Each local exchange elects one representative, usually its manager, to the central body, which is legally known as the Southern California Fruit Exchange. There are fifteen local or subordinate exchanges, and about sixty-four associations.

The system, or organization, you observe, secures to the central exchange a perfect understanding, at all times, of the condition of the crop in all parts of the producing field. Contracts are made between each individual member and his association, between each association and its local exchange, between each local exchange and the central one at Los Angeles, which contracts define the obligations of the parties thereto, and altogether they form, with the various articles of incorporation, the constitutions, so to speak, according to which the whole business is conducted.

The associations grade, size and pack the fruit, load the cars, and deliver the bill of lading of each to the local exchange, which, together with the central exchange, attends entirely, with one exception, to the sale of the goods. To look after that business some seventy-five traveling men, or "agents"—"drummers," in fact, as they are sometimes called in other lines—are employed by the central exchange, mostly upon fixed salaries, and devote their entire time and energies to the

service of the Exchange, and nobody else; among other duties, visiting, each one in his assigned district, every buyer of oranges in car lots and every place large enough to use a carload at one time, endeavoring to get orders for fruit, learning all the details, what varieties, what brands, grades and sizes the buyer wants, and arranging the price. The orders so obtained are telegraphed to Los Angeles and by the sales manager there 'phoned to the local exchanges to fill. Orders that name special brands must go to the associations that pack them. Orders that only name grades and sizes are distributed among the associations in such a way that the fruit to be shipped during the season by the associations shall be going forward at all times in about equal proportions.

The central exchange fixes the price from time to time at which orders may be taken or sales made. A traveling man, or agent, may get more if he can—and he often will—but he may not finish a final deal for less. If he receives an offer for a car at less than the stated price, he must at once wire it, if not absurdly low, to the Los Angeles office, and here is the one exception to the statement that the exchanges do the whole business of selling. For an offer of a price below the ruling one must be passed on to the association which loaded the car, and the manager of that association, who knows most about the fruit and the risk of refusing the offer, is the one to accept or reject it.

Here let me say that a statement in a paper just read to us that it is impossible to dispense with the employment of brokers is contradicted by our experience, for we have dispensed with them. A few agents in small and isolated places are paid by brokerage, but the aggregate of the sales of all such is comparatively inconsiderable. Brokers can be dispensed with, and the reason the Southern California Fruit Exchange ceased to employ them, except as stated, is that by experience it found salaried service was both cheaper and better.

The governing idea, controlling the rules and practices in all quarters, the associations, the exchanges, and the agents' offices, is that all members in all districts shall fare alike, all shall have an equal show, every man and every association shall have a fair deal.

To illustrate: In the lingo of our industry there are three grades of oranges—fancy, choice, and standard—and there is a difference in price between any grade and the one nearest to it of 25 cents per box. Certain sizes are called "regular," and sizes larger than the regular ones are "large offs," while sizes smaller than the regular are "small offs," and there is a difference in price between the regular sizes and either kind of "offs," of 25 or 50 cents a box, according to the degree of "offness," let me call it.

Now it is easy to ascertain how many boxes of fruit of every grade and every size had been sold in every pool and how much money was received from every grade and size. Then it is easy to calculate how

much each box brought in, on an average, and that amount less 10 cents per box to cover expenses of the Exchange, and 30 cents per box for packing-house expenses, is paid for every box of the nine sorts—grades and sizes—to the growers who produce the fruit in that pool. A “pool” is the period covered by each settlement, and is determined by each association for itself. Such calculations as above referred to are always made and a statement is sent every grower, showing number of boxes of each grade and size shipped by him, rate per box for each sort due everybody, sum due him for each sort, total sum due him for all sorts, and there is his check for the amount. Every man receives the same amount as the rest according to the quantity, grade, and size of the fruit each had in the pool.

Fair dealing requires that every association have an equal opportunity in all markets, and take equal chances on all, and that is meted out to them.

Two things, namely, that the Exchange is ourselves, we the growers, and that we thus can and do give ourselves in all respects an equal and fair show, have attached our older members to it with unwavering confidence and devotedness. They are convinced beyond all doubt that they receive more for their product than they could obtain otherwise.

As our brands are packed year after year from fruit grown on the same trees in the same locality, graded and handled in the same house by the same hands, for the most part, there is a greater uniformity in quality and grade than would be found under other conditions. As the same agents have sold for us for years, and usually without change of place, it is but natural that their acquaintance with the ways and requirements of “the trade” enables them to serve buyers better with exactly what they want, while obtaining for us higher prices than the average of any other equal quantity of fruit.

The expenses of packing and sale are only what we judge necessary, and all reserved for expenses above the actual necessary outlay is returned to us at the end of the season. The average of such expense for all associations for the last season was about 32 cents per box. The California Citrus Union received 39½ cents per box for all the fruit shipped by them. The 7½ cents difference may not have been excessive for the shippers of the California Citrus Union to receive, but if the growers whose fruit paid it had been members of the Exchange they would have saved it for themselves. The gross amount on all boxes shipped by them at 7½ cents a box would be \$234,419.55.

Those growers lost by their connection in another respect. The average returns per car of fruit shipped by the Citrus Union through the late Fruit Agency was \$6.36 less than the average returns per car of fruit shipped by the Exchange through the same agency. The Union had no money interest in getting higher prices. But the more the Exchange fruit brought, the more the shippers got.

I cite these facts in no manner to dispraise the Citrus Union, for it acted in the matter as the conditions and agreements impelled. Whether any such results will again follow, I express no opinion.

But I affirm that it is inevitable that the coöperative shippers of their citrus fruit will receive more for their product than an equal amount can bring otherwise, unless the other shippers give over their profits.

As to the late Fruit Agency I have no complaint to file, no answer to interpose, and no witness to call, and a court of law would not permit proceedings against a dead defendant.

The conditions, the feeling, the prospects of the Southern California Fruit Exchange are assuring. We have had a bad time, but it has passed and our coöperative selling saved us much. We marketed last season about forty-six per cent of the entire crop. No season, Manager Woodford says, ever began better than the present. A greater percentage of the citrus crop has been put in the hands of the Exchange for 1904-05 than ever before. Over 600 carloads have been shipped since the beginning of the Exchange year, of which amount over ninety-five per cent went upon orders. In fact, the difficulty for some time past has been not to get orders for fruit, but to get fruit for orders on hand.

The idea of coöperation in marketing a crop by its producers is in some cases surely capable of successful realization. It would be too much for me to say that it is possible to command success in all cases. In any event, the scheme in every case, I suppose, will have to be worked out by believers in the project and acquainted with all the details of production, handling, transportation, etc. Maybe a general union of all coöperative fruit interests for all purposes will be impracticable; and perhaps it may not be. But the Southern California Fruit Exchange looks upon all attempts to found and perfect other coöperative undertakings with hope and most earnest good wishes. We have not the vanity to think that we can instruct you. But we want to encourage you to persevere and to stand strong for mutual help and a square deal. If the time ever does come for a possible closer and larger union, we shall certainly be most ready to consider it with all friendliness and good will.

We have had a little recent experience in uniting, and found that not every union is desirable. But then, again, there are others.

THE CHAIRMAN. These papers on the subjects that were laid down on the program this morning, of course, were rather longer than was expected, but I think we can devote a few minutes before recess to business, and we will take up the report of the California Fruit Distributors by Hon. Alden Anderson. If some one will make a motion that his report be accepted, it will be in order.

MR. STEPHENS. I move that the report be received and placed on file. Motion seconded.

THE CHAIRMAN. Remarks are in order. I will call upon Mr. Anderson, to see if he wishes to make any explanations or remarks.

MR. ANDERSON. I don't know that any remarks will be necessary. It is simply a statement of conditions and facts that have happened. If any one wants an explanation, I will give it.

In order to put the matter in a proper light, I move the substitution of the minority report of the Committee on Transportation for the other report, and I would like to amend what I suggested there, that a request be made to our representatives in Congress that this amendment to the Interstate Commerce Law give the power to the Interstate Commerce Commission to adjust rates when they are unjust.

Motion seconded.

MR. STEPHENS. I would like to know what the minority report is. What is the meaning of the minority report? What is its substance? What effect will it have upon the original report?

A VOICE. The effect would be that you would get something done. You can resolve, as you have been doing for a number of years, until the cows come home, without any effect. The effect would be to have Congress, now in session, take up the matter and amend the Interstate Commerce Law so that it will make it criminal and impossible to give rebates to private car lines, or to any one else.

MR. STEPHENS. I want to know what effect this motion will have here; whether it annuls any part of the report as made by the committee; whether your motion to substitute your minority report annuls the majority report, or not? That is what I am getting at.

MR. ANDERSON. I can enlighten you on the subject.

THE CHAIRMAN. The minority report, of course, could not take the place of the report of the committee. It can only be accepted as a minority report.

A VOICE. Mr. Chairman, the gentleman moved the minority report as a substitute. That is to be the report of this Convention. Now, if that should carry, that would destroy the majority report so far as the action of this Convention is concerned, yet it would still remain the report of three members of the Committee on Transportation.

GEN. JENNISON. Mr. Chairman, I would like to ask for information. I was absent when the report of the majority was being read. I want to ask if there were any resolutions offered accompanying the majority report?

THE CHAIRMAN. There were none.

GEN. JENNISON. Then it is his resolution, asking our members of Congress and the Senate to support certain amendments to the interstate commerce law which he cares to have passed here.

MR. ANDERSON. Yes, sir.

GEN. JENNISON. It seems to me we could get at it in some way,

and let the reports come in and be filed, and then adopt the resolution accompanying the minority report, and I will make that motion when we get where there is not so much lumber in the way of making it.

MR. BERWICK. Mr. Chairman, do I understand that this committee has never met all together, including Mr. Anderson?

MR. ANDERSON. No, sir. I never was notified that I was on the committee. The first intimation I had of that fact was the receipt of a copy of the report, entitled "Report of the Committee on Transportation," from which I immediately presumed that the committee had been in meeting and had agreed upon these things, the inference being that I was desired to sign it. And so that this may not be misconstrued, I wish to say that I have been in Sacramento all summer, having been called up there, and I went to Suisun Friday night. Saturday, after I came into the office I found this report, and I called Mr. Stephens in Sacramento on the 'phone, and I told Mr. Stephens that I did not know I was on that committee and did not understand what he wished me to do. He said I was. He said he would be home all day Sunday, in Sacramento, and I could see him. The result was, on going to San Francisco Monday, I had an appointment at ten or eleven o'clock, and I could not see him Sunday. I was here Monday, but I could not see him. I have never had an opportunity of attending a committee meeting.

MR. BERWICK. Might I then be allowed to move that both the reports be referred back to the committee, requesting them to meet during recess, and bring their report back to us some time this afternoon. Would that be acceptable?

MR. STEPHENS. I wish to verify much that Mr. Anderson has said, and I wish to give explanation and emphasis to something he has not said. It does not include all that I said to him in the communication I sent to him at Suisun. I did not present it, sir, as the report of the committee. If you will read your communication you will see that it was to make suggestions, and final action of the committee was to be had— (Calls of "Question, Question." Where is your letter? Where is my letter?)

A GROWER. Mr. Chairman, I understand there is a motion before the house to recommit. I raise the point of order.

MR. ANDERSON. I think the motion to recommit is perfectly in order, and I will be pleased to meet with the committee, and we will not take up the time of the Convention.

MR. STEPHENS. Mr. Chairman, I believe I have the floor; I have the floor for the purpose of making an explanation. I did not present this as a report—of course it was in form, for that matter—but I presented it as a draft of the report to be made to this Convention, and I asked him in the most courteous language which it is possible to com-

mand whether or not it met with his approbation; and if not, then any suggestion that he might make as to its qualification in any way, or addition or omission, would be entertained by the committee, and careful consideration would be given to any such suggestion. I also said to him over the 'phone, as he states, that I regretted very much that I did not know that he was in Sacramento, because, had I known it, I should certainly have consulted with him. It would not have been a proper thing to have called a meeting of the committee at Sacramento—gentlemen from Los Angeles and other localities—because it would be possible to meet here in San José at this time; and I stated to Governor Anderson that I was going down to San Francisco on the afternoon train on Sunday, that I would be pleased to have him go along on that same train—he did not go down by that train; that I was going to stop at the Palace Hotel, and that I would be there almost continuously, so that I would be accessible; also, that I was to come to San José, which would give us Monday evening and plenty of time for the committee to meet. I have been at the hotels, I have tried to meet Mr. Anderson, I called a meeting of the committee, Mr. Judd, Mr. Gordon and myself, and we would have been pleased to have met Governor Anderson. If there was anything tried to be avoided by myself and the other members of the committee it was anything like sharp practice, and that for the reason that there is no question that is to come before this Convention that so much interests the growers of the State and the people of California as does this question. Now we want a friendly discussion; we want to give every opportunity to every man and every grower to express his views upon this question, because that is all there is of it. Now, then, if Mr. Anderson desires to meet with the committee, I have no objection, and I will heartily indorse the motion that this report be recommitted, and that a meeting of the committee be held immediately after the adjournment of this Convention, or a recess of this Convention. I have no objection to that. I desire to meet him and know his objections, if any. (Question called for.)

THE CHAIRMAN. Then you understand that the motion is to recommit, and that the supporters of the majority and the minority reports meet together.

Motion carried.

THE CHAIRMAN. We will take a recess until 1:30 o'clock P. M.

AFTERNOON SESSION—SECOND DAY.

The Convention met at 1:30 o'clock P. M. President Cooper in the chair.

It was moved and seconded that all speeches on this subject of the report of the Committee on Transportation be limited to five minutes each, except those of the members of the committee.

Carried by a vote of 39.

Secretary Isaac read the report of the majority on transportation; then followed with the reading of the minority report.

Upon motion, duly seconded and carried, the reports were accepted and placed on file.

REPORT OF COMMITTEE UPON CO-OPERATIVE ORGANIZATION FOR MARKETING DRIED FRUITS.

The following report of the Committee of Fifteen, appointed at the last Convention, was submitted:

To the California Fruit-Growers' Convention for the Year 1904:

GENTLEMEN: Your committee, appointed at the last session of this convention, to prepare and put into operation a plan for the coöperative marketing of dried fruits, respectfully reports as follows:

Owing to the great distance which separated the several members of the committee, we found it impossible to hold as many meetings for the discussion of our work as we could have desired, but we have held three meetings, and very thoroughly considered various plans for organized marketing, with the result at the end of a session at San Francisco in March last, that we unanimously agreed upon the following recommendations:

That it is the sense of this committee that the fruit-growers of the State, wherever practicable, organize local associations for the preparation of fruit for market, and that these several associations then connect themselves with some selling agency to make sale of their crop at the best market rate, at such times, and for such prices as such agency, acting in conjunction with associate organizations, may deem best. In case no such selling agency is available or satisfactory, we recommend that they proceed to establish one by delegate representatives from each such local association.

Also, that we further recommend that all selling agencies composed of organized growers, unite by delegate membership to form a central selling and purchasing agency, by which the highest advantages in buying and selling may be secured, without, however, relinquishing any brand, trade mark, or other advantage, peculiar to each, but eliminating to the greatest possible extent injurious competition with each other in the market, and in every practicable manner extending the consumption of California cured fruits.

Also, that we disclaim any purpose to antagonize any interest by such recommendations, being fully aware that a large percentage of the business will remain to be done

by established organizations. But we believe that when a considerable portion of the growers are thus organized, it will be possible to find a common basis of agreement with such interests by which market values may be sustained and regulated better than at present.

We further recommend that such centralized agency, at the earliest practicable moment, develop a plan for efficiently advertising California cured fruits, and placing them with the consumers at prices which shall provide for a fair average profit to the grower, wholesaler and retailer.

The following resolutions were also adopted:

Resolved, That we urge the State Commissioner of Horticulture to procure and publish all available statistics in relation to the fruit products of the Pacific Coast and competing countries.

Resolved, That a committee of three, with Mr. H. P. Stabler as chairman, be appointed to outline and put into operation a plan for increasing the consumption of the cured fruits of this State.

The chairman appointed on the committee with Mr. Stabler, Arthur R. Briggs and A. L. McCray.

The papers of the State very kindly gave wide publicity to these recommendations, but up to the present time we have heard of no locality which has taken action upon them.

It is very clear to your committee, that the losses to deciduous fruit growers, resulting from a lack of organization in marketing our dried-fruit products, are enormous, and are seriously threatening the general prosperity of all lines of business, unless effective action can be initiated soon, but it seems to us almost hopeless to expect the fruit-growers to form an effective organization upon strictly coöperative lines, so that we are moved to strongly recommend an alternative method of securing the desired organization of the market.

We, therefore, beg to report as follows:

We primarily recommend for your first consideration the representative system of coöperative action, which is based upon local associations, formed at all points where it is found convenient to assemble and pack fruit for shipment in car lots.

These associations should then be centralized, by creating an organization formed from the representatives of the several local organizations, which central organization should constitute a buying and selling agency for all of the local associations and should proceed to organize and put into effective operation the best approved methods of selling special food products, including the use of expert advertising, and other forms of influence to enlarge consumption.

Logically, these local associations should be formed first, but experience shows that it is extremely difficult to secure such local initiative, and therefore it seems essential to form some temporary promotive organization to cause the formation of a sufficient number of local organizations to give strength to the movement, which may then itself take up the work of extending the effectiveness of such coöperative action, by lending aid to organize all sections not yet included with it.

No one method of marketing the crop should be prescribed, but such central agency should be free to adopt such plans as conditions may require from time to time.

We regard the above plan as in all ways the best one, providing it can be made effective by the very general coöperation of the fruit-growers; but in case it shall appear to this convention quite improbable that it is likely to be generally accepted and acted upon, we recommend as an alternative method the following plan for a profit-sharing basis of organized marketing:

That a form of contract be devised by which each prune-grower may agree to sell for cash, on delivery, his entire output for the ensuing five years, at a basis price to be fixed slightly above the market price previous to the submission of the contracts to the public, and in compensation for thus giving control, such growers shall be entitled to one half of the net profits derived from packing and marketing such contracted products.

These contracts should be placed in trust until the control of a sufficient percentage of the crop can be thus secured to give efficiency to the movement, and until a company shall be formed able and willing to carry out the plans indicated by such contracts, viz: To organize an effective system for marketing all fruit products of the Coast, beginning with prunes, providing sufficient capital therefor, and submitting to an annual

audit of its business by a reputable auditing company, in order to determine the basis for declaring a dividend, consisting of one half of the profits of the business resulting from such contract fruit.

In the opinion of your committee, such a profit-sharing basis would yield to the growers returns far beyond any which can be hoped for without effective organization of the market, and still yield to the capitalist who shall put his money into this public service enterprise, a very satisfactory profit.

Very respectfully submitted.

(Signed:) A. R. SPRAGUE.
A. L. McCRAY.
F. H. BABB.
S. G. RODECK.
H. P. STABLER.
A. D. BISHOP.
B. F. WALTON.

PRESIDENT COOPER. We will pursue the same course as we did this morning: after all the papers are read, then they will be open to discussion.

THE BENEFITS OF ORGANIZATION.

BY F. H. BABB, OF SAN JOSÉ.

Nature is broadly divided into two great kingdoms—the inorganic and the organic. The first comprises the crude, raw material of creation, inert matter. When the atoms of matter are placed in symmetrical relations to one another and a vital principle binds the whole into one, we have the organic or organized. The highest type of organized life was reached when the material atoms were formed into the human body, into which was breathed the breath of life, and man became a living soul. Each particle of matter assumes definite relations to each other particle, and becomes circumscribed in its location and range in order to enter into the higher life.

When we have reached man, the top of the organic scale, we are not at the end. There is an organization of mind as well as of matter; of men into society governed by laws. No doubt the troglodyte, each in his separate cave, was less restrained and more untrammelled in his activities than his civilized descendant is. But his life was in danger whenever he left his rocky fastness in search of food, and he was always upon the verge of starvation. Men combined at first for defense, then for the development of agriculture, manufactures, the arts, and all that exceedingly complex thing which we call civilization.

Political organization was compulsory rather than optional in most of its successive stages. In the feudal period, the vassal must have the military leadership of his suzerain and the protection of his castle in time of war, which was nearly all the time, no matter how great a price in servitude he paid for it. And as the nobility were compelled to yield up their autonomy to the king in the building of the nation, it was always reluctantly, and often at the point of the lance.

While this political organizing was necessary for the organized, it was largely done in the interest of the organizer. This has not entirely ceased to be the case even now. When the people sought a larger voice in the management of the government, and a greater share in its benefits, there was again war, and the modern republic was born. This could not happen until the idea of representative government had been developed, and the small subdivision saw the necessity of yielding its power to the central authority. How slowly and reluctantly this was done, our own history shows. The war of the rebellion was finally necessary to decide whether this was a nation or a loose federation of sovereign States

The same development has taken place in manufactures. The individual artisan has been gathered into factories under competent management, and small establishments consolidated into larger, until in the fullness of time the trust was born, and not without fierce competitive wars, and under the pressure of stern necessity. Transportation became organized in the same way. So crudely did railroading start, that it is said that the question whether the conductor or the locomotive engineer was the supreme authority on a train, was settled by a pugilistic contest. The short local roads, calling for the constant rebilling of freight, and rebuying of tickets at their termini, have given way to the great trans-continental system, but not without war and suffering.

Industrially again, there was a revolt of the organized against their organizers, and it took the form of the labor union. The workingman felt that he was not personally getting the benefit of organization to which he was entitled, so he organized to obtain it. He did it often reluctantly, giving up his individual independence, and submitting to the dictates of his union officers only because of stern necessity. The union long meant war, and only war. And when truce was struck, wages were raised for the organized workman, prices were raised by the organized employer, and the unorganized general public paid the whole bill, and is still paying it.

Trade seems slow to organize in order to cut out unnecessary expenses. It was thought perfectly proper, in the Middle Ages, that the barons should sally from their castles on each hill top, and levy tribute on the pack train of the merchant as it passed, so that the consumer paid extortionate rates, and the producer obtained little. And even yet, the long line of middlemen between producer and consumer keeps them too far apart, to their mutual disadvantage. The Rochdale system, which is one of the most marvelous commercial developments of the age, remedies this for the consumer, but is yet of little help to the producer.

Is there no hope for him in organization? The tiller of the soil feeds and clothes the world. But those who elaborate and market his product enjoy the lion's share of the proceeds. He can get no more by asking

for it. He gets almost anything else handed out to him. He is praised for his virtues, called the conservative force of the country, the balance-wheel of the republic. He is encouraged to work harder, is told that most great men began life upon a farm, and left it as soon as possible. Almost any professional or business man is glad to give him *agricultural* advice free. The corner groceryman will cheerfully tell him how to run his farm, but refuses to give him more per dozen for his eggs. The line is drawn just there. No one obtains an increased price for his product, whether labor, or potatoes, or coal oil, by simply sanguinely hoping for it, or pathetically pleading for it. He must be in a position to demand it. He can only place himself in that position by effective organization. Until he does so, he is helpless, as an individual, to obtain a fair price for his products; meanwhile, he must pay, either directly or indirectly, the increased prices which wageworkers, manufacturers, and transportation companies are able to demand by virtue of their organization.

When he organizes, he must not expect an exorbitant price, and be disheartened and resolve to quit because he does not obtain it. Even the Standard Oil Company and the Stonecutters' Union are unable to advance prices and maintain them permanently much beyond the point where remuneration ends and highway robbery begins. Economic laws forbid. It will not be necessary. For prices can be kept at a steady, paying figure whenever the trade realizes that a strong, permanent organization is behind them. When the producer is his own packer and seller on a large scale, he can reduce administrative expenses and practice economies, as all other departments of activity have found. He can advertise and extend his markets, and feel that his industry is growing up with the country. And thus the specter of overproduction, which has so long haunted him, will be banished to the limbo of industrial chaos, where it belongs. He will not spend days running from one buyer to another, finding them in substantial agreement, and spend nights in wondering what the market of the world would justify him in asking—if he could get it. He will attend to this in his organized capacity, through the servants he elects to do it, as able and as fully posted as any one. He will have his nights for slumber, and may spend his days at home, enjoying the society of the scale bug, the codling-moth, and the peach-root borer.

The prune-grower will no longer find that the speculative packer has sold his crop short, below the cost of production, while still immature, and compels him to fill at still lower rates, that the middleman's profits may be kept up, while the grower is reduced to poverty and despair. Then cut-throat sellers will fill their shorts at their own expense. He can know that his goods are honestly and properly packed, so that markets are not ruined by attempting to make a fifty prune grade as a

forty, though it spoil before the box is opened. The commercial curse of the age is the excessive watering of stock. A large organization can secure better rates and service from transportation companies, or know the reason why. The benefits of such organization are moral and educational as well as merely financial. The man on the farm will learn to come out of his shell and act with others for the benefit of his class. Too often he distrusts his neighbor, considers him in the light of a rival or competitor, rather than one who should cooperate with him for the same ends. If farmers were organized, they would no longer wait for sporting clubs in the cities to tell them, through the legislators, which of the livestock raised on their farms and fed and fattened on their crops shall be killed and carried off by city visitors, and when it shall be done. They would no longer consent to bear the greater part of the burden of taxation, while millionaire owners of personal property are practically exempt. The French revolution was brought on by the exemption of the nobility from taxation. Then the whole trend of public education would not be away from country life, and a staff of educators, some of them of national reputation, would not be compelled to teach agricultural students in dilapidated sheds at the State University, while embryo doctors and lawyers are palatially housed.

The National Grange compelled the rural delivery of mails, and united action will continue to add the facilities of the city to the enjoyments of the country. The labor unions are not a tithe as strong numerically as the farmers, and yet see how they fill the public eye and ear. When they make a demand, the politicians stand and deliver. There are States where nearly all the farmers, and some of the State officers as well, belong to the Grange. Their peculiar interests do not often suffer. In the Middle West farmers' organizations have broken up oppressive elevator trusts, and replaced grasping telephone monopolies. It might be thought that California, especially the orchard sections, formed an ideal field for organization. The orchardists are a most enterprising class, the pick of the land beyond the Rockies. They have come from all other occupations, have been lawyers, doctors, business men, with broad and varied experiences, and familiar with the benefits of organization in other walks of life. But they have been too prosperous. It is said that "Jeshurun waxed fat and kicked." And the satisfactory returns from orchard property in past years have tended to develop the critical rather than the assimilative faculties. History teaches that combinations have generally been made reluctantly, at the spur of necessity. It is not enough to have an intellectual appreciation of their benefits. The will must be inclined toward mutual trust. Representatives of cooperative organizations have met to form a central agency, and the eloquent and unanimous commendation of the plan would seem to make its success certain. Not a dissenting voice

would be heard, until the time came for actually signing a contract. "And then, with one accord, they all began to make excuse." They were like the Irishman and the prohibition law. He was in favor of the law, but agin' its enforcement.

Prices this year indicate that the time for organization is at hand. A brutal old Englishman called kicking a man down stairs, giving him a hint to leave. Prunes at $1\frac{1}{4}$ cents are that kind of a hint to organize. The failures of the past are no reason for abandoning effort, for most permanent success is built upon failure, and most organizations have been born in war, have had their storm and stress periods, have made stupendous mistakes, and done penance for them in sackcloth and ashes.

WHY FARMERS SHOULD SUPPORT THE GROWERS' CO-OPERATIVE AGENCY.

BY A. T. J. REYNOLDS, OF WALNUT GROVE.

Coöperation being one of the leading topics of this Convention, it will be in order for me to say a few words on the subject "Why Farmers Should Support the Growers' Coöperative Agency."

In order to understand what the Agency is, and why it was established, it will be necessary to go back a few years to explain the condition of the San Francisco market.

The Sacramento River farmers raise large quantities of fruit and other produce, a portion of which is shipped to the Eastern markets, but the great bulk is forwarded to the commission houses in San Francisco for sale. The returns from those houses were very unsatisfactory. Charges were excessive, and combinations were formed by which the various houses would agree upon the price to be returned to the farmer, irrespective of sales.

In 1902 the fruit-growers held a meeting at Walnut Grove to consider the situation, and endeavor, if possible, to improve existing conditions. In time an organization was effected which resulted in the incorporation of the Sacramento River Coöperators, and its officers were directed to establish a house in San Francisco for the sale of our products. About June 1, 1902, this house was opened under the name of the Growers' Coöperative Agency, it being the intention of the founders to make it a representative house, and to invite other fruit-growers' associations to work with us and assist in building up a large business, taking a share in the management, so that farmers of all sections could be assured of getting honest returns for their produce and the cost of selling such produce be materially reduced.

In the beginning it was not considered good policy to antagonize the other houses or to cause any unnecessary friction, so the management was instructed to charge the established rate of commission, and also to apply for membership in the Commission Merchants' Protective Associa-

tion, in order to guard the house against irresponsible or unscrupulous dealers. The application was rejected in that and other trade associations, on the ground that, if our house was successful, our patrons would get a rebate on commissions, or in plain terms the farmer would get the benefit.

The bitterness of the fight waged against us is a matter of history. The old-line commission houses fought us from the start, refusing to buy from or sell to the Agency, or to any one who patronized it in any way. From the fact that the retailers have to keep a great variety of goods in their stores, for which they usually draw on a dozen or more wholesale houses, it can readily be seen that we could not protect our customers to the extent of supplying all of their needs, and the boycott against us was therefore very effective.

Legal advice was obtained and suit commenced against the Commission Merchants' Association, and we were promised that the case would come up for trial within two months, but it was delayed for over a year and eventually was withdrawn. In the meantime our customers, being afraid of the boycott, kept away from the store. Consequently the business was running at a loss, so that some of our weak-kneed members grew discouraged and withdrew their support, and even our manager advised closing the house. Fortunately, the most of our members were loyal and put their hands into their pockets and advanced means to continue the business.

A new manager was appointed, and in the spring of 1903, at the commencement of the second season, a meeting was held at Courtland, and when the farmers learned how the house had been treated they rallied to its support and in less than five minutes \$3,000 was collected to be applied toward carrying on the Agency.

This proved to be the turning point, and from that time on success was assured. The commission men, realizing that the Agency was there to stay, and knowing that the Woodward bill, to prevent boycotting, had become a law, withdrew their opposition. The Agency has since stood on its merits, and, as it became better known, farmers from other sections shipped their produce and helped the cause to an extent that was highly appreciated.

When the Growers' Coöperative Agency started, we were unable to secure suitable quarters for the business. Last fall, however, we were more fortunate and have rented the premises at 425, 427, and 429 Front street, in a fine location, close to the main arteries of trade, where we have excellent facilities for the display of our goods.

So far, the Growers' Coöperative Agency has not been advertised to any great extent, as the promoters thought best to follow Davy Crockett's advice, "Be sure you are right, and then go ahead." At the start too much trade was not considered desirable, but by gradually building up a business our salesmen could accommodate themselves to handle a larger

volume of goods to the best advantage. After the experience of three seasons we can now confidently assure shippers of good returns. The Growers' Coöperative Agency is now incorporated, and invites farmers from all sections tributary to San Francisco to organize fruit-growers' associations, take membership in the Agency, support the house with your consignments, take a voice in the management, and make the Agency what it was intended to be—a representative house of not only one section, but of all sections of the State.

From the Sacramento River, the Agency can always command large consignments during the summer months, but as we raise little winter produce excepting beans, which are mostly sold on the ranch, more business is desirable in the winter and early spring.

You can readily understand that a business of \$300,000 can be conducted with but comparatively little more expense than a business of \$100,000 would require; the rent, management, and larger items of expense would be the same in both cases, while additional bookkeepers, porters, etc., can be secured at low salaries. The profits would also largely increase, which profits would be divided among the different associations having membership in and supporting the Agency, in proportion to the value of their shipments.

We have all heard, time and again, of the advantages to be derived by coöperating with each other, and we believe there is merit in the principle. Let us make up our minds to commence right now and give coöperation a fair trial. We attend these fruit-growers' conventions to learn something, hoping to profit by the experience of others. We all learn and get new ideas. If we put the knowledge thus acquired to practical use we improve our conditions and derive lasting benefit. On the other hand, if we fail to profit by the suggestions thrown out, we might as well have remained at home.

We all agree that the expense of selling our products is altogether too high, and is bound to be so just as long as we support a small army of commission merchants and middlemen to handle those products; but if we unite our forces and join with the Sacramento River farmers in supporting the Growers' Coöperative Agency, making it what I believe it is destined to be—the leading fruit and produce house on the Coast—the business will be so largely increased that the cost of selling will be so greatly reduced that the difference will yield a handsome profit.

Being a member of the Agency will give you a voice in the management and in directing the policy of the house, and you at all times will have access to the books, a privilege which no other commission house will grant you, unless I am greatly mistaken.

Now, I do not wish to be understood that as soon as you join the Agency all will be plain sailing, or that there will be no obstacles to overcome, or that you will get higher prices than your neighbor on

every shipment, or that the old houses are going to stand idly by and lose your trade without a struggle. You will very soon find that other houses are quoting higher prices than you obtain, or than the goods brought, in order to get you again in their clutches. You will find their agents spreading all kinds of reports against the Agency in order to get you to withdraw your support. This has been our experience on the Sacramento River, and will be yours, unless I am greatly mistaken. In these days of keen competition, it requires a whole lot of energy and careful management to build up a successful business—those having grit, determination, and good staying qualities will succeed, while the timorous and weak-kneed will go to the wall. It is simply a question of the "survival of the fittest."

I do not wish to be understood that all commission men are dishonest; far from it. There are a number of honorable exceptions who are engaged in the business, whom I believe were pleased when the boycott against the Agency was stopped; but the average farmer has not the time or inclination to light his lantern in broad daylight, like Diogenes of old, and search through the market places for an honest commission man.

The Growers' Coöperative Agency has been of great benefit to the river and other farmers, particularly to those who are not with us, as the commission men have returned in many cases higher prices than the goods sold at, in order to cause our members to become dissatisfied and withdraw from the Agency. I might add, without comment, that some of the houses that fought us most bitterly at the start, are no longer in existence.

A careful study of the progress of the Agency has shown us many things. We find that as we are able to effect a gradual improvement in our methods the results are more satisfactory. As our support becomes more general and our shipments represent a greater diversity and a better supply, so does our trade increase and the greater benefits accrue to each line handled. It is obvious that with five hundred customers coming to our store every day, the chance for selling our goods advantageously are better than when we have but half that number. It is plain, therefore, that we should broaden our field of action, and the faster we are able to do so the more satisfactory will be the returns to our shippers. As we build, we must build solidly, however; our trade must increase with our shipments, and above all there must be that careful attention to the most minute details, without which no business can succeed.

We have been able to follow the beneficial results that come from the increasing strength and coherence of our organization. We find that by reason of the close relation existing between the management of the house and the individual shipper, and the confidence of the one in the

other, many improvements are effected in the pack and condition of the goods reaching the market. The Agency is in a position to point out any fault in the packing, and to indicate to the shipper the demands of the trade in this regard. We have also been able to improve upon the method of keeping the shippers thoroughly informed as to the prices, etc., and in this regard I would state that we are giving this subject the most careful study, with a view to still further improvements in future. It is of the highest importance that a thorough and comprehensive system be devised for this purpose, as it is by such means only that the shipper is able to take advantage of market variations and to either hasten or divert his shipments, as the situation may require.

In localities where return boxes are used, we have found it possible to return these empties much more promptly than has ever been done before, and in this regard also we are planning still further improvement. Our complaints and requests are listened to by the transportation companies much more respectfully than in the past, and we find that it is possible to outline many improvements which can be successfully carried out in this department.

The by-laws of the Growers' Coöperative Agency are practically the same as those of the California Fruit Exchange, whose success in marketing fruit in the East has been so marked under the able management of Mr. A. R. Sprague, and our directors thought they would make no mistake in adopting them, with what few changes were necessary, particularly as they had stood the test of experience.

In conclusion, I will present a few reasons why farmers should support the Growers' Coöperative Agency.

It is a house firmly established and doing a successful business, owned and controlled exclusively by farmers, and has the confidence of the trade.

It makes prompt and honest returns to all shippers who take advantage of its facilities for selling their produce.

It is in an excellent location and offers superior advantages for the display and sale of products.

It is under competent management and employs efficient and experienced salesmen, bookkeepers, etc., which insures prompt attention to every detail.

All profits that may accrue from the business will be divided pro rata among its members, in accordance with the amount of their shipments.

I will add that our manager is under bond, which can always be increased as the business grows, and will give as reference the First National Bank of San Francisco.

AGRICULTURAL ORGANIZATION.

BY A. R. SPRAGUE, OF SACRAMENTO.

What are the objects of business organization? Among them I suggest:

(1) To secure the orderly dispatch of business, thus preventing the waste which results from interferences.

(2) To concentrate business in order that, without extravagant cost, efficient employés may be secured, and other business facilities obtained.

(3) To prevent destructive competition.

(4) To concentrate power sufficient to secure proper grading of the product, thus protecting the market from poor or fraudulent material, and on the other hand protecting the consumers from excessive prices; also to secure such extension of the market as can only come from efficient advertising. In short, to buy low and sell high and to manufacture and handle at the lowest possible cost.

These are the main purposes of all organizations, whether in transportation, in manufactures, merchandising, of labor, or in agricultural pursuits. In other lines than the last it is no longer a matter to be debated. As well might we discuss whether or not we should use the steam engine or electricity.

It was long ago decided in those various lines that organization was not only desirable, but absolutely essential to their business survival. Point me to any instance of lack of organization, and I will show you an industry which is the prey of all others, in which the rewards of effort are uncertain and its whole outlook discouraging.

These statements are so generally admitted that I am not warranted in further enlarging upon them.

The only form of industry that still remains practically unorganized is that of agriculture. This is the most fundamental of all industries, since from it all others are derived. Let agricultural production cease for a few weeks and all the wheels of commerce and trade would stop. Merchants, manufacturers, bankers, with all their marvelously efficient organizations, would find nothing to do, should the farmer cease to use his labor in transmuting the dull clods into the varied forms of raw material from which the rest of the world lives. He is the primary wealth-producer, and therefore whatever promotes his well-being should deeply concern the rest of society. It must, therefore, be a matter of great solicitude to all business interests, that the farmer is at so great a disadvantage for lack of organization, and a way should speedily be found to change this condition.

The fruit interests of this Coast give a most impressive illustration of the losses to the whole community resulting from a lack of effective business-like organization of the industry.

In making this statement I except the Southern California Fruit Exchange in the south and the California Fruit Exchange in the north, as both of these organizations have for years been in successful operation, to the great advantage of their growers coöperating, and indirectly helping all fruit-growers.

Briefly reviewing the present custom of selling our dried fruit product, I take the case of prunes, as affording a specific illustration of conditions that normally affect the whole line of dried fruit products; for if in any particular season reasonably good prices prevail for any of the other dried fruit products, it is found to be due to an excessively short crop. We can well remember when with but a moderate crop of peaches, apricots, or raisins, the prices fell below the cost of production.

Prunes are now first sold by growers to packers, who mostly buy upon a basis price. In this manner the grower is at every disadvantage, for in counting the number of prunes per pound a deft and unscrupulous buyer can easily make it appear that prunes that easily average 50-60's seem to average but 60-70's, by which bit of juggling he gets half a cent per pound advantage, so that while the grower appears to be selling at 1½ cents per pound basis for the four sizes 60's to 90's, he is really selling for but 1 cent per pound. Again, the packer who buys without grading estimates far more accurately than the grower the quality of the prunes, for he makes a hundred times as many such estimates. But this evil, although serious, is but the beginning of losses which present market conditions make inevitable. More than a hundred packers, great and small, seek to sell prunes through hundreds of brokers. To these brokers, who each usually sell for several different shippers, samples are sent with prices quoted. In any large city each jobber is thus solicited by many brokers, each seeking to effect a sale. No one knows better than the broker that the quick and sure way to effect a sale is to offer at a lower price than do his competitors. This cut is sometimes made by giving to the buyer a part of his brokerage, or by giving a higher grade of product at the current price, or by an open or secret cut in price. The jobber frequently asserts that he has been offered a cheaper price by a rival broker, and this fact is at once wired back to the packer upon the Coast, to secure permission to meet the cut. Very often these assertions are wholly false, simply a ruse to secure a real cut. The result is inevitable; among a hundred different firms, each anxious to sell prunes, some will be found who will make a concession in price to effect a quick sale; this is followed by others, until the price so declines as to disgust every jobber who has already bought, as well as to warn from buying those who were expecting to do so. If the wholesaler has been able to sell freely to the retailer, the latter, too, participates in the general loss, and he, also, is "disgusted with prunes," and will have no more to do with them than he is absolutely obliged to.

When this sluggish state of the market has been thus produced, the brokers, who also sell many other articles, find that much more money can be made by vigorously pushing the sale of some of these things—dried apples, rice, canned goods, etc.

Thus we see the whole field of selling activity slowing up at a time when it should be most active.

As if this were not enough with which to afflict the industry, the situation is greatly aggravated by shipment of prunes of poor quality—either originally defective in sugar, or poorly cured, so that they have fermented or suffered other injury. Because they all look black and are packed in boxes marked choice, neither the dealer nor consumer readily can detect their poor quality, but when cooked they do not taste good, and the family that has bought them swears off from prunes for a long time. Now, we as a nation are eating hardly more than one pound of prunes each per year, and such experiences with poor prunes tend seriously to lessen even this light consumption.

Contributing to the general uncertainty is the custom of selling futures before the crop can be forecasted, thus arbitrarily making prices unwarrantably low in years of scarcity, since it is almost impossible to raise prices after they have been fixed by extensive offerings of futures. More and more, too, the Eastern wholesaler is insisting upon shipment of prunes in original condition, thus increasing the probability of manipulation of the fruit to the disadvantage of the consumer.

There is nowhere any effective control of the business of selling. The big packers are as helpless as the small ones, and the situation in every way illustrates the evils of a lack of business organization.

Contrast with this the organized methods by which other lines of special food products are sold.

One firm employs three hundred men in the business of pushing its products into consumption. The whole of the United States is divided into districts, with an agent in charge of each one. Subordinate to this district agent is a corps of salesmen in active service and reporting daily to the district supervisor. Each of these superintendents likewise reports to the general sales manager at the head office. This firm spends from one to two hundred thousand dollars per year in advertising the desirable qualities of their goods and explaining how much healthier all would become by using this product—never losing a chance to get a new consumer. They fix the price at which the product is to be sold to the consumer at a point which leaves a fair profit to producer, wholesale and retail dealer, and yet is not so high to the consumer as to prevent the general use of the article by all classes. In case the demand for their goods diminishes in any territory, they at once seek to know the reason and to fix the responsibility for it, and then bring the whole power of their organization to bear upon the recovery of the lost business.

They have annual conventions of their salesmen and supervising agents to compare experiences and advise together for the future advance of the business. They do not hesitate to pay enough to secure the services of the best men to be had for such work.

And this is not an exceptional instance; it is the method commonly used in selling almost all lines of manufactured goods.

Picture the influence upon our dried-fruit and raisin industry, of such an organic system for selling the products. Instead of waiting for something to happen to make prices recover, think of *making things happen* by the pressure afforded by three hundred efficient salesmen wholly devoted to our business!

Think of being able to safely advertise our product because we control the grading and packing and so can "make good" our assertions of quality!

Think of being able to plan for the expansion of consumption by reaching the consumer in convincing ways and to know pretty nearly what our product will be worth several years ahead!

Economy is only possible with organized control, and every efficiency likewise depends upon it.

Some people conceive that such systematic packing and selling of our products would be a difficult achievement. It is always more easy to achieve a desired result in an orderly way than through disorder and confusion.

We may safely say that if ninety per cent of the product could be under a single administrative control, the destructive competitive prune offerings would cease; utterly bad prunes would be kept out of the market, and uniform grades and an honest pack could be maintained; a largely increased consumption could be secured by extensive and expert advertising and up-to-date methods of selling; so that as a result of all these better conditions a market would easily be found for even a large increase beyond our present prune product at double the present price to the grower.

Thus in prunes alone there would be saved to the State over one and one half million dollars; add twice as much more for raisins and other dried fruits, and thus the aggregate would exceed four million dollars which would be saved, but which now seems likely to continue to be lost to the fruit-growers of the State for lack of organization. Surely no other one thing could so powerfully act to promote the prosperity of every commercial interest as this. What a field for efficient work for the one hundred and forty-six promotion organizations soon to meet in State convention at Los Angeles!

Doubtless there is not a single fruit-grower who will hesitate to assent to all of the foregoing; but—and here we are right up against the fundamental difficulty—they say growers will not organize. They have

been so discouraged by the failure of the system of coöperation attempted by the prune- and raisin-growers that they are utterly disheartened and disgusted. Many doubtless would be willing to try once more and this time with a thoroughly tested and approved system; but too many others would want to wait and see if it succeeds before they are willing to join (although that very act from them is essential to its success), and so many others hope to profit by its success by remaining outside, that it is not probable that a controlling percentage could be secured upon a strictly coöperative basis.

Accepting this, then, as one of the facts to be regretted, but yet acknowledged, I suggest that most of the objects sought may be accomplished by a modification of the coöperative plan—a profit-sharing basis.

We may, perhaps, safely assume that the prune-grower, even if unwilling to do business for himself by coöperative methods, will yet be willing to aid in saving the industry, if he can do so absolutely without risk, and at the same time can be sure of getting something more per pound for his prunes in cash on delivery, than now he can reasonably have any hope of getting for the next few years. If the prune-growers will contract to sell their prunes for a period of five years to a corporation to be formed for the purpose of packing and marketing them, receiving from such company, as a consideration for thus giving control for this period, dividends from such profit-sharing corporation amounting to one half of their net profits—if the prune-growers are willing to do this much for themselves, I feel assured that public-spirited citizens can be found with sufficient capital to successfully work out the redemption of the dried-fruit industry of this Coast—first for prunes and then for all the rest. It may be urged that no agreement could be reached as to price, but it would seem that if growers could be sure of getting even a little more than the present price, together with each his fair share of the gains resulting from such organized selling, they should be content. The idea of a long-term contract is familiar to Coast growers, because of the custom of the wine organization, as well as of the canneries, and the plan has been found very satisfactory to both the grape-producers as well as those who grow cannery fruit. We well remember that the state of the wine grape-growers, previous to the organization for selling the product, was most desperate. If, then, they were willing to give control without consideration beyond the market price of their grapes, how much more willing to do this should the prune-grower be, if, without investing anything, he can arrange to participate in the profits of the business equally with those who risk their capital and undertake the stress of managing so large an undertaking? It may be urged that the company would so manage as to absorb profits in obscure ways so that there would be no dividends.

To this it may be answered that doubtless men could be found to act as stockholders and directors in whose character the people of California already trust, and, further, that a yearly audit of their affairs by a public audit company should be provided for.

Of course no large business could be conducted without a basis of confidence between the contracting parties, and the instances where a group of men have abused such are very few.

The contracts should be held in escrow awaiting the signing of a controlling percentage of the crop and the formation of a company able and willing to carry the plan to a successful issue.

All of the details involved in the operation of such a plan could easily be worked out. No fundamental difficulty exists, except the possible unwillingness of the prune-growers to give the necessary control. If once it is put into effective operation it will naturally invite the participation of all other California cured-fruit interests, and would suggest a method available for all other lines of agricultural production, subject, of course, to modifications suiting the varying conditions peculiar to each industry.

STUMBLING-BLOCKS IN THE WAY OF CO-OPERATION.

BY C. D. HARVEY, OF SAN JOSÉ.

When asked by your Secretary for a paper on coöperation, it occurred to me that so much had been said and written upon this subject, and so little accomplished, that the effort would hardly be worth the paper upon which it was written.

A second thought, however, suggests that the consideration of some of the stumbling-blocks which have defeated coöperative efforts would be profitable to us in avoiding the things which occasioned failure in the past and in building upon experience rather than theory in the future.

Fully appreciating that stumbling-blocks are offensive, and that the mention of men's weakness or wickedness is never kindly received, I hesitate between an apparent acquiescence in a popular policy or strenuously advocating an imperative duty. The situation is expressed by John Bunyan's graphic lines:

Well, when I had put my ends together
I showed them others, that I might see whether
They would condemn them, or them justify.
And some said, let them live; some said, let them die;
Some said, John, print it; others said, not so;
Some said it might do good, others said no.

Believing, however, that the present situation demands facts, expressed in direct language, I submit the following for your approval or disapproval, doing what in my judgment a loyal citizen should do for his

fellows: namely, do that which is for the greatest good to the greatest number, regardless of selfish interest or the criticism of selfish men.

When coöperation brings direct personal gain to the individual, coöperation is as easy as rolling off a log, and springs up like the mushroom after a summer shower; but when it means individual or personal inconvenience, it requires effort and self-sacrifice on the part of the individual maintaining coöperative actions. "The greatest good to the greatest number" must be the principle which prompts each participant, if it is to become a success.

Coöperation, as defined by Webster, is, "Acting or coöperating jointly with one another or others, to the same end."

Two requisites are essential to constitute coöperation: First, joint action, one with another; second, acting to the same end, with no antagonistic or diversified interests involved.

Unless action be directed to the same end, it is like a truth half told, it is a lie, and a libel on the word coöperation. As construed and exemplified by designing and unscrupulous men it has wrecked more fortunes, blasted more hopes, and destroyed more confidences among our rural communities than any other word. It has so often been a cover for fraudulent double-dealing that all naturally ask, "Can any good come out of coöperation?"

Looking beyond the narrow limit of our present experience in coöperative efforts, history proves that coöperation is the handmaid of civilization, for where coöperation begins, there barbarism ends.

The absolute right of the individual, namely, the right to do what one pleases, is most fully exemplified in savage life, but is brought under restraint when communities coöperatively establish laws for the mutual benefit and protection of all its members; hence the law restraining what is termed the absolute right of the individual, from doing an act which injuriously affects his fellow, extends and enlarges the liberties of all the other members of that community. In the same manner coöperation in civilized society protects the weak from the exactions of the strong, and the lack of such protection leaves the weak at the mercy of the strong and unscrupulous.

This applies to financial as well as physical inability, and is strikingly illustrated in the prune industry, where prices primarily are fixed by the grower when for financial reasons he is compelled to accept the first offer made for his product. Here protection to one is equally a protection to all.

This principle must be recognized under whatever name it be called, whether it be legislation or coöperation, before prosperity will smile upon the prune industry again.

Having defined the mission as well as the meaning of coöperation as a theory, let us turn to the practical side as it affects the agriculturist.

Here I am at a loss where to begin or what to say. Spread out before me is the great ocean of the world's activities—a restless, surging, unsettled mass; currents and counter-currents on every side, a strong undertow beneath, shifting winds, and hidden rocks covered with the wrecks of coöperative efforts of the past to be avoided, no chart or compass to direct, no fixed star of successful coöperation from which to take our bearing, nothing but the failures of the past to guide our coöperation ship in the future.

Mining, manufacturing, commerce, and transportation, with hundreds of smaller activities, are in the far front. The greatest of all these industries is agriculture, yet it is the least in influence and power as a political or commercial factor. It is a servant of those who serve, and receives less reward for its labor than the laborers it employs. Why is this?

Organization permeates every department except this. As a consequence, the agriculturist is a prey to every predatory combination that coöperates against him, from the wage-earner to the all-powerful transportation companies. And this brings me to my subject, "Stumbling-blocks in the way of coöperation as experienced by an organizer."

Two years ago, from the seclusion of a foothill ranch in Placer County, I, for the first time attended the State Fruit-Growers' Convention. I stopped at San Francisco on my way to the Santa Clara Valley, where I was to labor as State organizer for the Patrons of Husbandry. Seven months of successful work opened my eyes to a more important field than organization for fraternal fellowship alone. Mortgaged homes, rapidly depreciating lands, and discouraged and disheartened growers attracted my attention, and directed my efforts toward a work, where I came into close touch with the growers of the Santa Clara Valley, as well as secured an intimate understanding of their conditions and necessities.

Among the many obstacles to be met in coöperation I mention only such as have been most apparent in my experience, not presuming such to include all, or even the majority of the stumbling-blocks to be encountered in the highway of coöperation.

Selfishness stands at the very gateway, and if taken as a companion will bring disaster as surely as water runs down hill. This has been a rock upon which more coöperative organizations have been wrecked than almost any other—and why?

Speaking from my experience in this valley I can safely say that in the prune industry, nine out of every ten are selfishly waiting for some other than himself to take the initiative, and as soon as prices begin to advance, quickly step around the corner, sell to the speculator at a slight advance and demoralize the market, leaving the coöperator to hold the umbrella while he profits by the efforts. This is called coöperation, where nine tenths are a menace to every effort of the small minority to

maintain a reasonable price. Nine to one practically coöperating with the speculator against coöperation, and then they wonder why coöperation is not a success.

This applies to associations as well as individuals. The unwillingness of one organization to join in a general coöperative movement has proved an effectual barrier to the coöperative effort of an entire community. The past season furnished a striking illustration of this, when all the growers' associations except one having practically agreed upon a plan of coöperation, it was defeated by this single association's refusal to coöperate, unless given the control of the united associations. This refusal resulted in the abandonment of the plan, which could not be carried out under such conditions, and the old rate-cutting plan was restored and reinstated to demoralize the markets and discourage the growers.

Another subtle and dangerous factor operating against coöperation is insincerity (a twin sister of selfishness). Insincerity is a big stumbling-block in an organization's path. It appears under a multitude of forms. Not being what one seems to be; pretending to do what one never does or never intended to do; the doing of things which one agrees not to do; the making of promises with no expectation or intention of fulfilling, are some of its meanings.

Coöperation can no more exist amid such surroundings than a fish can live on land, or a prune-grower raise prunes at the bottom of the sea, for they are antagonistic in every respect to the spirit of coöperation.

Selfish motives concealed under insincere management beget distrust, distrust destroys confidence, and coöperation without confidence is at best an armed neutrality, where each individual coöperator is a competitor against his fellow, guarding his individual interests as jealously as any non-coöperator.

Such coöperation is a farce and a travesty on the word coöperation, for the harmony of action ceases when the individual interest becomes competitive; and when each grower's effort is directed to himself, unity of action is impossible. And this is most apparent in organized associations wherever a general coöperative movement is attempted, for the failure of any single representative to fulfill his agreement with his fellow coöperators destroys and overthrows the coöperative efforts of the entire community. The effectiveness of coöperation is destroyed when insincerity appears, as has been experienced in the past season in the attempt to maintain prices on prunes, when the breaking of one pledge by one individual broke the bands which held the growers together.

The failure of the former movements in this direction of coöperation has discouraged the growers, and ninety-nine out of every hundred point to the California Cured Fruit Association as conclusive evidence against coöperation. This association should be classed among those which were organized ostensibly for the growers, but in fact controlled, man-

aged, and manipulated by those not for the grower; therefore it is unnecessary to mention this failure, except to say that its discouraging influence will be felt throughout the present generation, and will be resurrected whenever it will serve to frighten timid growers into line to sell at ruinous prices and prevent organization.

This, with lesser organizations called coöperative, where dividends are absorbed in salaries and in paying interest on capital stock until the growers' dividends have become an unknown quantity; where increment from processing has entirely dropped out of the statement of account to the grower and has no place in the annual report; where the association, like a two-edged sword, cutting either way, has cut the grower as cruelly in the hands of his own managing board as in the hands of the packers—those are powerful influences in the way of coöperation over which we are stumbling to-day.

To rescue the fruit industry from these conditions the good ship Coöperation must stem the currents, counter-currents, and the undertow of selfishness and self-interests; it must avoid the sunken rocks of prejudice and distrust which have made so many wrecks in the past; it must battle with the shifting winds and changing sands of insincerity, until she reaches the gulf stream of confidence and the trade winds of prosperity.

This will require wisdom, prudence of insight, and self-sacrifice on the part of all who partake in this movement, for coöperation under present conditions means more than the herding together of the masses by self-appointed guardians. It signifies more than a "stand and deliver" scheme to secure fair prices. It means a thorough organization of those personally interested in the industry, beginning with the grower of the product and ending with the consumer—an organization of the growers for the growers, with the speculator and speculating interests eliminated. Based upon neighborhood organization looking forward to a central exchange composed of representative growers from each of the local associations, this is feasible, practicable, and is not subject to the abuses which have wrecked the hopes in the past. And until our coöperative efforts shall be based upon practical and sensible methods, which recognize the rights of the grower to direct his own business affairs as other men, we will continue to stumble over the stumbling-blocks in the coöperative highway until they are removed, for which I earnestly labor and devoutly pray.

PRESIDENT COOPER. I will say that the report of the committee of fifteen, on this question of coöperation, will take precedence to-morrow morning over everything else, at 9:30 o'clock. The chairman will be limited to fifteen minutes, and all others who wish to discuss it will be limited to five minutes, and no longer time, without the consent of the Convention.

CONSIDERATION OF REPORTS OF COMMITTEE ON TRANSPORTATION.

Here the report of the Committee on Transportation was read by Secretary Isaac, and also the supplemental report, and the minority report.

Motion made and seconded that the minority report, made by Alden Anderson, be made the report of the Convention.

PRESIDENT COOPER. You will understand when you vote that this is on the minority report and not on the majority report.

QUESTION. Do we understand that this minority report is to take the place of the majority report?

PRESIDENT COOPER. Certainly.

A MEMBER. I would like to hear the difference between these two reports.

MR. ANDERSON. The reports speak for themselves, but I regret that the audience could not, apparently, hear them read perfectly. I would say that there is very little difference in them except in degree. The majority report has minimized one essential which I think very important. These car lines are all under the control of the Interstate Commerce Commission, and are made common carriers. It is simply a question of degree between the two reports. You heard here this morning a report from a transportation man in regard to the car-line matter. I want to disavow any connection with any car-line company or any transportation company. I don't know anything about their business. But I am interested in orchard products and in California, and I never will do anything conscientiously that will cast reflection upon any single industry in the State.

MR. JACOBS. I will also state that I have no interest in this matter excepting the general welfare of this State, and the difference in these reports refers probably to the question of refrigeration. I have no objection to the majority report, except that it states things that are not true, and that is that refrigeration has been the bane of California. It has been said here that the cost of refrigeration is less in proportion than from other Eastern points. Refrigeration is a special industry; it is a special branch of business. All the railroads throughout the country carry refrigerator cars for the various companies, and my own idea of the matter is, as I suggested a number of years ago when this matter first came up, that if we had an organization in California sufficiently large to invest twenty or thirty million dollars in refrigerator cars, you ought to go to work and buy your own refrigerator line.

DR. DINSMORE. I have had some experience in this matter of shipping fresh fruit. I like the clause in that minority report. I wish it were still stronger. I was reading the other day about the failure of

Porter Brothers Company, in which their affairs were disclosed under oath. I have not yet seen the official report, so what I am saying now is from the newspaper report. It was proved that there was a profit of \$80 from Sacramento, and of \$73 from Riverside. And refrigeration was no option with us at all. It was brought out in the testimony of the president of that company that icing those cars cost just \$10.32 and that there was a rebate given of more than \$70, which was divided among certain people. Mr. Watson said he got \$50,000 in one year. If we could only bring cases like that before the Interstate Commerce Commission, and have a court with power to prosecute for the criminal violation of the laws, it would be effective, and I entirely indorse the minority report and feel that it is not quite drastic enough.

MR. HARTRANFT. This is the first year this question has come fairly before the fruit-growers. On every other occasion it has been the case, in order to vote down the various reports, it has gone on record as being against any advancement along the lines of improvement in our transportation facilities. This year we have got it fairly and squarely set before us, with the distinction between a sensible report and another kind of a report. Now there is a much larger difference between those two reports than most of you think, and I am going to use my five minutes to point out where the difference is. If you will shake Mr. Stephens's sleeve you will find it. Every year he has brought into the Convention an innocent-looking report, and he has hidden in his inside pocket the real facts, and he has held back the true facts. He has given us an unreliable compilation, or partial facts and figures which do not represent the condition of our industries. At the two previous annual conventions he has showed us his report and held back the printed tabulated statement. It does not give us honest figures. And after we have admitted the report, he has circulated in the hall the other one decrying our industries and prosperity, and befouling our own interest. The difference between these two reports is that the one is for a better transportation service, the elimination of the criminal rebate, and defending the name of our fair State, and the other is not. That is the vital difference.

MR. WEINSTOCK. Ladies and gentlemen, I also am opposed to the majority report, partly for the reasons that have already been stated, and partly for other reasons which I shall state. In the first place, the majority report is in error, in my opinion, when it says that the refrigerator business is a monopoly. I do not so understand it. Only yesterday, coming down on the train with Mr. Sprague—his word is always found to be reliable—he informed me that the refrigerator business was not a monopoly of Mr. Armour; the Santa Fé Company had its own refrigerator lines, and that he was at perfect liberty to ship on the Santa Fé, and did ship over that line; that no man is obliged,

or coerced, or compelled, to ship in Armour's cars. It lies entirely with himself to decide whether he will ship over the private car line, over the Southern Pacific, belonging to Armour, or whether he will ship on the refrigerator lines owned by the Santa Fé Company over the Santa Fé lines, and to that extent this report is in error. I am rather inclined in favor of the minority report, because we heard this morning a statement presented by a railroad authority, who pointed out that to compel that particular company to establish a refrigerator car line of its own would involve an outlay of between eight and nine million dollars; that to make that investment on top of existing investments would make the carriage of freights in refrigerator cars unprofitable to the Southern Pacific Company. I, for one, do not want to ask any individual or any company to do that which is unreasonable and unfair and unjust, and if we ask any company or any individual to do business with us at a loss, we ask that which is unreasonable and unfair and unjust. And until the gentlemen representing the majority report can show that these statements made by the speaker this morning are not true, and that the Southern Pacific Company can afford to own its own cars and handle a refrigerator line at a profit, I shall feel that we have no right to ask this transportation company to do that which we ourselves would not do if we were in the place of the transportation company.

Furthermore, it has been suggested here by Mr. Stephens, when the question was first brought up, that if refrigeration was objectionable, and if it was an injury to the industry, we should reject the refrigerator cars and use freight cars. You remember he said that you could not get them. In that he is in error, because only a few years ago, while president of the California Fruit Growers' and Shippers' Association, I received a communication from Mr. Stubbs, who was then in charge of the freight department of the Southern Pacific Company, in which he said that the railroad company was opposed to the use of refrigerator cars; that they had gone to the expense of having several hundred ventilated cars made for the express purpose of carrying fruit, and he urged upon our association to do all that it could to induce the growers to accept the ventilated cars, and assured us that, so far as the company was concerned, he would give them the best possible time. We did the very best we could to persuade the growers to use the ventilated cars, and we absolutely and utterly failed. The growers insisted that they wanted the refrigerator cars, making no objection to the additional cost, claiming that the fruit arrived in very much better condition, so that it commanded the highest price. Hence, Mr. Stephens is in error if he says that the railroad company insists upon the use of refrigerator cars. You can have other cars on demand, providing you act in good faith and assure the company that you are ready and anxious and willing to have them. For all these reasons, gentlemen,

I am opposed to the majority report and shall vote in favor of the minority report.

MR. PELTRET. This proposition clearly puts the matter before this Convention, as I see it, that if Mr. Anderson's report had been presented to this Convention as a majority report there would be no question in the mind of any one about accepting it. All of the provisions in Mr. Anderson's minority report are in the majority report with some other matters. When the majority report was submitted, Mr. Anderson presented this minority report, and that minority report, while stating certain just grievances which required remedy in a transportation way, purposely, apparently, left out the private car-line proposition. Now the result of that was that if the minority report had been adopted by this Convention as the substitute for the majority report, whether intentionally or not, we would have been put on record as being decidedly in favor of the private car lines. That is to say, we would have been in the position of practically saying that one of the worst and most atrocious wrongs which the producing interests of this country ever suffered was not a bad thing. Even in the minority report as it stands now, the proposition in relation to private car lines is left in such a form, and intentionally left in such a form, apparently, as to make it appear that the Convention does not regard private car lines as a bad thing, but that it would like the gracious railroad company, when it is ready to do so, or when it has money, at some time in the far-distant future, to provide refrigerator cars of its own. That is to say, this proposition is not merely to vote on that report; it would otherwise be a good report if this discussion had not come up. You have heard speeches in favor of one and the other, and also honeyed words in support of, and apologies in defense of, the railroad companies which have been such benefactors of the public and of the State of California, especially the Southern Pacific. I would like to talk on this subject for about an hour and a half if I had an opportunity.

Mr. Chairman, over a hundred years ago, because of a nominal tax on tea, certain Americans went upon a ship and threw that tea overboard, and that was the birth of the American Republic, and all because you were taxed without representation. To-day we are suffering with a far greater taxation without representation, of a far more enormous and worse kind, and yet there is hardly one who will get up in opposition to it. We have our Legislatures corrupted, Congress bought, executives controlled, and courts themselves under the control of these great corporations.

MR. GORDON. I do not intend to make many remarks. I did not sign my name to the majority report of the Committee on Transportation. I did not see any reference to any refrigerating matter. I believe the private car lines are absolutely detrimental to the best

interests of the fruit-growers of the State of California. My evidence is this, which I think is not disputed. Porter Bros. of Chicago, for a number of years, paid rebates to different people. If one firm can pay such rebates and make money, why can not others? I am not a railroad man, but I have sufficient confidence in the financial policy of the Southern Pacific Company. And I submit to this Convention that the statements that came from the official of the railroad company are made for the purpose of leaving us a little to one side. If the Armour Company can build 7,500 cars and rent them to the Southern Pacific and net \$75 a car and rebate and make money out of them, why can't the Southern Pacific? That is all I have to say at present.

MR. SPROULE. This is not the first Fruit-Growers' Convention in which I have, by your permission, been a participant; but in all of them those same rash statements, requests, and exaggerations in the resolutions of the Committee on Transportation have prevailed. And I regret to notice that the facts in that report are not as the Convention knows them. To state, for example, that refrigeration is the bane of this State, is, within the knowledge of every fruit-shipper in this room, a fiction. If you will permit me now to give you a history of refrigeration in this State, it is this: At first the Southern Pacific built ventilator cars to carry fruit; finally, some shippers of more advanced ideas, in their own view, devised the scheme of shipping in refrigerator cars, and said that if refrigeration were granted them there would be no difficulty about the time that the fruit would be in transit. The Southern Pacific did not take that view and counseled against it. The facts are, that after the refrigerator car came in, the clamor for faster time was just as insistent as before. The company did not engage the first refrigerator cars; they were engaged by individuals, and the refrigerator charges were three times then what they are now. Finally, connecting roads were compelled to put on cars, the Rock Island Dispatch was put on, the Northwestern went into the business, and as time progressed, it was found that by other concerns going into the business of refrigeration, an additional drawback was discovered. It was found that certain cars furnished by some companies were more desirable than those furnished by other companies, and it was advisable to get a uniform type of refrigerator car, and that was in deference to a public demand. We hauled refrigerator cars to this coast by the hundred, only to leave them on the sidetrack, because the shippers said they were not suitable for fruit. Finally, we developed the plan of engaging a line of refrigerator cars of uniform type and having a provision for their systematic care while in transit so that the fruit would get proper attention. Then, as now, arose the question as to why we could not continue to ship in ventilator cars instead of in refrigerator cars. We were assured at one of these conventions, that if we put in additional ventilator cars to

those we had already had, a large volume of this business would go in ventilator cars and the refrigerator cars would not be necessary and the demand for refrigerator cars would correspondingly decline. What was the result? We put approximately \$750,000 into the highest type of ventilated fruit cars, and those cars remained on the sidings. Shippers would not use them, and we had to change them into box cars or find any use for them that we could. Now that is the condition with which we are confronted in the matter of the ventilator cars. The question was asked, "Why don't you ship in box cars?" The demand for that class of cars is gone, and that it will not come back we have tested. This theory, that there is some collusion under which transcontinental carriers are a party to the robbery of the fruit-grower, I can not conceive. I know the fact is not so. Our contract with the refrigerator car company is on file with the Interstate Commerce Commission. It is a regular business transaction and without any covert clause; it has been before the Interstate Commerce Commission in two cases, and they know all about it, and anything to the contrary, is contrary to the fact.

In the matter of this rebate, it seems to me that what the Convention is really seeking to accomplish is to put itself on record as in favor of the lowest refrigerator charges practicable, and the elimination of rebates of any kind. Now allow me to inquire of this Convention as a business convention if that is not so? Let us get at really what you want in the fewest possible words. If you will bear with me in saying this—I do not wish to be in the position, even by implication, of censuring this Convention. I greatly respect its deliberations and welcome the privilege of addressing you, and anything that I may say is merely in a desire to throw some light on the situation as it exists. I do not know that there is anything further for me to say at this time, but if the Chairman desires any questions to be asked me pertaining to the subject I will be glad to answer them.

MR. STEPHENS. The statement made by Mr. Weinstock is correct regarding whether the company would furnish ventilator cars if desired?

MR. SPROULE. His statement is correct in this sense: The Santa Fé on its rails furnishes Santa Fé refrigerator cars; the Southern Pacific on its rails furnishes Armour's refrigerators. There is no such thing as shipping Santa Fé refrigerator cars over the Southern Pacific lines. The Santa Fé does not accept Armour's refrigerators for shipments over its rails, and the Southern Pacific does not accept Santa Fé shipments over its rails. They are not interchangeable. The Santa Fé provides its own refrigerator cars for its own business, and the Southern Pacific provides refrigerator cars of its own, and the car moves over the line that provides it.

MR. STEPHENS. My question was not relating to refrigerator cars,

or the furnishing of cars. Mr. Weinstock said that if a shipper desired to utilize ventilator cars, the Southern Pacific would furnish such cars.

MR. SPROULE. I don't think Mr. Weinstock said so. However, I will answer it. Indeed, I have already answered it. The Southern Pacific Company to-day has not ventilator cars for the purpose, because, as I have already explained, when we had many hundreds of those cars and all the equipment at the suggestions of the shippers, and the shippers wanted them, they would not use them and we had to turn them into our general business. The last order on these cars was for seven hundred, and we had to turn them into our general business, because the shippers would not use them.

MR. STEPHENS. At one time the Southern Pacific, at the request of the growers, expressly built over seven hundred ventilator cars?

MR. SPROULE. In addition to the thousands it already had.

MR. STEPHENS. Should it develop that the fruit-growers to-day wanted ventilator cars and would indemnify the company with a bond, so that they would suffer no loss, and should want those ventilator cars, could they get them?

MR. SPROULE. I believe so.

MR. STEPHENS. Is it not a fact that shipping is obligatory in refrigerator cars to-day? Supposing a shipper should make application to ship fruit in a box car, could he get it?

MR. SPROULE. He would be idiotic if he did make that application.

MR. STEPHENS. Supposing some of them did, for the purpose of shipping oranges, as some of them do to-day?

MR. SPROULE. For deciduous fruits we give them refrigerator cars; they cost them nothing.

MR. STEPHENS. I am simply asking the question. Is it not so?

MR. SPROULE. Not necessarily so. Let me answer you in another way.

MR. STEPHENS. Mr. Naftzger asked permission of your company some years ago to ship fruit in ordinary cars to El Paso, because there he wished to transfer it to a refrigerator car so as to get a rebate from El Paso on east, and your company refused to give him that privilege. Do you remember that?

MR. SPROULE. I would not be surprised. That was part of the general effort to obtain rebates, which our company, having no desire to share in, did what it could to prevent. We have always stood against rebates.

MR. STEPHENS. If I understand the conditions rightly to-day, the Southern Pacific rents a refrigerator car line, and the Santa Fé owns its own line. What difference is there in the matter of rates between the two companies in refrigeration?

MR. SPROULE. None, so far as I know. If our charges were higher

than the Santa Fé's they would get the business. Regarding refrigerator companies, let me say this: I believe there was such a time; it was a time when the citrus fruit business was in a state of demoralization. The law provided that carriers shall not be party to the giving of rebates. The shippers of southern California, witnesses on the stand before the Interstate Commerce Commission, said that they did not believe there was any fruit shipped out of southern California on which there was not a rebate. In the investigation of the citrus fruit business they did not find that the Southern Pacific had paid any rebates or been a party to their payment. That is the history of that. We endeavor to obey the law. We were then, we are now, and always have been against the payment of rebates.

MR. STEPHENS. If the fruit-growers of this State were to buy their own refrigerator cars from some company, would the Southern Pacific make a contract to handle those cars?

MR. SPROULE. We would make contracts with any refrigerator company under existing conditions if they could furnish the cars in sufficient number and of the proper type; they would have to be such that all railroads would accept them. Those are the requirements.

MR. STEPHENS. Supposing the citrus fruit-growers organized a company and bought nine hundred cars, or enough to handle their business?

MR. SPROULE. It is not a question of refrigerator cars altogether. It is a question also of the organization to take care of them. The fruit is loaded in the car, and the ice is put in the car after it is loaded. That is only the very beginning of the transportation. Now it is required that that car, which is started for a certain market, Chicago, for instance, shall be iced at all points in transit; it shall be iced at certain points, and it shall be ventilated at certain points. May be it was billed for Chicago, and it may go to Duluth, or to Boston, or to Jacksonville, Fla., or Memphis, Tenn., or Galveston, Tex.; it may be diverted to any town in the United States, and is diverted in a large number of instances to any town that the shipper designates. It requires organization to do this; it can not be done otherwise. If it were not so, disaster would result of the worst kind. Consequently the carrier has to provide the ice at the proper places; the carrier has got to provide for its wanderings all over the United States, and divert the car, depending upon the exigencies of the market and the stress of condition which the shipper and the consignee are confronted with. All of this organization costs money, and business can not be done except for reasonable compensation.

MR. STEPHENS. Do I understand that it would be impossible for the Southern Pacific to own its own refrigerator cars?

MR. SPROULE. Yes, sir.

MR. STEPHENS. Is it not a fact that the company can not send its cars over the Santa Fé?

MR. SPROULE. The Southern Pacific Company has no jurisdiction beyond its own rails. No other road has jurisdiction beyond its own rails. That is true of every road in the United States.

MR. STEPHENS. Do I understand that it would be impossible for the fruit-growers, if they bought five hundred refrigerator cars, to get ice, etc.?

MR. SPROULE. I certainly think so.

MR. STEPHENS. In regard to the diversion you spoke of, that would be within the control of the refrigerator company, I presume?

MR. SPROULE. The diversion is under the control of the railroads, but the railroad diverts at the will of the shipper. The shipper, not the railroad, determines the route of the freight. We have no jurisdiction over that. We accept the routing given by the shipper over our rails and connections. In diverting these cars we must have an understanding with the refrigerator car concern. It must be iced at certain places, and ventilated, and is likely to be diverted. We divert the car at the request of the shipper, and see that the Armour Company provides the necessary ice and care during transit; that is part of their contract. Our contract with them provides that we are to use their cars up to a limit of five thousand individual cars. Beyond that we may provide refrigerator cars for all purposes.

MR. STEPHENS. Then, so far as operating five thousand cars on your line, they would have a monopoly of this business?

MR. SPROULE. Yes, over our rails, and so will any refrigerator company that operates in the green fruit business over the rails of carriers.

MR. STEPHENS. Supposing the fruit-growers were prepared to purchase five hundred refrigerator cars and the Armour Company had not the full five thousand cars in operation over your line, we are absolutely barred from going on your road?

MR. SPROULE. What good would those five hundred cars do you without an organization to care for them?

MR. STEPHENS. If those growers gave you a satisfactory bond that they would not hold you liable for any damage?

MR. SPROULE. The bond would not be worth the paper it was written on, because if we accepted the cars our liability begins as a common carrier. We would be liable if we neglected our duty. If it were a more economical thing for the Southern Pacific to own and operate its own refrigerator cars to-day, and the money were available to do it, I do not see why it should not do it. But the fact remains that we do have the private car lines, and it would take an investment of between seven and eight million dollars for that equipment, the greater part of

which would be lying idle nearly half of the time. I know that fair-minded men like you are can not expect the Southern Pacific Company to establish this, because it would be too expensive a project. The Armour cars are used all over the United States, and their cars are in service the whole year round. When they are not in use in California, they are in Florida, or in the banana trade from the Gulf, or in New England; all over this country and Canada; and they can keep their cars employed when we can not. That is the reason why we can more economically make a contract with the Armour car lines than we can furnish the cars ourselves.

MR. STEPHENS. Does the Great Northern and the Canadian Pacific own their own car lines?

MR. SPROULE. They do to some extent, but their business is but a few hundred cars; their fruit is almost all managed west of St. Paul.

MR. STEPHENS. If it should appear that a thorough coöperative organization of the fruit-growers of California were to provide their own refrigerator cars necessary for their service for the purpose of transporting citrus fruits and deciduous fruits, would the railroad as readily make a contract with them as with the private car lines?

MR. SPROULE. When the fruit-growers of California come to the Southern Pacific with a proposition to supply their own refrigerator requirements for the future, so that we can abandon our contracts now existing with these refrigerator companies, they will be received in precisely the same way as any other refrigerator company seeking to contract with us, on a business-like basis, for the use of the equipment and of the organization that goes with it for the protection of the fruit wherever found in the United States.

MR. STEPHENS. I suppose it would be sufficient for a time to show that the fruit-growers of California could successfully do business coöperatively?

MR. SPROULE. The answer to that would be, when the fruit-growers of California get into the refrigerator car-line business upon that scale, a fraction of their business will be fruit-growing, and the important part of their business will be the refrigerator car-line business. There is nothing in it.

PRESIDENT COOPER. The chairman of the majority reporting on transportation is entitled to fifteen minutes. Fifteen minutes now would be too late, and we had better postpone the vote on the subject until the chairman of the majority has a chance to say what he desires to say; so I think it would be better to take an adjournment to the hall in the St. James Hotel at 7:30 P. M.

(Calls of let us have it now; we won't be there to-night.)

MR. JUDD. Can I be heard on a question of privilege? Gentlemen and ladies of this Convention: My name appears on that majority

report. I put it there for the very best reason—that it does not indorse any private car line, while the minority report does do that thing. Mr. Sproule made a remark here—he says that all over the United States the Armour cars are used. Well, that is so. But the Great Northern, Canadian Pacific, and Northern Pacific do not have car lines up there, and I want to say, gentlemen, right now, that the refrigerating charges are only on the initial icing, from \$10 to \$15, with an eight-day schedule to New York. The rate on all refrigerated fruit is only \$1.18 a hundred pounds; the rate on all common fruits shipped in refrigerator cars without icing, like apples, etc., is 60 cents a hundred pounds, and delivered in eight days.

MR. STEPHENS. It is stated that the Santa Fé charges the same rate that the Armour Company does. It was stated upon the stand, I believe, before the Interstate Commerce Commission, that the Santa Fé paid a rebate of \$25 a car, in order to compete with the Armour Company. Now if the Santa Fé had to pay \$25 in order to compete with the Armour Company, what is the natural deduction to make from that? It is that the Armour Company was also giving rebates; and these rebates had to be given to the shippers in order to get the business. It has been stated by Mr. Sproule and by Colonel Weinstock that at one time the growers of this State could have had the use of the cars. Now, why didn't they get them?

MR. SPROULE. I said they had the use, and had them for a year. Don't misquote me, if you are going to quote me.

MR. STEPHENS. I believe you stated you built seven hundred additional cars?

MR. SPROULE. I told you, sir, from the platform, we had several thousand cars, and by a statement of representatives of the fruit-growers we put \$700,000 more in, and they lay upon the sidetrack and you used refrigerator cars then.

MR. STEPHENS. Then the cars were not used. It is also stated that the cost of refrigeration was twice as much as it is now, or, comparatively speaking, so. The men who handled your fruit, growers, were shippers. Porter Brothers Company and Earl Fruit Company each controlled a refrigerator car line, and if the profits on refrigeration now are sufficient to afford a large rebate, as the Santa Fé says it gave, and that Armour must give, what was done to the shipper? We consult the evidence given by Mr. Watson. He admitted the receipt of \$50,000 a year just about that time, and before and after. So that shows what can be done by refrigerator car lines. I declare here that the refrigerator car line company can and does control the distribution and marketing of the fruit products of this State.

MR. SPROULE. That is not true. I know of my own knowledge.

MR. STEPHENS. I will ask you, Mr. Sproule, if you believe the

condition existing, that will make it possible for Mr. Armour, if he sees fit, to make a profit of \$1,200 a car, when the grower receives hardly a pittance, is a good thing for the fruit-growers of the State of California? Last winter the members of the California Fruit Distributors bought, on the Sacramento River, pears at 50 cents a box. Some of those pears sold for \$4 a box. In round numbers that makes \$1,920 a car. The freight was \$360. We will add 15 cents a package that it costs to put these pears up, with \$10 and some odd cents for refrigeration, and that makes over \$1,100 a car at any rate.

COL. WEINSTOCK. Mr. Chairman, I move that Mr. Stephens have double time added for all interruptions. I have as my authority Mr. Sprague, in whom I think we all have confidence, who told me yesterday that most of the pear-growers on the Sacramento River have usually sold their pears at 50 cents a box; they received this past year 70 cents a box. Is that correct?

MR. SPRAGUE. Yes, sir.

COL. WEINSTOCK. At that rate, the growers along the Sacramento River received more money for their fruit this past year than they have in years previous. They were at liberty themselves, as I understand it, to take the speculative risk, and ship East, if they chose to do so; but they preferred to take an absolute price of 70 cents, forty per cent more than they had received in years past, rather than take any chances of shipping East. It may be that there were some cars that netted the speculators \$1,200; but, as I am informed from reliable authority, there were tens of thousands of dollars lost by the speculators who shipped their pears East this year. Is that correct, Mr. Sprague?

MR. SPRAGUE. I understand that that is the case.

COL. WEINSTOCK. Yes, sir; that is. There were thousands of dollars lost. And when Mr. Stephens tries, by implication, to leave an impression that somebody made at the rate of \$1,200 a car, he is endeavoring to leave a false impression that ought to be corrected.

MR. SPROULE. May I rise to a point of information that is important to the question before you? Under our arrangement with the Armour car line, no fruit is transported in these cars that is owned by the Armour Company. We did have a contract with a company to furnish refrigerator cars, some years ago, which was greatly objected to by the fruit-growers, because Mr. Earle was in the fruit business. We canceled that contract at the request of the fruit-growers, and entered into a contract with the Armour line on the condition, and notified them, that if we found they were interested in the fruit business over our rails, that any fruit in those cars was in their name or title, we would not renew the contract.

MR. STEPHENS. I will ask Mr. Sproule when the contract to that effect was signed?

MR. SPROULE. When the present contract was entered into. Some two or three years ago.

MR. STEPHENS. In regard to Alden Anderson, I wish to say this: He stated in his report here that the organization did not handle fruit for itself, as an organization; that it did not buy fruit, and in no way was connected directly or indirectly with the marketing of fruit or proprietorship of fruit. But he did not tell you that the members of that organization did not buy fruit. Mr. Anderson told you the reason the Distributors are of so vital importance in the necessities of the growers is that it can distribute at will and prevent gluts. Now, gentlemen, think a moment. If it can prevent gluts, it can create gluts at will. It can select a market for the f. o. b. fruit. I will state that any such a machine in the hands of any intelligent man can put the growers in a position that they will be compelled to sell their fruit f. o. b. In one week ending August 5th, of this year, the average loss on the sales of every car that was sold at the Eastern markets, reported here, was an average of \$429 for every car—something over two hundred.

MR. DORE. How many of those cars were owned by the company—the refrigerating company?

MR. STEPHENS. I don't know. You will have to ask Mr. Armour.

MR. DORE. You stated they were in the business. Then of course they lost.

MR. STEPHENS. I don't know whether they did or not. We only get the reports of auction markets. Now, sir, as a business proposition, Mr. Dore, if you had ten cars of fruit, you might have to sacrifice three cars, put them into glutted markets, in order to protect your private markets where the other seven went, and if you could control distribution, you are absolutely master of the quantity of fruit put into those protected private markets, and while you might lose \$100 or \$300 a car on the three cars, you could make \$400 on them, and it was a business proposition, the necessities required that you distribute your fruit in this way in order to make a profit—

MR. DORE. I understood you to say that for a certain time all the shipments were at a loss?

MR. STEPHENS. No, sir. I say the reported sales, the sales in the auction markets, and I think it was three hundred and odd cars, sold at an average loss, last year, of \$429 a car, and the aggregate loss for fourteen weeks this year I presume was over \$830,000.

MR. SPROULE. What are the causes of those losses?

MR. STEPHENS. In my judgment, the Armour car line.

MR. ANDERSON. This morning I presented a report of the California Fruit Distributors, and I challenge denial of anything I asserted in there; and Mr. Stephens stood up there and moved that the report be accepted and placed on file, and now he is attacking that report. I

rise to a point of order. It is not pertinent to this business, the transportation question. If he goes on, I demand a chance to reply to it.

MR. SHOUP. Just one moment. I rise to a question of personal privilege. There are statements made by me in my article that have been challenged both on this floor and outside, and there are one or two gentlemen who have laughed at the statements I made. I simply want to say that I am prepared to prove any statement that was in my article upon this subject.

MR. STEPHENS. Mr. Shoup, I want to ask you one question. Can I have the privilege?

MR. SHOUP. Go ahead.

MR. STEPHENS. I would like to ask why it costs the Southern Pacific more to haul a carload of prunes in bags than in boxes?

MR. SHOUP. I did not say it costs the Southern Pacific more.

MR. STEPHENS. Well, there is a difference in the rate.

MR. SHOUP. I did not say there was not.

MR. STEPHENS. Then you admit there is an increase in the rate?

MR. SHOUP. Yes, sir; and made at the request of fruit-shippers and fruit-growers of the State of California, in 1893.

(Question called for.)

THE CHAIRMAN. Now, the Convention will understand the question is upon the adoption of the minority report. All those in favor of the adoption of the minority report will hold up one hand.

(Secretary counts 53.)

THE CHAIRMAN. All those opposed to the adoption of the minority report will hold up one hand.

(Secretary counts 9.)

The Convention then adjourned until Thursday, December 8th, at 9:30 A. M.

PROCEEDINGS OF THIRD DAY.

THURSDAY, December 8, 1904.

The Convention was called to order at 9:30 A. M. President Cooper in the chair.

PRESIDENT COOPER. The chairman of the Committee on Resolutions has some resolutions he wishes to read.

REPORT OF COMMITTEE ON RESOLUTIONS.

Hon. John Markley, chairman of the Committee on Resolutions, reported the following resolution (introduced by A. N. Judd), with the recommendation that it pass as amended:

WHEREAS, The Government of the United States, through treaty and by purchase has acquired the Panama Railroad, or at least sixty-nine seventieths of the same; and,

WHEREAS, There exists at the present time between said railroad and the Pacific Mail Company a certain traffic contract; therefore, be it

Resolved, by the Fruit-Growers of California in Convention assembled, That said contract is extremely detrimental to the best interests of the Pacific Coast in general, and, to the fruit-growers in particular; and be it further

Resolved, That the fruit-growers of California herein petition the President of the United States, that he will, at his earliest convenience, abrogate said traffic contract. By so doing, he will not only greatly increase the traffic for said railroad, but very materially reduce the present burdensome transcontinental rates.

On motion, the resolution was adopted by the Convention.

The following resolution, introduced by Edward Berwick, was reported by the Committee on Resolutions, with the recommendation that it do pass:

WHEREAS, Our postal service is at present lamentably deficient in the matter of an up-to-date foreign and domestic parcels post; and

WHEREAS, The American express companies have found it possible to inaugurate for the British postoffice a postal stamp rate on British parcels of 24 cents for eleven pounds, to any postoffice in the United States, thus proving the practicability of profitably doing the business at such a rate.

Resolved, That this Convention of the Fruit-Growers of California, assembled in San José this 9th day of December, 1904, hereby requests its Senators and Representatives in Congress at Washington, D. C., to introduce and support such measures as shall secure for the American citizen, through the United States postoffice, a parcels post at least as cheap and effective as that now afforded by the American express companies to the Briton.

Resolved, That this Convention also requests the President, in conjunction with the Postmaster-General, to conclude postal conventions for the handling of parcels up to eleven pounds weight, with all the nations who are present members of the International Parcels Post Union; this on as favorable terms as those enjoyed by the citizens of Mexico and European lands.

MR. BERWICK. You have heard the resolution read. You have heard that the American express companies are carrying for the British public eleven pounds for 24 cents between New York and California. I have in my hand a letter received this morning from Professor Wickson, whom you all know and respect highly, in which he says that they have agreed to carry for the French public eleven and a fraction pounds for 24 cents between New York and California. I thought I would tell you this as additional proof of the proposition. If it can be done and is being done for the British and French people, it has got to be done for the Americans. (Applause.)

The resolution was carried as read.

The Committee on Resolutions then reported favorably on the following, and it was adopted by the Convention:

Resolved, That we request the Governor and Legislature to provide for a non-partisan revenue or tax commission, whose duty it shall be to formulate a revised code of revenue laws which will provide a different system of revenue for the State from that for the county or municipality. That this may be accomplished, we ask the Legislature to submit a constitutional amendment to the electorate, enabling the commission to formulate, and the Legislature to enact, a revised and equitable system of revenue laws herein contemplated.

DISCUSSION ON TRANSPORTATION, ETC.—(Resumed).

MR. SPRAGUE. Mr. Chairman, just a word or two preliminarily. In the heated affray that took place yesterday afternoon I was not able to say all I wanted to. I want to say emphatically that in my judgment there is no truth whatever in the charge that the California Fruit Distributors were managed dishonestly. I was in the office nearly every day during a busy season, and so far as I know there was absolute impartiality shown in the distribution of cars. I want to say that there are undoubtedly limitations in that organization. But it is not true that cars were distributed to the disadvantage of any one man more than another. Secondly, I want to say that it is not true that that organization showed any special favor to the Armour interests, that is, this year at least. Evidence of that is the fact that we, a coöperative organization, made up of growers, absolute coöperation, gave a large portion of our business, almost half, to the Santa Fé refrigerator line, although we were members of the California Fruit Distributors. Because we brought the Santa Fé Railroad here into competition, we enable the fruit-growers on the Sacramento River to get 60 cents instead of 50 cents for their pears this year. A coöperative action was what brought that condition about, gentlemen. If you wish relief, get together coöperatively; you will then get relief in the way of transportation, and that is the only way it can come.

MR. STEPHENS. It is hardly fair to cast reflections upon state-

ments made by another member without his having an opportunity to place the matter right before the Convention. And I should have an opportunity to answer.

MR. SPRAGUE. I have cast no reflections at all. I will speak absolutely on the subject of coöperation, which I think is very closely allied to the subject of organization, of the dried fruit interests of California. Unless we can secure an efficient organization for the marketing of our dried fruits, there will continue to be a surplus of fresh fruits pushed into the Eastern markets; more than can be sold. We can sell, in an ordinary year, in the East, from five to seven thousand cars of fresh fruit. It does not matter what the conditions are back East, we can sell the minimum amount of fresh fruit. When we get a thousand or two cars over that, that is enough to make a surplus, making low prices. If we can keep back a thousand or two cars of peaches each year we can prevent this glut and keep the fresh fruit market prosperous. We can not keep those cars back unless we can make it profitable to dry the fruit. It would not be profitable to dry it unless we could get an organization which will control the marketing of it here, in a systematic, business-like way. The same thing is true of apricots, and, of course, you know the condition of prunes. Now this is preëminently a fruit-growing State. It is the fundamental industry.

Now there are two questions presented to this Convention about this report of this committee of fifteen. One is a method of strictly coöperative organization. If that is not available, then the only alternative is the profit-sharing plan, which I think is more available, and should be the one favored by you. Then the question is, which of these two plans is more likely to obtain the favor of the fruit-growers of the State? There is one way, of course, in which all of these things will right themselves, but that is through utter ruin and chaos; it is through the foreclosure of mortgages, and the breaking of hearts. Are you willing to let it go that way, my friends? If there is an ounce of manliness left in the fruit-growers of California, if there is an ounce of courage left, they ought to stand together and step forward and say *NO*. Why, the ignorant garment-workers, the Polish tailors of New York, the unskilled labor fresh from Europe, suffering there in the sweatshops for years, under the most terrible conditions that human life could find, had the courage and intelligence to get together and coöperate, and to coöperate so effectively that they have put all of those conditions in the past. They have improved their scale of living; their wages have become better. They have solved the problem, in spite of the fact that three or four thousand are coming to New York every year, and still they are able to maintain coöperation. Should it be said that the intelligent fruit-growers of California can not do as much as those people? Now, I said to a gentleman yesterday that ruin would come

unless something is done to organize. He said, "Ruin is here. Half of our orchardists don't know how they are going to get through next year." All of the fruit men in this room know that there is no future for prunes, with an average crop, with conditions as they are now, unless we can secure an organization to push the marketing in intelligent, business-like ways. Now then, I ask you if there is anything more important than that? And if we are to be content with merely passing resolutions—if we go out of this Convention before we adjourn, without agreeing upon the most practicable plan, according to the judgment of all—we will make a mistake. Now I am not going to take more time except just simply to beseech you that in this discussion you keep clearly the difference of these two points, which of these two points do you think most available? The Rochdale plan has been put forward, and that has been used successfully by business organizations; it is the plan used by all fraternal organizations, but I don't think it is practicable. I think the discouragement and disgust that have come upon our fruit-growers generally are the results of the failure of the prune association and of the raisin association, and will prevent any genuine coöperative organization. I believe that the profit-sharing plan is practicable. I think it will appeal more powerfully to the fruit-growers of the State. I think that after the termination of the five years' contract it will then be possible, very likely, to have a coöperative organization. Now then, gentlemen, I leave the subject with you, hoping that you will keep closely to the discussion of those two things.

REPORT ON PRUNE DEMONSTRATION AT ST. LOUIS.

BY PROF. C. W. CHILDS.

Mr. President, Ladies and Gentlemen: For some years I have advocated the plan of advertising prunes by demonstration, and this last spring Colonel Hersey and Mr. Lyon and some other members of the Grange and the Farmers' Club said to me: "You have talked over this subject a good many years; now put it into practice." They said: "If we can arrange to have you go to St. Louis and cook prunes and give them away, will you do so?" I said, "If you will simply pay the expenses of myself and wife, we will go there and see what we can do for you." So they raised \$2,000. And let me say that we spent six months giving away two thousand dishes of prunes a day, and when we made our report we turned back \$200, so it only cost \$1,800 to do this work. Before returning I visited western New York, visiting such cities as Buffalo, Syracuse, went down through Pennsylvania visiting the miners, in Indiana, Ohio, and Illinois, and I believe I have talked to more

people than any other man who ever went back East from this State. Over two thousand people passed through our booth every day; we gave prunes to two thousand, and probably a thousand more came through the doors. Now, when I went East I was under the impression that the people did not like prunes, and that that was the reason there was no demand for them. But to my surprise, ninety-five per cent of the people whom we questioned said they liked California prunes. I was surprised at that. We asked these two questions of the people: "How do you like California prunes?" and "What are you paying for them?" I was surprised when I found that nine tenths of the people said they were paying 12½ to 15 cents a pound for prunes. I went to western New York, Buffalo, Rochester, and spent some time in Detroit, and different towns like Cayuga, Seneca, Onondaga, Ithaca, and Syracuse, and I asked the same questions. I found that the merchants in many places kept their prunes in bins, all mixed together.

In St. Louis, in a store close by where we were stopping, they were selling two pounds of prunes for a quarter. We lost a great many prunes because of molding. In our booth we had prunes from every packer in this valley, fifteen or twenty boxes, and there was not a box, by the 10th of August, that we dared open. All the processed prunes had spoiled. Those in bags did not. We had to write back for more prunes, because the processed prunes had spoiled. Those put up in bags and unprocessed, kept much better. When I left there in October, the prunes that were unprocessed were in good condition. Some had sugared a little, but none had molded.

In Oakland the other day, I sent out to get some prunes, and we got some from two or three different stores. None of them were fit to eat and we had to throw them away. So I sent down here to the fruit exchange and got a sack of unprocessed prunes. In the East I asked a good many dealers why they did not deal in California prunes, and they said they could not afford to deal in them. They were not pushing California prunes and did not buy them to any extent at all in the present condition. The demoralized condition of the market keeps them from buying. I have come to the conclusion that all this talk and discussion about transportation, so far as dried fruit is concerned, is nonsense. If the railroad companies would carry your prunes for nothing, and you spent a hundred thousand dollars in advertising, as the California Cured Fruit Association did, you would not be any better off. If you can not get the prunes to the consumer at a less rate than he is now paying for them, there is no use in selling prunes at all. That is the question. The whole problem is how to get prunes to the purchaser, the consumer, at a less rate than you are to-day. Now all of these people who said they liked California prunes would be glad to use them if they could get them at a fair price. And when you have settled that

question, you have got the whole question settled. That is my opinion, after a very careful examination of the situation, and after questioning thousands of people this last summer.

DISCUSSION ON CO-OPERATION.

MR. JACOBS. About a year ago I was invited by one of the leading combinations in the East to write a history of the California fruit industry from its inception. Having grown up in the fruit business, I made a very exhaustive examination of the subject before proceeding to write the history, and I was surprised at what I found. I discovered that right from the beginning of the fruit industry there had been many discouraging features. I discovered that dried fruit was overproduced over twenty-five years ago. The result was that the people were compelled to look for new markets. When the canned goods business began in 1878, a meeting was held in San Francisco; the banks withdrew all support to the canners; they said there was overproduction. So you can see that it is less a question of transportation than of distribution. For a number of years, up to two years ago, I have written papers presented to the State Fruit-Growers' Convention on this subject, the wider distribution of our products. I contended then, and I contend now, that that is the solution, the actual solution of the question. Transportation, while an important question, is not so important. In the green-fruit business it is a question of expeditious service. But unless you have a systematic method of handling your products you will not be able to succeed, and the results have proven this in both the prune and the raisin business. Coöperation in dried fruits and in canned fruits alone in shipping will succeed. I will state right here now, and I challenge any one to contradict the statement, that if it had not been for the fruit-canning industry of California during the year 1904, your growers would not have known what to do with their products. And yet the California canning industry only handles a very small proportion of the fruit crop of this State. We have got to face the situation as it is. I think the second plan is best, but we must exercise the necessary care and skill in selecting the management, so that the fruit will be honestly distributed and handled, so that there will be no dishonest dealing of any kind.

MR. GORDON. I am very much interested in this subject. I believe that this coöperative proposition is the right thing for us to pursue; and it has been the prominent factor that has entered into every fruit organization attempted in this State, to my knowledge, at least north of the Tehachapi. We have been shown the necessity of something being done, and the committee has outlined this plan of coöperation to save the fruit industry of this State. The plan is beautiful, but putting it into execu-

tion is the next thing. In reference to the organization and coöperation of farmers, I have had some considerable experience. I spent the greater part of one summer in trying and helping to organize the Raisin-Growers' Association. I claim, after spending anxious days and anxious evenings laboring and lecturing to the raisin-growers, to know something of their disposition; and I presume the disposition of the prune-growers is about the same as the disposition of the raisin-growers. Now, gentlemen, this one thing is true, and I defy contradiction. There is no plan, there is no man, there is no power outside of the intervention of the Almighty that can make all of the raisin-growers get together into an association. There is no power, no man, no leader that can get all of the prune-growers into one association. Now, then, Mr. Chairman and Mr. Sprague, unless you can provide a plan whereby you can bring them all in, your coöperation must end in failure. There is one third of the human family that can get along all right without being mean or ridiculous. Now, then, one third of the fruit-growers in this country are earnest, coöperative men and will do anything at all to save the industry; that one third, by persuasion and labor, and anxious days and anxious nights, can draw another one third in, but no power outside of the Almighty himself can draw the other one third in. That one third will prevent the organization of the fruit-growers of this country. The Raisin-Growers' Association has only three thousand growers in it. At first many of them stood together; but those outside of the association were making more money than those inside. At last some of the members in the association got dissatisfied, and in some cases they delivered one half of their raisins by moonlight to their neighbor who was outside of the association, and the other half they would deliver to the association.

MR. SPRAGUE. We all know perfectly well that the raisin association did not succeed. Let us quit discussing this and keep to the line.

MR. GORDON. I propose to give you a remedy. I believe that no human being on earth could get all the fruit-growers into an association. Now then, unless something can be done, we can come here year after year; we can pass a fiery resolution, and we can get up those theories that read beautifully, but they are not effectual.

MR. JACOBS. I want to ask a question of Mr. Gordon. Is it not a fact that when they started the coöperative plan in Fresno prices nearly doubled in value for the next few years and brought millions of dollars to the producers?

MR. GORDON. They did not double; they increased in price. They did make millions of dollars. But those outside were making more money than those of us inside. I say that there was an overproduction, and it is proved by the fact that 40,000,000 pounds were piled up in the month of August last year. That showed clearly and conclusively that the raisin business was overproduced.

PROF. FOWLER. I do not propose to discuss the question as to whether coöperation is a good thing or not. I do not believe that there is a man or woman in the fruit business or in the agricultural business in this State who is in this Convention here but recognizes the fact that some kind of coöperation is necessary. The question is, how? I believe that the plan of organization that will be available to the fruit-growers of this State is to have branch organizations in the different parts of the State, composed of those having interests in the fruit business and in their homes, and these organizations may be unified in one central organization. I believe that is the plan that you will finally adopt. It is the unit idea; it is the home rule, home government, and it is the unification of all these in one central organization to do all the business. You say, is this possible? We have this plan working at San Diego and other points in California, in Oregon and Washington, and they all have confidence in the central organization, located in San Francisco. Last year it sold over \$50,000,000 worth of products. I could elaborate upon this plan if the time permitted. You can send and get printed matter concerning this method of coöperation if you wish and study it for yourself.

Upon calls for the question, the Chairman put the question on the resolution directing the Horticultural Commission to correspond with the growers to the end that a definite coöperative plan may be settled upon, and it was carried.

MR. DAY. I have been connected with the Southern California Fruit-Growers' Exchange. In 1893 the orange-growers of southern California were in just the same condition that you people up here are in now. You have been told that you must line up all together before you can do a thing. What is the fact in southern California? The exchange down there has only one half of the orange-growers that are shipping through the exchange, and yet what is the result? We are successfully operating. How have we done it? We have cut out the middlemen. We are selling our products to the consumers direct. We have reduced the cost of selling from 10 cents a box commission to 3 cents. We have cut out the middlemen; we are packing and handling our products from the tree to the consumer. And that is just exactly what you want to do. How do we sell them? We pack and grade, and we have spent years in establishing our brands in the associations, and those brands to-day are the most valuable assets we have. Our brands have become well known in the markets of the East, and we have many customers there who buy them year after year. We have built up our reputation. The fact is that we run the association upon a business basis. Where is our capital? The only capital we have is the money that we have in our own packing-houses. We handle our fruit economically. We have cut out the middlemen; we have cut out all packers, packing and handling

our own fruit, and we distribute it ourselves upon an economical basis. And it is possible for you to do the same thing. It is a waste of time to talk the theory. You can do it with only one half of the fruit-growers, as we did with one half of the orange-growers. One half of the orange-growers are outside, and they are helping the commission men to fight us, and yet we can market our fruit cheaper than they can and yet sell at a higher price.

MR. STEPHENS. I am a prune-grower quite extensively. A very large portion of my money is in prunes, and consequently I feel a very large interest in this question. In a dozen words let me say to Mr. Sprague and to Mr. Jacobs what I think I would have expressed yesterday had I been permitted to express myself as I had intended. I would not have said what Mr. Sprague said, as he said in a conversation with a gentleman yesterday, that our State is lost unless we had organization, or that ruin is here now. I would not have been so radical as that. I was not here yesterday when this proposition was read.

MR. SPRAGUE. The proposition is this: We can submit to the prune-growers of the State this proposition, providing that each prune-grower shall agree to sell his product for the next five years at a price slightly in advance of the market price at the time this contract is submitted to the people. Put those contracts away until we have accumulated a sufficient percentage to make it a probable success, and also awaiting the formation of a commercial company that will undertake to carry out the plans of the organization.

MR. STEPHENS. In the event a market is not found for the prunes, who will bear the loss of the prunes?

MR. SPRAGUE. The capitalists.

MR. STEPHENS. Then I understand that if they bring a profit, whatever that profit may be, that profit will be equally divided between the capitalists and prune-growers? Well, to that I have got serious objections, because I have put about twenty years in growing my orchard and renewing it each year. I have no doubt that if such an organization could be formed, in the end the entire prune interests would be turned over to the capitalists. They would get fifty per cent of the profit, and that would give them a half-interest in the business.

MR. SPRAGUE. Divide the profits on marketing. If there was a loss they, and not the farmer, would stand it.

MR. STEPHENS. Well, I am opposed to that. I am in favor of coöperation. I am a strong advocate of coöperation. I say I am a strong advocate of organization, and without organization you can accomplish nothing in any way, shape, or manner that will redound to your interests.

MR. McDONALD. Mr. Chairman, I have not consumed much time in this Convention, but I want to say that it gives me great pleasure to

be present here and hear this discussion. I am a representative. It has done a great deal of good, at least I think it has, toward promoting the interests of horticulture. We have produced a good many and brought forward a good many persons who have been favorable to the horticultural interests; for instance, we have produced one who is now a member of our State and a valuable acquisition, and that is Mr. Burbank. I had a conversation with him only a few days ago; he is deeply interested in this State, and in horticulture, and is ready at any time to do anything he can in our behalf. Now I want the Horticultural Society of Sonoma County to be recognized here by the horticulturists of the State, and we are glad to be here and deliberate with you, and if we can do anything toward favoring those interests we want to do so. I simply say, without advocating either of the methods spoken about, that it does seem to me that the one Professor Fowler spoke about, along the lines he suggested, is the one we should follow. And then the one suggested by Professor Childs is a practical one, the plan of putting prunes on the market at a price at which the people can afford to buy. I do want our society on any of the committees that may be appointed, or in anything else we want to be recognized, so that we may work with you and for you.

MR. JACOBS. I want to ask Mr. Sprague a question, as chairman of the committee which introduced this report: Do you think that if the second proposal were adopted, a sufficient capital could be secured to put this plan into operation?

MR. SPRAGUE. There is only one question before you, and that is how to get sixty or seventy or eighty or ninety per cent of the prune-growers to make these contracts at the market price, to sell their prunes at the market price. That is the only thing before you. How can you get them to do it? The capital can be secured. I speak authoritatively. I know it is simply a question whether your prune-growers are willing to help themselves to that extent.

MR. JACOBS. If sixty or seventy per cent of the prune-growers would combine together on this second plan, is it not your experience that the price of prunes would bring half a cent a pound more than they do at present?

MR. SPRAGUE. There is no question about it in my mind, that if the prunes were under business control, so that the business could be pushed by the single idea, the single policy, they could be sold steadily on a 3-cent basis. But if you do not get ninety per cent you will not accomplish so much. You need ninety per cent in order to accomplish that. With a small percentage you can accomplish only a small good. You will accomplish considerable good with a small percentage, but your amount of good is entirely in proportion to the amount of the coöperation you get. Do not think that with any such organization as this on

a profit-sharing basis, you could immediately advance the price of prunes. It is ridiculous to expect a commercial company to organize and help you out in that way.

MR. STEPHENS. I would like to ask, in your opinion, with such a consolidation, would the packer stand in with that arrangement?

MR. SPRAGUE. No, sir; absolutely not. The packer will not help initiate anything that tends to eliminate the packer. If this comes he might be opposed to it, and some might coöperate with it. But he will not help initiate it.

MR. STEPHENS. Then we would have a fight on our hands right from the start.

MR. SPRAGUE. We don't get along without fights in this world, if we do anything.

PRESIDENT COOPER. The resolution will be referred to the Committee on Resolutions before recess, as there are several things that ought to be passed upon.

On motion, the report of the committee of fifteen was received and placed on file.

MR. STEPHENS. Before we take a recess, I would like to talk about a matter that interests every member of this Convention. I think this is one question upon which we will all unite, and I believe the resolution is that we deprecate the absence of Senator Johnston from this meeting, and I would like to have the rules suspended and that the resolution be taken up and considered now for the reason that after the excursion many will be leaving the city and will not have an opportunity of expressing their regrets at his absence. Therefore, I move, with unanimous consent, to have that resolution taken up and considered. It will take but a moment.

Motion duly seconded and carried.

RESOLUTIONS OF GREETING TO SENATOR WILLIAM JOHNSTON.

WHEREAS, By reason of impaired health, our fellow-worker and esteemed neighbor, Senator William Johnston, of Sacramento County, has been unable to attend this thirtieth Convention of the fruit-growers of California; and

WHEREAS, We have missed his genial companionship and valued counsel in the deliberations of this session; therefore, be it

Resolved, That we extend to him our cordial greeting and best wishes for his early recovery, and that the Secretary of the Convention notify him of this action by his fellow fruit-growers.

MR. STEPHENS. I wish to say that Senator Johnston is not in condition to be present. I have never known a man more wretched than himself, and only his condition keeps him from attending here. It is, I am sure, the wish of every fruit-grower in this State to extend sympathy to him for the condition in which he finds himself, and we all hope that he will be able to attend the next convention. I move that the resolution be adopted by a rising vote.

Carried unanimously.

The following resolution, concerning the death of John Rock, was also read, and a motion was made for its adoption, which was duly seconded and carried:

RESOLUTION OF RESPECT TO THE MEMORY OF JOHN ROCK.

WHEREAS, In the wisdom of Almighty God, we have had removed from our midst a co-worker, valued and esteemed by all with whom he came in contact; and

WHEREAS, In the passing of John Rock, California has lost one of its most eminent horticulturists, a creative genius in the line of his chosen profession; therefore, be it

Resolved by the fruit-growers in their thirtieth session of the State Convention, That we deplore the loss of this man who so faithfully served his country in the time of war and served so well his chosen State in the noblest art of peace; and that the Secretary be instructed to spread these resolutions in the official report and convey the same to the family and business associates of the departed member.

The Convention then adjourned until 7:30 P. M.

EVENING SESSION—THIRD DAY.

THURSDAY, December 8, 1904.

The Convention was called to order at 7:30 o'clock. President Cooper in the chair.

PRESIDENT COOPER. The program is a pretty long one and we can not wait. I have rearranged the program for this evening so as to get through all the papers, if possible.

INSPECTION OF NURSERY STOCK FROM A NURSERYMAN'S STANDPOINT.

[BY GEORGE C. ROEDING, OF FRESNO.]

All fruit-growers will concede that the growing of nursery stock is a legitimate business. No one will deny, who is at all familiar with the many difficulties with which a nurseryman must contend, that he is entitled to the same consideration any other business man would receive at the hands of the law. A nurseryman who has the interests of a community, as well as his own, at heart, can do more than any other person to build up and advance the fruit interests and encourage the planting of ornamental trees for beautifying city gardens, or making the surroundings of a country home pleasant and attractive. The progressive nurseryman is one who introduces new varieties of fruits and vines, and ornamental trees and plants, adapted to the soil and climatic con-

ditions prevailing in his district, and who also, through his experience in such matters, is in the position to advise and make recommendations to newcomers, as to what to plant and what not to plant. Men who are such important factors in developing the very foundation upon which the horticultural interests of any section are built should receive every encouragement in the furtherance of their work.

It is demanded of nurserymen that they shall have their trees true to name, and that their stock shall be free from pests. Still, in many cases, after they have exercised all the precautions which any reasonable man could expect, it is a common thing to have stock condemned on general principles, even without inspection in some cases. When a nurseryman sells stock which may later prove untrue to name, the first inference of the fruit-grower is to set him down as a scoundrel, and if he happens to be dragged into court on account of his shortcomings, he receives such a drubbing down that by the time the court, lawyers, and jury have passed judgment on him, he is willing to question his right to even exist.

On the other hand, the unfortunate fruit-grower who has a mixed up orchard is in a very serious position, and after devoting money and three or four years of hard work to bring his trees into bearing, it is not in the least surprising that he should consider the injury which he has suffered, with a deep feeling of animosity toward the man who has brought him to this state of affairs.

To have nursery stock true to name is of the utmost importance to any nurseryman. This can only be accomplished by taking buds from bearing trees. For the sake of argument, we will admit that the only bearing trees from which buds can be secured are infested with scale; but rather than take chances on cutting buds from nursery stock, they are taken from the infested orchard. Before using these buds, however, the pest is killed by following formulas for fumigation recommended by our horticultural commissioners. When the trees are ready for the market, scale is found on them, and again precautionary measures for killing it are followed.

After doing all this, is the nurseryman not entitled to be fairly and squarely dealt with? Do you know what happens in many cases? A county commissioner who examines the trees finds scale on them. He may only have been recently appointed, never has had any practical experience. No doubt he received his job through political preferment. What does he do? Instead of notifying the nurseryman, and giving him an opportunity to investigate the matter first, he rushes to a newspaper office, reports his find, and the next morning there is a detailed account of how the zealous inspector has found insect pests on so-and-so's trees, and that they are infested with everything in the category, from the mysterious vine disease to borers, fungoid diseases,

and other pests, whose virulence is magnified by the fertile brain of the reporter. Your inspector reads the article, swells up, and pats himself on the back as an authority. Has he considered for one moment the great wrong he has done the nurseryman? No. Later on it may be discovered that the trees which he said were diseased were found, when submitted to higher authorities, to be all right. He can not repair the injury his report has done, and like all evil reports it takes a long time to explain it away.

The proper course for an inspector to follow in a case of this kind is to correspond with the nurseryman. Call his attention to the condition of his stock. If, on further investigation, it is found to be all right, it should be passed, or if not, then it should either be returned to the nurseryman or destroyed as he may direct.

Men who occupy the positions of horticultural commissioners or inspectors should have had some practical experience. They need not necessarily be entomologists. They should, however, be practical fruit-growers, and know a scale bug from a clam. Before finally entering into their duties, they should receive a few practical suggestions as to the pests commonly found in plant life. Such a man, with ordinary common sense, can be of great benefit to any community. He can advise fruit-growers how to prune their trees, and serve them in many other ways, and his services will prove to be of inestimable value to the entire community. A man who has once acquired experience as horticultural commissioner through constant study and close observation should, as long as he gives proper attention to his duties, be retained in office, and not ousted whenever there is a change in the political complexion of a Board of Supervisors.

The horticultural laws of this State were framed for the purpose of protecting our fruit interests as a whole, and were not enacted for restraining any set of men from conducting their business. They have been grossly misconstrued in many counties of the State, and special ordinances have been passed which have for their object no other purpose than to hamper a nurseryman in conducting his business. Either the nursery business of this State is, or is not, a legitimate business. It is needless to dwell on this point. All that can be said of it is, that many of the county ordinances as they exist at present should be annulled. That they are unconstitutional there can be no question. The great difficulty which arises is for a nurseryman single-handed to fight them. If many more of these obnoxious ordinances are passed, it will finally mean that the business of a nurseryman will be confined to his own particular county. No large nursery business can exist under such conditions, for trees and vines are propagated not only for planting in his section of the State, but also for distribution in other parts of the country and in foreign countries as well. No possible objection can

be made in general to our State horticultural law, and if this law was enforced among fruit-growers, owners of parks, and in cities where shrubbery and plants are covered with pests, much more good would be accomplished to the community at large than where an inspector devotes all his energies toward retarding the business of a nurseryman. As a class the nurserymen of the United States exercise more care, are more particular in conducting their business, than any other set of men in the fruit business. In spite of all their efforts to comply with the law for their own interests, if there were no other reasons, measures are enforced against them, from which, unless there is some concerted action on their part, there seems to be no recourse at present.

Every encouragement should be given to the enforcement of the horticultural laws of this or any other State. These laws should deal with all horticultural interests on an even basis. They should not be framed in such a manner as to restrict trade by making it compulsory on a nurseryman to take out licenses for several thousand dollars in every county in which he attempts to sell trees. Such laws have been enacted in several counties in California, and similar laws are being enacted in other States. The sooner such measures are withdrawn, the better it will be for the entire fruit-growing community, for such prohibitive measures prevent a nurseryman from entering new fields and selling his stock.

The only good reason which any inspector or commissioner can give for holding up stock, and preventing its entry, is when he finds it infested with insect pests which are a menace to the fruit interests. To prevent nursery stock entering any particular section because a certain insect pest has been found on trees of the same variety in this district, although the trees which have been shipped are free from this disease or any other, for that matter, is a gross perversion of justice, and should not be permitted.

A decision rendered by H. Z. Austin, Superior Judge of Fresno County, on the subject of special county ordinances and the condemnation of nursery stock, is so apropos on this occasion that I have taken the liberty of quoting it. It covers the ground in such a concise, clear, and forcible manner that it is worthy of being carefully digested. In this particular case, Fresno County was compelled to pay for the cuttings destroyed by the Horticultural Commissioners, and since then no stock has been condemned, unless it has been found to be diseased or infested with pests.

On the 15th day of February, 1901, the Board of Supervisors of the county of Fresno passed an ordinance, No. 97, which, among other things, provided that no person or firm shall import or bring into the county of Fresno any grapevine roots or rootings of any species or variety whatsoever from without the said county of Fresno. The same ordinance also provided that no person or firm should transport or in any-

wise deliver into the county of Fresno any bud or cutting of any grapevine of any species or variety whatsoever from any portion of the State of California south of the line forming the north boundary line of San Luis Obispo, Kern, and San Bernardino counties, and from no district within the State of California north of the north boundary line of Alameda, San Joaquin, Calaveras, and Alpine counties, with the exception of Sonoma and Napa counties. After this ordinance had been duly passed, Clara L. Pew imported into the county of Fresno certain grapevine cuttings from Contra Costa County, a county outside of the limits mentioned in the ordinance. The county commissioners seized these cuttings and burned the same, claiming that they had a right to do this under the ordinance. Clara L. Pew thereupon sued the county of Fresno for damages, and the case came before the court upon the validity of the ordinance. Judge H. Z. Austin, in passing upon this ordinance, used the following language:

The particular points upon which it is claimed that the ordinance is illegal and void are because it is in restraint of trade, and permits the confiscation of property without due process of law.

I am of the opinion that both these points are well taken, for reasons briefly stated, as follows:

The ordinance purports to prohibit the bringing into, or receiving within this county of any "grapevine roots or rootings" absolutely, no matter where grown or produced, and without reference to the question as to whether they are healthy or diseased, or whether their receipt or importation into this county could or would be detrimental or beneficial to the horticultural interests of the county. The same prohibition is made as to limbs, buds, and cuttings not produced within certain designated portions of this State. As to these articles there is likewise no limitation to the prohibition, and all, healthy as well as diseased, are included in the prohibition. It will not be denied that it is within the power, and it might be said that it is the plain duty, of the board to protect, in all legal ways, the orchards and vineyards from infection by importations of diseased nursery stock, but I can find no authority of law that would justify or allow prohibition of trade in healthy and unobjectionable nursery stock. The vice of the ordinance is that it makes no distinction in this regard, condemns the healthy as well as the diseased. I do not think the power of the board to declare a quarantine against diseased nursery stock outside of this county could be questioned, if done by an ordinance drawn with due regard for the Constitution and general laws of the State. In this connection it is but proper to say, however, that any attempt to distend or enlarge the powers granted to County Boards of Horticultural Commissioners by the general laws of the State is exceedingly dangerous. (See Act of March 31, 1897, and also the Horticultural Quarantine Law of March 11, 1899.) These laws, supported by decisions of courts construing them, seem to furnish means for the due and legal accomplishment of everything requisite for the protection of our orchards and vineyards.

I am also of the opinion that the power attempted to be given to the horticultural commissioners by the ordinance in question to destroy roots, rootings, et cetera, irrespective of the fact as to whether they are healthy or diseased, is an unauthorized delegation of power, and amounts to depriving a person of property without due process of law. It attempts to authorize the horticultural commissioners to seize and destroy the property without warrant or process, to condemn it without proof, or the observance of any judicial form, and to destroy it without notice of any kind. Such enactment can not be harmonized with those constitutional guaranties which are supposed to secure every one within the State in his rights of liberty and property. "No man" says Mr. Cooley in his work on Constitutional Limitations, "can by his misconduct forfeit his property unless steps are taken to have the forfeiture declared in due judicial proceeding. For-

feiture of rights or property can not be adjudged by legislative act; and confiscation without judicial hearing and judgment, after due notice, would be void, as not due process of law." This most necessary principle of constitutional law is violated in the powers given by the ordinance in question. The determination of questions of this character, and the liability of property to seizure and confiscation, is a judicial proceeding, and judicial proceedings are required by the Constitution to be exercised by courts of justice, and can only be reached through the forms of law, upon a regular hearing. The law of the land in judicial proceedings requires a hearing before condemnation and judgment before destruction of the property of another.

For these reasons, I am of the opinion that Ordinance No. 97 of the Board of Supervisors is illegal and void, and furnishes no defense to the acts complained of.

Similar ordinances have been passed in several counties in this State, but the practical workings of such ordinances fail to reach the desired results. Such ordinances may benefit some nurserymen and injure others, but the farmer is always the loser, as competition is prevented, and in many cases the best nursery stock excluded. Vine and tree diseases are more or less prevalent everywhere, and the best results can be obtained only by a personal inspection, by a competent expert, who will accept or reject each shipment on the merits, and not on geographical limits. This is the spirit of the law as appears by the decision of Judge Austin, from which I have already quoted, and I might add that this decision is based upon numerous decisions in this and other States. There should be one State law controlling this subject, and it should be broad enough to protect both nurseryman and farmer, and Boards of Supervisors should not be allowed to pass local or special laws. Less politics and more learning will benefit both the nurseryman and the planters.

THE ENTOMOLOGICAL EQUIPMENT OF THE HORTICULTURAL COMMISSIONER.

BY PROF. C. W. WOODWORTH, OF BERKELEY.

California has led the world in the effort to control its fruit pests. At the time the first laws were enacted establishing our system of Horticultural Commissioners, they placed us well in the lead in the matter of practical control. We have, however, remained practically stationary through two decades, while other States have advanced, until now only State pride prevents us acknowledging that we have been left behind. Many have expressed their conviction that our laws should be radically changed and brought in line with the progress of other States, if not to new and advanced ground which will again assure us the leadership. We ought to be able to command the services of the best men and draw them from any part of the world, instead of seeing our island neighbors deplete our own forces. We should add to our system of County and State horticultural officers the two items entirely neglected

in the past, a department for investigation and a scheme of centralized control. These are the two points which have given efficiency to the Eastern inspection systems.

But it is not my purpose to-day to discuss the subject of horticultural legislation, but rather the means of making our present system more efficient—particularly to indicate what might be done in the study of insects.

In every department of human effort the tendency of the age is to insist upon a special preparation of those undertaking any work, because of the greater average efficiency of those thus trained. The application of this principle to the office of Horticultural Commissioner is something that can not be too strongly insisted upon. Laws are not the really important thing. The personnel of those entrusted with their administration largely determines whether laws are useful or not. A strong public sentiment which will insist that the Horticultural Commissioner shall be a man specially qualified for his position will go far toward making the position worthy the best efforts of the best equipped men.

In comparatively few instances, in the past, has the man appointed to this position made any special effort to prepare, except in the most general and superficial manner, for the duties of the office. Usually he has first secured the place, and then attempted to inform himself upon the subjects in which his duties require knowledge. In many cases commissioners have after a time become quite well informed, and have proven efficient and valuable officers and continued long in the service to the full satisfaction of their constituents. Whatever of success has been attained in this work in this State has been due to men of this class. These men have felt the need of knowledge so keenly that they have fitted themselves in the hard school of experience. They will be doubtless the first to appreciate the importance of insisting upon the appointment of properly qualified men to these positions.

Perhaps none will take issue against this general principle, but may be inclined to doubt the possibility of finding or commanding specially qualified men, and may differ as to what constitutes the most important qualifications for the office.

Some years ago, in the course of a conversation with a gentleman who has charge of the administration of one of the most effective State systems of horticultural inspection, he remarked that he regarded the most important qualification of an inspector to be honesty. He considered it so important, that he would be willing to overlook almost any deficiency in technical knowledge, if he could be assured that this quality of a man's character was highly developed. In a centralized system like the one which he controlled, where every determination made in the course of inspection work was checked up in the main

office, the possession of technical knowledge may be less essential than here; still here, as well as there, honesty must be reckoned as the qualification par excellence.

Honesty is of many kinds, as well as being possessed in all degrees. The quality of honesty required to make a good Horticultural Commissioner is what we may call scientific honesty. We have all doubtless known men strictly honest in money matters, for instance, whose conscience seemed wholly asleep in religious or political affairs. Honesty of any kind is something that must be developed and trained before it will be large enough to be conspicuous. A high degree of scientific honesty is really a rare thing, though it is no harder to develop than any other kind.

The most important item in the work of a Horticultural Commissioner is the determination of scientific facts. If he is not an expert, he is able to do nothing well. We are all so full of prejudices; so apt to jump at conclusions without adequate knowledge; so thoroughly unreliable in our ordinary observations, that unless a man has had a training specially developing his conscience in such matters, his word is not worthy of belief. No matter how honest he may be in other matters, he should not be trusted under oath, if he attempts, without first becoming an expert, to decide such matters as a Horticultural Commissioner is continually required to decide in the performance of his duties.

An expert is one whose training has been such that he can say a thing is so, and say it honestly. He knows what is necessary to do to determine the truth about the matter and takes the pains to learn the truth. As long as public opinion fails to insist upon the necessity of experts in this office, a great many of the appointees will fail to appreciate their need of growth.

Do not misconstrue what has just been said as containing the suggestion that there is or has been dishonesty in this matter. Such an insinuation is entirely foreign to my thoughts. Between the form of immorality which we call dishonesty, and the positive righteousness of honesty, there is a broad neutral zone of undeveloped powers, incapable of either good or evil. The office of Horticultural Commissioner has been filled as a rule with men remarkably free from dishonesty, even those who have never qualified themselves for their work, and I have been glad to know and number among my friends a large number of these officers.

Those who are now Horticultural Commissioners and have become expert enough to give satisfaction in the administration of their office should never be replaced by others for political or any other trivial cause. They have become valuable men, and have a knowledge of the local situation that no one else possesses, and their successors must acquire it before they will become most effective.

When a new unqualified officer is appointed, there will be an interval while the new man is trying to make himself capable, during which very serious losses may occur, through his ignorance. If such risks are not to be taken, a man already an expert must be chosen.

Insects are responsible for such a large part of the work of a Horticultural Commissioner that the entomological equipment represents no small factor in the qualifications he should possess. A man may be a very good entomologist, however, and possess very little knowledge that will aid him as a commissioner. Entomology is so large a subject that few go further than to familiarize themselves with some small division of it. Most of those studying the subject have nothing to do with injurious forms. Being an entomologist, therefore, may not fit a person for the horticultural work with insects, any more than being a geologist or a chemist. Scientific work of any kind is a real preparation nevertheless, because a thorough study of any science can not fail to develop to a high degree the quality which we have denominated "scientific honesty."

Among the things a Horticultural Commissioner should possess is a sufficient knowledge of the injurious insects to apprehend all suspicious characters. This requires that he shall know something of the habits of all groups of insects and be able to recognize them in all their stages. Of course, in special cases he can submit specimens for determination to those who have made a special study of the particular group, and should avail himself very frequently of this help; but this will not do for the routine of everyday work, and after a specimen has been authentically determined the work becomes permanently valuable only to the extent that one understands how it differs from other allied forms and may thus become capable of certainly identifying it again.

A much more important matter than a knowledge of species and habits is the ability to appreciate the effect of external conditions on insects. The fact that an insect is injurious in one situation is no proof that it will be so in another locality; nor its harmlessness elsewhere, full assurance of its behavior here.

No insect is uniformly injurious. The codling-moth, for instance, is capable of producing a loss averaging fully half the crop in some sections, and in exceptional years taking almost everything, while in the State as a whole it scarcely averages twenty-five per cent, and in several regions there are considerable areas so entirely free from loss that one per cent would be a large estimate. The San José scale, which has given this district a bad name, has long ago ceased to be a very troublesome insect. Northward along the bay it is only periodically a serious pest, and at Berkeley it is practically unknown, being replaced by the much less fatal species, the greedy scale.

Thus we might show an extreme range of variation for all our injurious species even within the limits of this State. So diverse are our

conditions that no general plan of fruit-pest control can be devised for the State, nor for all parts of a single county.

The Horticultural Commissioner is not simply a police officer, delegated to enforce specific laws. The necessities of the case make him much more than that. The purpose of the law is to accomplish as much good as possible, and the provisions are intended to be elastic enough to enable him to do what is wisest in each particular case. This large amount of discretion given him, imposes on him a correspondingly great responsibility. He must decide in every case whether this insect, under these conditions, constitutes a real menace to the horticultural interests of his district or of the State. An error in either direction involves a financial loss to the citizens of the State. An active commissioner is quite likely to decide doubtful cases in a way involving a small immediate loss, rather than take the risk of greater future losses; and the more passive one will take these risks rather than produce unpleasantness by a positive stand requiring the destruction of property. In either case there is easily possible a loss far greater than the amount that would be necessary to pay in order to employ continuously an expert of the highest quality.

At this time of the world, when reading matter is so abundant and so cheap, we might suppose that every commissioner would have a well-selected library of the standard books dealing with his professional duties, but the fact is—no, I will spare the feelings of those commissioners who may be present, and refrain from saying how bad it is.

Perhaps some have been so impressed with the fact that California is different from any other part of the country, and fear to fill their minds with things that will not apply under our conditions. They may be afraid of learning entomological heresies. While it is true that one must make due allowance for our climate, there is no excuse for remaining ignorant of the best knowledge of other countries.

Every commissioner should possess a set of the standard entomological textbooks, and keep abreast of the current entomological work of the world. For the latter purpose, I would recommend the Experiment Station Record, published by the United States Department of Agriculture. This comes twelve times a year and contains notices and reviews of everything of importance in economic entomology appearing anywhere in the world.

The University has tried to do what it can to aid commissioners in their work, and in the preparation of those doing, or desiring to do, horticultural inspection work. Possibly in conclusion I can enumerate these efforts, as a reminder of how earnestly and sincerely we have endeavored to be of service. These activities may be grouped as follows:

Publications.—The Experiment Station of the University issues

reports, bulletins, and circulars on all sorts of agricultural topics, many of which bear directly on a Commissioner's work. These will be sent free to any one desiring them. We can furnish a limited number to Commissioners for distribution to those with whom they deal in their work, and will be glad to send any bulletins still in print to names furnished by the Commissioners.

Correspondence.—The University holds itself ready to answer direct inquiries as far as it is able, and many Commissioners have availed themselves of this service. Answers are made as promptly and fully as possible, and no one should have any hesitation in applying, though it not infrequently happens that questions will be asked that we can not answer satisfactorily.

Coöperative Investigation.—Where a problem presents itself which can not be answered, if it is of sufficient importance, the Experiment Station is ready to assist in an attempt to discover the answer by a careful investigation of the subject. We have coöperated with the Horticultural Commissioners of several counties. Our usual arrangements for coöperative work have been that the Station furnish one or more men who will work under my direct supervision, and those coöperating will pay the local expenses. In the case of coöperation with Horticultural Commissioners, the man delegated for the work often is appointed an inspector, because it is easier to arrange for an inspector's salary than to get an allowance for expenses from the Supervisors. Finally, the Station publishes the result of the study, giving due credit to the officers coöperating.

Class Instruction.—The University has arranged a way by which a person who is mature enough may enter the Agricultural College as a special student without examination. Thus persons who perhaps could not meet the requirements for regular admission, but who have serious intentions, are admitted to the same laboratories and classrooms as the regular students. Everything that we can offer in the way of instruction is freely offered to any who may wish in this way to prepare themselves better for their work. The short course given each winter is designed particularly for special students having very little time at their disposal. The instruction in entomology has now been arranged so that a person can enter at any time and find ample work to occupy his attention for a period of any length he may desire, and commissioners or prospective commissioners are particularly welcome. The new laboratories which have been planned, and we hope will soon be constructed, will be the most complete and best arranged building for instruction in this subject to be found in the world.

Opportunities for Research.—In connection with the instruction at Berkeley, there is opportunity for actual field experience in research work after a student has qualified himself therefor. This is in connec-

tion with the coöperative work previously alluded to. Thus far the demand for assistance of this kind has greatly exceeded our ability to supply the men capable of doing the work required. Such students are stationed for a time in the region where the problem in hand can best be studied; they have everything in the way of scientific apparatus and the use of orchards—indeed, all that is necessary for the study, and when results are secured, a place for publication which will at once give them a standing among the economic entomologists of the country. A training of this kind I conceive to be none too elaborate a preparation for the work of a Horticultural Commissioner.

Reading Courses.—There are many who are ambitious, but who can not take advantage of the regular university work. For such, a reading course has been prepared, intended to acquaint the reader with a good selection of the best literature on economic entomology. A great many of our horticultural commissioners are now availing themselves of this course. We have had in all something over two hundred applicants for this course; more, indeed, than we have thus far been able to provide books for. Those who conscientiously follow this course will have a good foundation in this science.

Collections.—The Experiment Station will soon issue a circular giving directions for collecting insects, and we will make the offer to any desiring to make collections for themselves to furnish them a set of specimens carefully mounted and named, in return for specimens they may collect and send for the University collection. This proposition will be made particularly for the purpose of aiding country schools and county horticultural officers in obtaining named sets of their common insects. These collections will be furnished in neat boxes, suitable for exhibition on the wall of the schoolroom or office, and should be found very useful for the identification of specimens brought in for comparison.

These efforts of the Entomological Department of the University are based on the thought which has been the burden of this paper—the belief that the future demands more of us than the past has received, and that in the practical work of insect control greater evidence of progress is imperatively demanded.

PEAR BLIGHT IN NORTHERN CALIFORNIA.

BY PROF. RALPH E. SMITH, OF BERKELEY.

It is not the purpose of the writer to describe, or discuss, in this paper the nature and history of the well-known pear-tree disease called "blight," since this subject has been fully covered in various agricultural publications at different times. The previous history of the disease in California, the destructive effects produced by it, particularly in the

district centering about Fresno and Kings counties, and the general nature and appearance of the blight, are but too well known to almost every pear-grower in the State, and need no special consideration at this time. It is rather my purpose at present to consider in a practical way a more recent development of the subject which is of the greatest importance to one of our best and largest fruit industries.

Previous to 1904 the pear-growers of the Sacramento Valley had looked with complacent sympathy upon the situation in the upper San Joaquin region, in respect to the destruction of the orchards by blight. The conditions then existing are well stated in the report of the State Board of Horticulture for 1901-1902, from which I quote, as follows: "Radiating from these counties (Kings, Kern, and Tulare) the disease seems to decrease in virulence, until in the more northern counties it is unknown. North of Fresno the disease has not obtained any serious foothold. It is not general, nor is any great damage apprehended from it."

The great prevalence of blight in the portion of the State just mentioned, and the fact that year after year passed with no spread of the disease toward the north being observed, gave rise to the general belief that climatic or other natural conditions produced immunity of the northern orchards from the blight, since otherwise a more rapid spread would be expected. In the spring of 1904 this rosy illusion was rudely shattered. Reports began to come from many points far north of the previous blight limit, of something new affecting the pear trees. This trouble had the appearance of blight, and was soon determined by various authorities to be the typical disease. The reports came from various localities, indicating a considerably widespread outbreak, and one of so serious a nature that the writer, in the latter part of June, made a tour of that part of the Sacramento Valley when pears were growing, to determine the extent of the blight occurrence and the nature of the situation in general. The conditions found were stated in an article published in the principal horticultural papers, as follows:

"That the true blight, identical with that which has devastated the pear orchards of Fresno, Kings, Tulare, and Kern counties, has occurred this year in all the counties of the Sacramento Valley, there is no question. The writer has personally visited numerous orchards in Solano, Yolo, Colusa, Glenn, Tehama, Shasta, Sacramento, and Contra Costa counties, and found an abundance of the typical disease scattered all over this section of the State. From Vacaville to Colfax, and from Martinez up to Anderson, the blight is present in numerous orchards. In a few the disease has not yet appeared, in some it is very severe, but in most cases the trees are slightly affected in a branch or twig here and there. In this year's crop no great loss will result; scarcely any in most cases; the danger is for the future."

This serious situation did not go unnoticed by those whose duties include the consideration of just such matters, and the Horticultural Commissioners of most of the counties mentioned became active in advising and enforcing the best known means of blight control. This consisted in cutting out the blighted twigs in order thereby to check the spread of the disease. Sacramento County was particularly active in this direction, as the most general appearance of the disease occurred in that county, in the reclamation districts below Sacramento City. Reports of pear-blight occurrence in the Sacramento Valley were soon followed by similar news from San Luis Obispo County, where another very serious outbreak developed, and appears to be spreading up the coast from south to north. As the summer went on, the writer, being much in the field for various purposes in connection with plant-disease work, was able to follow quite closely the development of the blight and the results of efforts made to suppress it. It is, therefore, possible to speak with some degree of certainty as to the situation now, at the close of the season, and of the outlook for the future.

We know in general from the history of pear blight in California that it is the most destructive plant disease of any which occurred within our borders. We know that no method of treatment has succeeded in preventing the ruin of the pear industry in this State, wherever the blight became abundant. We now know that the blight is present, and generally distributed, in our best and greatest pear-growing section, the Sacramento Valley. This is the situation in a nutshell, laying aside all theories, hopes, and speculations, either of good or bad. The disease is a bad one; it has not been satisfactorily controlled in California; it has now appeared where very great damage may result.

According to our best knowledge of pear blight, it is caused by a bacterial organism which infects the young growth of the pear tree in spring, developing in the succulent cambium layer, or inner bark, spreading down into the twigs and larger branches, and thus causing them to wither and die and ruining the tree. Infection takes place largely in the blossoms, whither the germs of the disease are brought by bees and other insects. From the affected parts, a sticky juice or gum is produced, which contains the germs of the blight and attracts the insects. Such insects are supposed to carry the infection to the blossoms, and thus spread the blight from tree to tree. Based on this knowledge of the origin and spread of the disease is the pruning or cutting-out method of control, with the idea of removing all affected wood at the end of the season, so that there will be nothing left to start the disease next spring. This method has proven successful in many parts of the country and the pear blight effectually controlled thereby. In California we can scarcely doubt that blossom-visiting insects are

largely instrumental in spreading the disease, yet the widespread occurrence of blight last spring, in regions more than two hundred miles from any known source of infection, is truly remarkable. While we can not be positive that there had been no pear blight before in the Sacramento Valley, it is practically certain that the great majority of the orchards affected were hitherto free from the disease, and that it spread a great many miles during the past season, more in fact than in all the previous years of pear blight in California put together. Why and how this occurred is one of the questions which need to be answered, if the disease is to be controlled satisfactorily in this State. The cutting-out method of blight suppression, the only one at all effective at present, has been practiced with various degrees of thoroughness in all parts of the State where the disease has occurred. It is perhaps too early to judge of the results of cutting done in the Sacramento Valley this summer, although inspection at present shows about as much blight as ever all over the valley, except where cutting has been done very recently. The advisability of general summer cutting by our average farm labor, where the blight is actively spreading, and in its most virulent condition, is somewhat doubtful. Certainly, very thorough cutting in December, when the green leaves have fallen, is advisable, and to be strongly urged upon every pear-grower. Whether this alone, however, can ever be made a satisfactory means of thorough control in California is open to serious doubts, judging from present conditions in the upper San Joaquin. It may be said that the work was not thoroughly done, that this or that individual orchard is in better condition than the average; but taking the general results in this section as a standard, the present condition of the pear orchards and pear business in Fresno and Kings counties, as compared with that of a few years ago, we can reach but one conclusion as to the effectiveness of this treatment. Apparently the spread of the disease and its progress in the tree are so rapid in our climate that thorough cutting out results at last in the extermination of the tree, rather than that of the disease.

The possibility of the blight dying out, or subsiding of itself, may be and is being considered. The opinion is frequently expressed that the disease has run its course in the San Joaquin Valley and is dying out. Whether this be true or not, such a result offers little hope to the regions more recently affected, if the blight is to have the same destructive effect before dying out as in the lower counties. In short, let the Sacramento Valley pear-grower, in whose orchard the disease has just started, visit Fresno, Hanford, or Visalia, examine all the pear orchards, good and bad, remaining there, and decide for himself whether the blight is controllable by present methods, or its destructiveness is passing away.

Methods of control other than that mentioned have been generally put aside as impracticable, or not adapted to the nature of the disease.

In this respect, however, it is my opinion that too much has been taken for granted. In the words of a recent publication, for instance: "Spraying, fumigating, and all other external remedies are utterly worthless, as the disease is in the sap-wood of the tree, protected from all external influences." Yet, on the same page, we read: "There is little question but that our honey bees are an important source of infection, flying as they do from blossom to blossom, and carrying the germ to the most susceptible point of entry of the plant." If then, we may well ask, the disease is "protected from all external agencies," and its germs on that account not to be reached by any spray or similar treatment, how does the honey bee obtain such germs to carry to the blossoms? The disease once started is, of course, located inside the tissues of the plant, but so is the peach curl, the asparagus rust, the potato mildew, and every fungous disease with very few exceptions, yet these we successfully treat by spray methods, destroying the spores or germs before infection takes place. In no plant disease do we expect to destroy the parasite once in the tissues, but in every case, fungous or bacterial, germs which are to spread the disease to other plants must come to the surface and are there destroyed by successful spraying before further infection can take place. Why, then, if the germ of pear blight is accessible to the honey bee, is it so certain that a proper spray, at the proper time, might not reach and destroy the same source of infection? This is but one suggestion as to the outlook for better methods of blight control. Too little effort has been made in this direction. That the disease is a very destructive one, or that it is bacterial, and develops internally, does not preclude its successful control by some practical method, or justify the abandonment of a valuable industry without more of an effort than has yet been put forth in California to solve this problem.

The investigation of plant diseases is the work of the specialist in that study, with the assistance and coöperation of growers and practical men. Too little attention has been paid to this subject in California, where, of all States, it is of most importance. When one considers a State like Connecticut, smaller than many of our single counties, with two Experiment Stations; or a region like New England, of little agricultural importance and an area not more than half that of our State, with seven Experiment Stations; while in California no provision whatever has been made by the State for experimental investigation of plant diseases other than those caused by insects, is it to be wondered that in regard to pear blight, walnut blight, vine diseases, root knot, root rot, citrus troubles, apple diseases, grain smuts, and a host of their kind, we are still largely in the dark?

In the case of the pear blight, a thorough investigation under State control appears to me to be most urgent. The industry is one of great importance to the whole State, and concerns more or less directly a large

share of its population. The Bartlett pear is our most valuable deciduous fruit, and the Sacramento Valley its greatest seat of production. What hurts this business, hurts California. The blight may or may not prove as destructive here as in the San Joaquin, but the danger is too near, and too real, to be made light of. Better too much than too little, or too late, in such a matter.

To investigate this matter effectively and thoroughly, with regard to all parts of the region concerned, will require assistants for carrying out field and laboratory work, giving their chief attention to this alone, necessary equipment, appliances, and materials, and provision for the various considerable expenses attached to such work, if it is carried on vigorously, and on a scale proportionate to the importance of the problem. A department of plant diseases having been recently created at the State University by the enterprise of the asparagus-growers, the work of which is particularly along this line, the only obstacle to proceeding with a pear-blight investigation is the matter of financial support. Suggestions have been made that this be afforded by the growers themselves, by the several counties most concerned, or by the State. The last proposition seems most feasible. To collect a subscription or assessment from various growers would limit the work by personal considerations, not desirable in such a case. To depend on the action of various county officials would also prevent a uniform effort and application of results. In the Legislature, support should come from every pear-growing section for such a proposition as this, and work could be carried on with State support, wherever most desirable or necessary, without regard to personal or single county interests. With such an investigation, supported by the State, work could also be done incidentally on many other similar troubles, occurring in the same localities, and a department of plant disease investigation, worthy of the name, permanently established.

THE PROBLEM OF INSECT CONTROL.

BY C. A. DAY, OF PASADENA.

This problem is one of many phases, each species of injurious insect in itself constituting a minor problem of no small importance. Insects comprise four fifths of the animal kingdom, numbering upward of two hundred thousand species; of these many species are injurious and attack fruits and farm crops and forest trees. In their methods of attack they are divided into four classes: first, root-feeding insects, which attack roots of plants; second, boring insects, which bore into the stem or trunk, roots, leaves and fruit; third, sap-sucking insects, which puncture the leaves and stems to obtain their food; fourth, defoliating

insects, which eat the leaves and other green parts of the plant. No part of the plant or tree is exempt from the attack of insect enemies. The importance of insect control is evidenced in the yearly loss of vast sums to agriculture from the ravages of injurious insects which prey upon fruit and farm crops. In addition to this loss a considerable amount is expended yearly in applying remedies that, in many cases, are only of temporary effect and requiring repeated application.

In a state of nature we find on an average a pretty even balance maintained in insect and plant life; that birds, insects, and plants are closely related; and that those insect species which are vegetable feeders are in a measure held in check by insect-eating birds and parasitic and predaceous insects. There are times when nature's balance is temporarily upset. There are years classed as insect years, when certain species of insects, from a temporary reduction of natural enemies, increased food supply, and climatic conditions favorable to their propagation and increase, become numerous and very destructive to certain species of plants. Undisturbed, nature by her methods of geographical distribution and means of diffusion of insect, bird, and plant species, is able to maintain on an average a fairly even balance of insect life; but in nature's methods of geographical distribution and means of diffusion, there seems to be no provision made for the sudden transportation of insect and plant species to distant regions.

The careless transportation, by man's agency, of a vegetable-feeding insect from one continent to another, where it is freed from the presence and check of its natural enemies, results in the destroying of nature's balance. In this connection it is important to note the natural or geographical distribution of insects and the means employed by nature in their diffusion. In the geographical distribution of insects Packard says: "The polar, temperate, and tropical zones each have their distinct insect fauna, and each continent is inhabited by a distinct assemblage of insects. The limits of these insect fauna are determined by temperature and natural boundaries, such as the ocean and mountain ranges. Mountain barriers, inland seas, deserts, and peculiarities in the flora, or collection of plants peculiar to a certain district, are boundaries of a secondary importance in limiting the distribution of species. The whole region of the United States is divided by meridional or nearly meridional lines into three or perhaps four great zoölogical districts, distinguished each by numerous peculiar genera and species, which with but few exceptions do not extend into the contiguous districts. The eastern one of these extends from the Atlantic Ocean to the arid prairies of the Central West. The central district extends from the western limits of the eastern district to the Rocky Mountains. The western district is the maritime slope of the continent to the Pacific Ocean. In the Pacific district a small number of species are confined to a small region of

country; most species occur in considerable numbers and in traveling even one hundred miles it is found that the most abundant species are replaced by others, in many instances very similar to them."

This variation in the insect fauna of the Pacific Slope is probably in part due to the variation in temperature and to the humidity of the atmosphere. In a state of nature insects are diffused by winds, rivers, and ocean currents. Protected as we are on one side by vast mountain ranges and on the other by the broad Pacific Ocean, with no tropical or temperate lands near our coast, we are protected from the introduction of foreign insects by nature's means of diffusion. Prior to 1880 there was no inspection of plants or nursery stock coming into the State from foreign countries, and prior to this date many of our most troublesome and destructive insects were introduced on nursery stock and fruit. Many of these insects through the agency of man had become cosmopolitan and widely distributed throughout all agricultural countries. These introduced species have with us been very injurious, because their natural enemies which held them in check in their home section have been left behind, and, freed from the check which nature had placed on them, they have increased enormously and have become the most injurious of our insect pests. The true remedy in this case is to restore nature's balance by the introduction of their parasitic enemies. Prevention is cheaper than the cure; therefore, an effective quarantine should be maintained by our State Horticultural Commission.

Another strong argument in favor of prevention is that when an insect is once introduced into a section and becomes thoroughly established there is no known means of exterminating it; even the most effective of parasites can do no more than control any species of insect, and the appearance of a secondary parasite may greatly retard the work of effective control, if not defeat it. The appearance of a secondary parasite, attacking the *Scutellista* in parts of southern California, threatens to partly nullify in certain sections the work of this chalcid fly on the black scale.

Another argument in favor of prevention is the cost of applying remedies such as fumigation and spraying where parasites are not at hand for the work of control. Again, where the insects to be treated have come to infest weeds, street trees, native plants and shrubs, and trees in a state of nature, no matter how thorough the treatment of the orchard may be, it is soon reinfested from these sources of infection. Then again remedies are not always as effective as they should be. A certain treatment in the hands of a scientific expert may be successful, but it is so because of the scientific exactness in securing the right quality of material, the proper quantity of each ingredient used, the proper uniting of the same, and its thorough application. The same treatment in the hands of the average farmer or commercial agent will not give the

same good results as when administered by the expert. The margin between a remedy strong enough to destroy the insect and at the same time not injure the foliage or wood of the plant or tree is often very slight and requires experience, good judgment, and scientific exactness in all the details of the treatment to make it successful. The possible strength of the treatment depends also upon the health, condition and vitality of the tree. Remedies, expensive, not always satisfactory, and sometimes injurious, are the means of last resort, when prevention has failed and effective parasites are not at hand.

Another preventive measure is the use of the resistant stock of native grapes for protection against phylloxera and the use of resistant apple stock as a protection against woolly aphid.

Our State quarantine protects us on our seaboard at San Francisco, the principal port of entry, from importation of insects from foreign countries, but the county quarantine maintained by our County Horticultural Commissioners is no less important to protect the fruit-growers of the State from the importation of insect pests from the adjoining country of Mexico, and from Florida and other parts of the United States, among which are the gypsy-moth of New England, the white-fly of Florida, and the Morelos orange-maggot of Mexico. In the way of preventive measures the work of the County Horticultural Commissioners is important in preventing the spread of local infection of serious insect pests that without official control would become general and widespread. As an instance, some three and a half years ago the different County Boards of Horticulture of southern California united in securing ordinances in each county establishing a quarantine against the phylloxera which infests the grapevines of central and northern California. At this time certain interested nurserymen protested strongly against this quarantine, and at least one of our agricultural papers vigorously attacked and ridiculed the action taken by these boards. Time has proven the wisdom of the action taken by the County Boards of Horticulture of southern California. The vineyardists of the southern part of the State have from the first been a unit in support of this quarantine.

There are three important factors employed within the State in the work of insect control: The State Horticultural Commission, the County Horticultural Commissioners, and the Agricultural Department of the State University.

While our State Horticultural Commission and our County Horticultural Commissions are instituted under separate acts of the Legislature, the Act which creates the State Commission of Horticulture places the County Boards of Horticulture in matters of quarantine under the direction of the State Commissioner; also making the said State Commissioner ex-officio member of all County Boards of Horticulture and providing that the County Boards shall report to the State Horticultural

Commission. This is as it should be. In a case of emergency the County Boards of Horticulture are placed at the command of the State Commissioner of Horticulture, centralizing the efforts for effective quarantine within the State.

The County Horticultural Commissioners are very important as field-workers, in the identification and classification of insects and the study of their habits, the prescribing of remedies and their proper and timely application, preventing the spread of present infestation, and aiding the State Commission in the matter of State quarantine and the introduction of parasitic insects. From the personality of the county commissions have come our former State quarantine official, Mr. Alexander Craw, and his successor, Mr. Ehrhorn. Two of our most valuable remedies, the rosin wash and fumigation with cyanide, are discoveries made by members of county commissions.

The Agricultural Department of the State University has rendered valuable assistance to the fruit-growers and farmers of the State, by the investigation of various phases of the insect problem, and the publishing of the results of such investigations in bulletin form for distribution. Some of these investigations have been conducted in coöperation with County Boards of Horticulture and Boards of Supervisors of the various counties.

As a final summing up of this question of insect control I favor the application of remedies for temporary control; the restoring of nature's balance by the introduction of parasitic insects; effective State quarantine to prevent the introduction of insect pests into the State, and a rigid local quarantine for the purpose of confining local infection to its present limits.

There should be a hearty coöperation of the different official departments for insect control, and considering the amount of capital invested in fruit-growing in the State of California and the effective work of imported parasites for insect control in the past, the Legislature of our State should make a liberal appropriation for the work of introduction of parasitic insects.

OBSERVATIONS ON PHYLLOXERA.

BY O. E. BREMNER, OF SONOMA.

As a resident of California, and more particularly of Sonoma County, my duties as a Horticultural Commissioner have led me to the investigation of those diseases attacking the prominent industries of my section. Although we have many of the prevalent diseases found elsewhere attacking other varieties of fruits, our county is so predominantly a wine county that my attention has been more particularly

directed to the diseases of the vine, one phase of which I have attempted to discuss in a practical manner in this paper.

Mission vines were introduced into Mexico, according to Bancroft, in about the year 1525. The name by which they were then known, Buenos Carlos (the good Charles), afterwards became changed to Mission. At this time, Cortez, the Governor of Mexico, sought to advance agriculture by the compulsory planting of trees and vines, but later, owing to the rapid growth of the industry, the exportations of wine, olive oil, etc., from Spain began to decrease, and then the mother country sought to cripple the industry by not only forbidding the planting, but by ordering the removal of vines. By other legislation fully as discouraging as this, the industry soon became confined almost entirely to the Mission fathers, and from this time on they seem to be almost wholly responsible for the spread of this industry.

With the establishment of the Mission at San Diego in 1769 by Father Junipero Serra, the first vines were planted in California. As the missions gradually pushed north, the introduction of vines naturally followed until the last mission, at Sonoma, was established in 1822. General Vallejo also speaks of the introduction of a new grape of Madeira stock about this time. Bancroft speaks of the planting of trees and vines at Fort Ross, in Sonoma County, in 1817 from Lima. The apple and cherry trees are still in evidence, but I can find no evidence of the existence of vines.

It is quite certain that European varieties were introduced into this State before 1860, but the first record of wholesale importation of fine varieties I find to have been by Mr. Dresel and Mr. Haraszthy in 1860. Mr. Haraszthy brought Hungarian varieties, Zinfandel, Queen Victoria, Burgundy, Chasselas, and many others varieties. Mr. Dresel brought from France and Germany, Reisling, Traminer, etc. Altogether these gentlemen imported over five hundred of the choicest varieties. It is interesting to know that descendants of these vines on the property of Mr. Carl Dresel of Sonoma produced wine which won him the grand prize for dry wines at St. Louis in 1904. Dresel & Co. also introduced and planted the first resitants on a large scale in 1878.

In about 1860 vines in different localities began to show signs of some disease, which afterwards proved to be phylloxera. The introduction of this insect into this State has given rise to much study and discussion. It would now be a hard matter to say whether it was introduced from Europe or from the Eastern States. It would have been quite as possible to bring phylloxera to this State on Eastern cuttings as it was to carry it to Europe. It was not detected in France until 1865, and was probably introduced there some ten years previous. A Mr. Knouth imported cuttings direct from Nassau, Germany, in 1853. He was troubled with a disease early in the sixties, which he afterwards found

to be phylloxera. But, as it is claimed that phylloxera was not introduced into France from this country until about 1853 or 1854, we find ourselves in considerable confusion as to the real origin.

Phylloxera made quite a widespread appearance between 1860 and 1870. In 1873 samples of roots infested with an insect from the vineyard of O. W. Craig were shown at the August meeting of the Viticultural Society of that year, and in 1874 the first phylloxera was shown to be identical with the European insect and was taken from the Herman Wholler vineyard, Sonoma. It was identified a little later at Napa. After this identification the pest seemed to spread with alarming rapidity. In 1881 it was reported to the Viticultural Society by Mr. Morse as having been found in Sonoma, Napa, Solano, Yolo, Placer, and El Dorado counties. By 1885 most of the vineyards in southeastern Sonoma had been killed. Since that time the line of march has been steady and unceasing.

Phylloxera seems to be no respecter of vineyards, so far as European vinifera is concerned. Some varieties resist a little longer, and some soils prove more resistant. The Vine Hill district, formerly reported by leading viticulturists to be immune on account of its sandy soil, is now badly affected. And now I think one is safe in saying that there is no district of any extent in northern and central California which does not show some signs of phylloxera.

There have been many claims as to the first description of the root form of this insect, but the first account of which I have heard was given by a German scientist who, while traveling in the Mississippi Valley in 1806, pulled up a young vine, and the insect he describes attached to the roots in great numbers tallies exactly with that of phylloxera. We are much indebted to European and American scientists, who have not only given us its life history, but also our most valuable information as to checks and remedies. Among these stands preëminently C. V. Riley, then State Entomologist of Missouri, who labored several years to give us its complete life history. But this cycle is not applicable in all its details in this State, as here the complete cycle is gone over in one year, while in the East it takes two years. It also continues to multiply throughout the winter here, while it is dormant there, owing to climatic differences. Although Mr. Lichtenstein, of Montpellier, was the first to hazard the opinion that the phylloxera of Europe was identical with the leaf-gall louse of America, Mr. Riley established the identity of their insect with ours. Mr. Riley also gave us our first facts concerning our resistant American varieties.

A phylloxera-infested vineyard usually begins to show signs of disease the second year of attack. The first symptom observed is the lighter coloring of the foliage and then the reduced growth of the canes. If you wait until the canes are very much reduced, or the vine in an

almost dead condition, you may quite often miss the cause, as the phylloxera has migrated to new material. This is not often the case, as in most regions the insects remain on the vines until they are actually dead, and often is this true where the land is heavy and produces more or less fine rootlets near the surface of the ground. About the third year of the attack, after the smaller roots have all been killed, it is here that the winged form appears most abundant. I have found that at least ninety per cent of the winged forms occur on these rootlets, and contrary to what is generally supposed I have found them quite abundant in all sections during the past two years. I feel quite positive that this winged form has been responsible in a great measure for the spread of this insect in most of our districts. I will cite one case. Mr. Greeley had a large vineyard on a hillside facing the southwest. About a mile away was an infested vineyard, and Mr. Greeley says that two years before he noticed his vineyard was affected he observed that the wind blew in his direction from this vineyard. There is a hill midway between the two, so the wind struck his vineyard about halfway up the hillside, and on this line, very plainly to be seen, the phylloxera made its first appearance. It moved from here in an almost unbroken wall. He sprayed with anti-phylloxerine, a powerful stimulant which causes the production of surface rootlets, and on these the winged form made its appearance, and the second year after, the insect was to be found in every section of his vineyard. To show the sudden decrease of crops due to this sudden spread, the first year of spraying there was 150 tons of grapes, the next 65 tons, and the third year about 15 tons. I have noticed the same thing in other stimulated vineyards, and I believe that any strong fertilizer would cause the same results. Now this very strongly convinces me that the very best thing to do when you find your vines very badly infested is to remove at once, burn, and replant with resistants, *then* fertilize. This has been very successfully done in the Italian-Swiss colony, and as a result you can find no plague spots in this vineyard.

I found the undeveloped winged forms first making their appearance early in July. They have the appearance of the ordinary wingless female, but with dark patches on the sides—the wing-pads. After about twenty days or a month in this form they change their molt and come forth a bright yellow, four-winged fly, which lives just long enough to lay its eggs—from one to three days. It grows darker during this time, and at death is nearly brown. I found that they laid their eggs under the most adverse circumstances. Their power of flight is very limited, but they have a trick of springing straight up and spreading their wings so as to catch the wind, and will thus be carried for comparatively long distances.

If you wish to discover phylloxera, pull up a supposedly infested

vine about the 1st of August, when the insects are most abundant, and if there are small roots you will find abnormal swellings on them, and on these swellings you will find one or more yellowish-colored insects. If these small roots are destroyed, lift the loose bark on the larger roots or crown and you will usually find a patch of yellowish-orange, which, under an ordinary hand lens, will show many tiny insects, each with its pumping apparatus appropriating as much sap as it can possibly use. It is not this loss of sap that does the damage; but, the vine in attempting to cure the injury, produces swellings, which rot and cause the death of the roots. If the vine is nearly dead the phylloxera may have left, and you will have to judge by certain unmistakable signs on the dead roots.

We always say that the phylloxera attacks the light land first; but it is the light land that is on the hillsides, and here the winged form is more apt to be left by the wind. Of course the disease will generally show its ravages on the less vigorous vines first. Still I can see no hard-and-fast rule for the attack and spread of phylloxera, except that it is as sure extermination to European vinifera as is grim death to the human being.

But here ends my pessimism; the pleasing side is to come. Naturally the large rewards offered in Europe tempted many to seek a remedy for this great vine pest, but none proved successful in any great measure until the planting of American resistant stocks was tried. By this means I now believe we have not only met and defeated the enemy, but the industry stands on a surer and better basis than before the introduction of phylloxera. The first planting of resistants in California on a large scale was by Dresel & Co. of Sonoma in 1878. The varieties were principally Riparia and hybrids, Clinton, Taylor, Lenoir, and many others. The Lenoir did not do well, on account of soil conditions. Riparia proved the most successful in this locality, and after twenty-six years we find these vines producing excellent crops. As to quality, have I not already stated that Mr. Dresel received a grand prize at St. Louis this year?

As to resistants in general, I can do no better than quote Mr. Dresel's own words. He says: "We made all the mistakes possible, the main one being to graft from four to six inches below the soil. In general, I can see no difference in the behavior of grafted resistants and non-grafted vines in regard to bearing crops, except that some of the vinifera bear larger crops upon resistant roots than upon their own. I have not remarked that the crop is falling off in any way, except the usual phenomenon of a light crop after an exceptionally heavy one or a succession of two heavy crops, and the falling in such instances seems to me the same as it was upon our vinifera vineyards." He also says that he believes they will remain stationary in respect to crop for an indefi-

nite period. Of course abused vines will retard, bear less, and will eventually have to be replaced. I see no reason why our vines will not last much longer than the natural bearing age of those in Europe, placed at thirty-five years.

Mr. Dickson has had a resistant vineyard for eighteen years, consisting of Riparia and Rupestris grafted to Zinfandel. They bear from three to five tons a year, and he says he considers the grapes of a superior quality. As to young vines, I will cite two instances: C. T. Driscoll has a young vineyard of twenty acres of Lenoir stock grafted at three years to Alicante Bouschet and Zinfandel. The third crop, 1904, or seven years from planting, a bad year, having suffered from excessive heat and early rains, they produced three and one half tons to the acre. J. M. Talbot, who has a seventeen-acre Lenoir-Bouschet vineyard, grafted at three and four years, received this year, 1904, four tons to the acre. Now these reports compare favorably with the 1893 report of I. de Turk, Commissioner for Sonoma District, as follows:

“Driscoll, T. Total, 18 acres; in wine grapes; in bearing, 16 acres; soil, loam, part red, light and black; upland; east exposure; crop, 40 tons.”

“Talbot, Jos. Total, 20 acres; all in bearing; soil, volcanic loam; upland; exposure, south; crop, 100 tons.”

This was before the phylloxera had depleted these vineyards. Mr. Dresel's vineyard (resistant), at Sonoma, according to this report, was then yielding four tons to the acre.

An attack has been made by many, in fact I encounter it every day, and every time I find it to be false. It is: “The so-called resistant stocks are not really resistant, but they also succumb to attacks of phylloxera. I hear Mr. So-and-So's resistant vineyard is dying.” I have never found phylloxera the cause.

Mr. Dresel planted Taylors, a vine supposed to be but partly resistant, and in the holes with each rootlet he placed whole handfuls of phylloxera. Not one of those vines ever died from this cause and are producing good crops to-day.

Mr. Pleasant Wells, nine years this spring, planted Lenoir, another supposedly only partly resistant vine, in the same holes from which the same year he pulled vines badly infested with phylloxera, and every vine is perfectly healthy and vigorous to-day.

The Talbot Lenoir vineyard was planted on the same land where phylloxera vines were pulled out, and on either side may be seen the old dead stumps, yet I challenge any one to find a single diseased vine on the eighteen acres.

Some resistant vines have died, many others look badly. The cause I have already stated. Mr. Dresel says that their main mistake was in grafting four to six inches under the surface, “and in consequence,

many of our vines are suffering from phylloxera attacks to-day." In no other condition do I find phylloxera attacking resistant vines.

Now, if I may say a word in praise of one resistant vine, I should like to bear testimony to the most excellent results we have had in Sonoma County with the Lenoir. Not only as to its growing qualities, easy to graft, either bench or field, but our people have confidence in our worthy expert, Newton B. Pierce of Santa Ana, and he tells us that the Lenoir is the vine most thoroughly resistant to the California vine disease. Many prefer the Rupestris St. George, and in many localities it shows a superiority. Of course, we must suit our vines to our soil and climatic conditions.

In summing up our prospects, I feel confident in saying that, if some do believe the star is setting on our vine industry, I believe that the sun is just rising, and instead of Europe accusing us of relabeling their wines, we will have to watch them closely to see that they do not transpose such labels as Italian-Swiss to, I might as well say, any kind, as President Rossi informs me they drew the grand prize at St. Louis in 1904. And now look sharp for the Santa Clara champagne, for it will surely be coming back to us with a foreign label; but happily no external manifestation can change the uniform and excellent qualities of our California wines.

THE WORK OF THE COUNTY HORTICULTURAL COMMISSIONER.

BY A. D. BISHOP, OF ORANGE.

Most papers deal either with fact or theory, but this must be individual opinion, and as there are as many opinions as there are people, no one will be compelled to agree with me.

The idea that the Commissioner was to deal only with the insect enemies of our industries is deeded to the past, and with the present have come diseases of an entirely different character, although working as insidiously and as destructively, and to guard against their introduction and spread into fields where they have not already gained a foothold is a problem of as great importance as any that has ever been encountered and solved.

And to be able to trace their character and to attempt their control must require a careful scientific training. Consequently, a thorough training in entomology need not necessarily be a prerequisite to a good Horticultural Commissioner. His work should be devoted to the acquirement of a knowledge of pests and diseases, their sources and danger, together with the most approved methods of control and prevention, putting it in the simplest form, and keeping it always before the people of his district, rather than devoting his time to the inspection of orchards

for insect pests known to be in all, because he can increase his salary by so doing. As quarantine guardian, he should be most careful to guard against the introduction of pests and diseases not already established, and should spare no pains to eradicate should they appear, while assisting as much as possible in the laudable object of adding new and useful plants and trees to our already extensive list. While it is true that most of our troubles were brought to us by this means, it is not at all certain that additions can not be made without the introduction of new ones.

To be absolutely successful, he must have the confidence and assistance of every resident of his district, and be possessed of such abilities as to command the respect of the power which appoints him.

THE QUARANTINE DIVISION OF THE STATE COMMISSION OF HORTICULTURE.

BY E. K. CARNES, OF SAN FRANCISCO.

The Quarantine Division of the State Commission of Horticulture virtually stands as a guard over the horticultural interests of the State, by preventing the introduction of destructive insect pests.

Geographically situated, San Francisco is the natural doorway of commerce, where ships and vessels representing nearly every country of the globe pass through the Golden Gate into San Francisco Bay, and up to their various piers, to discharge and receive cargoes. This city being the distributing point from whence these cargoes are sent to every section of our State, the greatest danger from the introduction of foreign pests is to be found at this port of entry; consequently, the Quarantine Division is stationed at San Francisco, with offices in the Union Ferry Building, which is admirably located for the work, being situated in the heart of the shipping district.

The acquisition of new territory by our Government, better facilities for ocean travel, large freighters with lower shipping rates, and the recent unpleasantness in the far East, have acted as powerful stimulants on foreign commerce in general, and very prominent among the various commodities which show a wonderful increase appears fruit and nursery stock.

As much of this stock is from countries where destructive insects have made such inroads on fruit culture that it has been found almost impossible to continue the business, the strictest quarantine is maintained to prevent their possible introduction into this State. Under our present strict quarantine system, and with the kindly assistance of the United States customs officials, these arrangements have made it possible to present now a formidable barrier to the introduction of

new species, and the effectiveness of this system can be vouched for by the fact that for the past ten years no new pests have been introduced.

The principal duties connected with this division are, the inspection of all foreign ships and sailing vessels that arrive at this port, the inspection of stock arriving by rail from outside the State, the propagation and distribution of beneficial insects, and correspondence relating not only to keeping out new species of destructive insects, but ways and means of keeping down those we unfortunately have within the boundaries of our State.

We are all familiar with our horticultural quarantine regulations, and we know that our ports of entry are guarded from the invasion of foreign insects, but I believe little is known of the actual details of this work, and it is my firm belief that every orchardist should know just how and what we have to deal with, and when made acquainted with the facts and dangers, the importance of additional quarantine protection will be manifest to all. Therefore, a short description of the manner in which vessels are handled at this port, together with some of the trials and pleasures of standing guard at the natural gateway, will be interesting to all.

The present system, under which we operate, was inaugurated by Alexander Crow during his many years of service as Quarantine Officer at this port, and which has so perfectly protected us in the past from the introduction of any new species; but, with the enormous increase in ocean traffic, that system will have to be materially strengthened according to the increase of work, if we wish its efficiency to be sustained.

On almost every vessel that touches at this port comes some shrub, plant, or fruit, and with it some form of destructive pest, but none are permitted to land any farther than is necessary to make an inspection.

At our office we are kept constantly informed regarding the movement and arrival of vessels by the two exchanges, of which we are members, and from them receive notice as soon as a vessel is sighted, which, on a clear day, is from twenty to thirty miles out. In this manner we are able to figure ahead a little, and be ready for them when they are passing up to the dock, and we immediately start for that particular pier. As the laws of our State empower us to go almost anywhere in the shipping district, we are allowed to pass into the customs corral, and take our station at the side of the gang plank and carefully scrutinize every package that comes down.

When we spy a plant, tree, or package of fruit, it is immediately taken into our possession, and guarded until all the passengers have landed; then comes the work of inspecting them, and sorting out what may be allowed to land, what must be fumigated, and what must be burned. While this is being done, the customs officials are going

through the baggage, as every package, however small, must be opened and inspected, and through the kindness of these affable gentlemen, absolutely nothing, not even a single piece of fruit, is passed until it has been submitted to us for inspection. In this manner, we have a most rigid system of inspection, and when all the baggage has been worked over, we search the vessel, call on the officers and crew, and make inquiry as to whether anything in their possession is in our line. As they know full well that they can not get it ashore, they will, in most cases, promptly bring out all they have. We compel them to take it ashore, as nothing is passed on the ship, and as this fact is well known to all the customs officials, they can not be talked into believing that it has already been inspected.

At several of the piers where most vessels dock, we have fumigating-rooms, or in adjacent piers, so they will be handy, also air-tight sheets made of heavy canvas and oiled, various sized fumigating boxes, and a good supply of chemicals handy. When the amount to be fumigated is small, we bring an outfit to the gang plank and do the work there, but when larger amounts are to be treated, we use the rooms. When we are satisfied that all the insects are dead, we paste a red label on the packages thus treated, which is signed and dated, and with this passport on it the customs officer at the gate allows it to pass. As the customs officers are always present at the planks of the steamers while in port, both day and night, they hold everything for us that has not been brought to light at the regular inspection, the owner of the fruit or plant is given our 'phone number, and we make another trip to that vessel, and pass or reject that which is left. Several later visits are paid to the ships while in port to see if anything is being held for us.

The duties of Horticultural Inspector at this port are not all filled with sunshine, for we have no office hours, but must be on hand from sunrise to sunset, as vessels can dock during these hours, and if they arrive inside by sunset, they are entitled to dock, which means as late as 9 P. M., and later, before all the baggage has been searched, and perhaps next morning an early boat will arrive at 6 A. M. It is the general opinion among the inspectors and dock officials at this port, that sea-captains have a preference for docking on Sundays and legal holidays, and our time, therefore, includes these days.

In many cases the gang plank of a vessel may be likened unto the "Bridge of Sighs," for it is certainly pathetic to listen to the deep, sad sighs that come from the heart of some thoughtless passenger who has treasured, nursed, and cared for some rare plant, shrub, or tropical fruit, purchased in some distant land, and is bringing it home as a souvenir from that trip across the pond, only to find that it harbors some species of noxious insect, and to hear that final sentence pro-

nounced by the inspector at the plank, "This plant must be consigned to the fiery depths of the donkey engine, for this pest is not allowed to land," and with a farewell look at the cherished curio, he sees the inspector start toward the furnace, and soon all that is left is the smoke, as it slowly curls up the ship's funnel. Even an explanation of the danger of allowing it to land fails dismally toward appeasing the wrath of the individual in a case like this, and remarks of a rather pointed nature are directed at the head of that unfortunate inspector, and the cultivation of new friends is rather an impossibility with the traveling public who bring anything in the line of horticulture.

From Mexico our greatest danger is the introduction of the orange fruit-fly, and not even a single orange is allowed to land. Now, as an illustration, place yourself in the position of inspector for a few moments at one of the vessels from Mexico. Down the plank comes a Mexican lady, with her husband, and in the mother's arms you see a bright-eyed baby, closely hugging to its breast a large, ripe Mexican orange. That orange must not land, for it undoubtedly contains the eggs of the dreaded fruit-fly; your duty compels you to destroy the orange, for contained in it might be the start of the entire destruction of our orange industry. The parents of the child can not speak a word of English, and know less of horticultural laws. Now, do your duty. Not very pleasant. Certainly, every one on the dock blames you for making the child cry; the father talks Spanish to you so fast that it is a good thing that you only possess a limited knowledge of the language; and just how it was taken must be settled by you, on the supposition that you are the inspector.

Many attempts are made to bring in the Mexican sweet orange, both by passengers and crew. This fruit has often been taken from the bottom of a trunk, folded up among the clothing, and I recall one instance where a passenger had several fine specimens tucked inside socks, down in the corner of his trunk. But all are immediately confiscated and burned, even when found among the ship's stores and not intended to be landed.

Another "pleasant" duty is to remove and destroy the floral decorations from the casket of some departed citizen who has died abroad and who is being brought home for interment. Cases of this kind require gentleness, yet absolute firmness, and a strict adherence to your duty, and a knowledge of the danger in yielding, for by the enforcement of just such rigid quarantine has the State of California been spared the expense and loss that would occur through the introduction of most any one of the hundreds of insect pests which we know exist to-day in other countries and which have made fruit-growing almost an impossibility in those countries.

The pests which we now have, that have caused us so much trouble and expense, were not introduced first in large numbers, but, perhaps, by a single fertile female on some hand plant, and from this insignificant start they have spread the entire length and breadth of our State, and, as in everything else, it is the small things that we must watch as well as the larger ones. In the case of nursery stock and tropical fruits landing at San Francisco, all are inspected carefully, and fumigated on general principles, so that nothing can escape. The commission merchants and importers have fumigating rooms in connection with their establishments, and we personally treat all infested fruit landing, with the exception of that destroyed. In our work the greatest aid is afforded us by the United States customs officials, and without their aid our work would be greatly hampered, and would require a much larger force, as it is in the case of vessels from Honolulu and the Hawaiian Islands, where they have some very serious pests. One especially I might mention as the cucumber fly (*Dacius cucurbitæ*). This fly attacks all kinds of melons, tomatoes, and cucumbers, and were it introduced into this State would cause us tenfold the damage done by the San José scale, and would be a hundred times as hard to fight. This is a close relative to the Mexican orange-fly, and works in somewhat the same manner, by depositing its eggs in the mature and half-grown fruits, and these in turn hatch into maggots, completely ruining the fruit by converting the inside into a mass of mingled slime and maggots. This is one of the most disgusting pests of which we stand in immediate danger, and absolutely nothing in this line is permitted to land. Many other serious pests exist in our new possessions, and as there is no customs service on the vessels plying directly between here and the Islands, we have to attend to all these vessels alone, which takes a great deal of time, and with our many other duties, it can not be watched as closely as it should be, especially if the trade with these Islands increases as rapidly in the future as it has in the last year or so. When it is taken into consideration that we have some three or four vessels, usually docking at different piers, and often several at the same time, and with but two men to attend to them all, it can readily be seen that we have reached about the limit under the present system, and unless it is strengthened, some new pest is bound to evade us, as it is impossible to be in more than one place at a time. With so many deadly pests year by year gradually crawling nearer to our State, and better facilities being added to aid them to be introduced, it certainly behooves us to throw around our State every safeguard possible against their introduction.

Many cases of plants arrive with good credentials, certifying that they have been carefully inspected and fumigated, but we recognize no

certificate, and only pass them after a personal examination and treatment.

In case the destination of the package is some point in the interior, we give it a cursory inspection to satisfy ourselves there is nothing in it not permitted to pass, give it a light fumigation to kill anything that may be crawling, and then notify the County Commissioner that it is coming, turning it over to him for a piece-by-piece inspection, thus giving us a double check on it. We have the same regulations at the port of San Diego, and this closes that port against those dangerous pests.

From the above description of the methods employed, I feel confident that you will agree that it has been almost impossible for any new pests to gain admission to our glorious State, and the fact that no new ones have gained admission, considering the fact that some of the worst known pests are to be found in our nearest neighboring countries, speaks well for California's system of horticultural quarantine; but may I be pardoned for stronger emphasis on the fact that our commerce is steadily growing and the system we have inaugurated is well enough for the past, but will not do long for the future? To a person not acquainted with the extremely dangerous pests that arrive at our ports daily, and coming thicker and thicker every year, this danger can not be comprehended to its fullest extent, yet a visit to our office, where you can see the rows and rows of specimens of pests that have been captured and destroyed, will, in a measure, impress on your minds the importance of this matter. I wish you all could spend a day with me, and with your own eyes see the various insect pests that arrive from other countries on shipments of plants consigned to various nurseries, and small plants and palms that are addressed to cities and towns in the very heart of your most prosperous fruit-growing section. Should any one of these escape, you all know too well, from past experience, what the consequence would be. Could you all see this day after day, personally, then you might realize the need of stronger quarantine protection.

Next in importance to the quarantine work of this division is the propagation and distribution of beneficial insects, and for this work we have a small room with glass partitions, fitted up with breeding cases, jars, and the necessary appliances to carry on this work in a small way. In this room we have growing plants, each the host of some particular pest for which we have a parasite. A stock of these parasites is kept constantly on hand, but our limited space will not permit us to breed them in sufficient quantities to send out large colonies, so we simply aim to distribute a small colony in each district where the pest is to be found, and from this start the neighboring sections must seek their supply,

which makes the result from these little friends seem somewhat slow. The wonderful results accomplished by California along the line of insect control, by use of their natural enemies, certainly justifies the establishment of a larger insectary, where the food plants could be propagated, and all of our beneficial insects raised and distributed on a large scale. The greatest difficulty is encountered when we try to obtain the proper food plants, and in the small room we now have, it is impossible to supply each applicant with but a very small colony in order to have enough to go around. Could California have a large propagating plant, and raise her beneficial insects on a large scale, thereby enabling us to send out a good supply instead of a very small colony, I venture the assertion that the direct results to the grower in one season would repay the necessary expenditure many times over. This parasite method is no longer an experiment in California, but is now firmly established, and with the eyes of the world on this State as an example from which to copy, we should place our beneficial insects on a basis where they can demonstrate to the entire world that California's method of "Bug vs. Bug" will repay a hundredfold every dollar expended in their behalf.

With our collector, Mr. George Compere, in the field, and his recent discovery and introduction of the parasite for the codling-moth, and the predaceous enemy of the dreaded red scale (*Chrysomphalus aurantii*) and the other species of general *Aspidiotus*-feeding ladybirds, we have much to hope for, coupled with the fact that the policy of our Commission is to push this matter forward until we have an efficient enemy for every pest that we now have within our boundaries. Judging from the number of applications for the parasite of the codling-moth already received at this early date, the demand for this insect is going to be enormous and will require the closest attention and very careful manipulation in the work of propagation, as the life history of this parasite differs greatly from our common species of parasites, and in order to supply this great demand we will require the hearty coöperation of every grower of apples and pears in the State.

To prevent the introduction of any new pests, to reduce below the danger limit those we now have, and to help California to produce the finest, cleanest, and best fruit of any State or country on the face of the globe, is the present and future duty of the Quarantine Division.

THE CHAIRMAN. The essays that you have heard read are now open for discussion.

DISCUSSION ON PEAR BLIGHT.

MR. BOOTH. Mr. Chairman, I would like to ask Professor Smith if he can give us a personal opinion as to the effective control of the pear blight. Have you formed a personal opinion as to whether the pear blight will be controlled with ordinary efficiency in this State?

PROF. SMITH. The question of whether a method will be found is simply a matter of opinion, and I have not any opinion now that would be worth anything, because it is to-day simply a matter of experiment and investigation. We believe that there is a remedy for every disease, and the only way is to try to find it, and it is worth an effort to try to find it. As to its being possible to control it, we can only judge by the experience in other parts of the State. In the southern part of the State they have cut it out, and they have held it back with various degrees of success, but finally it has not been controlled.

MR. BOOTH. I find with us, on the Cosumnes River in Sacramento County, there are a few cases where it is to be seen, and other places right by the side of them it is not to be found; while sixteen or eighteen miles from us, on the Sacramento River, they have it pretty bad. The question with us has been whether we could control it in our valley.

PROF. SMITH. The best thing we know of is to cut it out very thoroughly at this time of the year, when the blighted leaves stick on the tree and the green leaves have fallen off.

A GROWER. In our county the second year there was more damage done to the trees that were well cared for and had previously been sprayed every year. There was more damage done from the effects of this blight right on the body of the tree, from four to twelve inches from the ground, than any other place. The top would be green and raise a crop of pears—not good pears, but a crop of pears—but the tree was dead clear around the trunk three months before the foliage changed, as disclosed by cutting it with a knife.

PROF. SMITH. There are effects something like that in the northern portion of the State. Orchards where blight had appeared and been cut out very thoroughly, would afterwards show it on the bodies or large limbs of the trees, where it was impossible to see any connection with the blossom or with insects. That is a peculiarity that does not exist in the East. There is something about the spread of the disease in that respect here that is apparently not like that that is laid down in the books. The general theory of the blight treatment is that the blight develops more rapidly in the more succulent and vigorous growth, and the more the tree can be retarded the harder the wood is kept, and the slower the blight develops. I think in Sacramento County the best thing would be to determine how successful a very thorough pruning would be. It is hard to tell how thoroughly the work is being done,

because of the somewhat unreliable nature of the labor employed there in most of the orchards.

A MEMBER. I wish to ask if the blight affects all varieties of pears, or is it partial to the Bartlett?

PROF. SMITH. It is partial to the Bartlett, but it affects all kinds.

LEGISLATURE ASKED TO FURNISH ASSISTANCE IN QUARANTINE DIVISION.

DR. DINSMORE. It is getting very late; we have heard this paper on quarantining in San Francisco, and I presume that every man who has any interest at all in any department of the fruit industry appreciates the great importance of the utmost vigilance and efficiency of that quarantine. And we are also told that the force now allowed is altogether inadequate, and we can well understand how it must be, with only two men. I am making this motion without consultation, but I think that it will meet with approval, and I therefore move that this Convention request the Legislature to make an appropriation sufficient, at least, for the employment of another man in the quarantine office in San Francisco.

JUDGE LIEB. Mr. Chairman, I take great pleasure in seconding that. I wish it had gone a great deal farther. At a little dinner we gave to Alexander Crow just before he left this State, some gentleman from Sacramento whose name I have now forgotten gave the statistics of the fruit industry of this State; and I must confess I was myself astonished at the figures, showing that there are millions and millions at stake in the fruit industry. Here we are constantly standing on one volcano after another from the introduction of pests which destroy so much property. We are getting all sorts of things here, as everything that is bad is not native here, but comes from somewhere outside. I think there ought to be no limit to the money—as long as it is spent well—to be appropriated by the Legislature to keep out every kind of insect, and there should also be most generous appropriations for the purpose of developing beneficial parasites in addition to those we have. I am almost sorry that the motion did not go further, and to the extent of saying whatever may be necessary to be devoted by the Legislature to aid this good cause.

DR. DINSMORE. I sympathize with what Judge Lieb has said. I said one, because I did not dare to make it more. If Judge Lieb will second it then we will ask for two.

MR. DAY. Mr. Chairman, one question I wish to ask Mr. Ehrhorn. What provision was made in regard to San Diego, as to the inspection of plants there?

MR. EHRHORN. I will say that Hon. Ellwood Cooper has

appointed a man who attends to the port of San Diego, and all vessels that come into that port are inspected just the same as those which come to San Francisco are inspected.

DR. DINSMORE. I will then put this motion: That this Convention very urgently requests the Legislature to make a sufficient appropriation to permit of the employment of two additional inspectors at the port of San Francisco.

THE CHAIRMAN. You have heard the motion. All those in favor please show their assent by saying "Aye."

Motion carried unanimously.

INTRODUCTION OF PARASITES AND PREDACEOUS INSECTS.

MR. DAY. I move that this Convention ask the Legislature for an appropriation of \$20,000 to be used for the finding and introduction of parasites and predaceous insects.

JUDGE LIEB. Mr. Chairman, I remember some ten years ago Professor Koebele told me that, in the southern part of Europe, there was a parasite of the codling-moth that absolutely held it in check; and that, if the authorities of this State would, after he had established it here at his own expense, pay him \$5,000, he would take his chances of doing it. Shortly after that some little bit of a country down here richer than we are got him away from us, as they do most of our men—got Mr. Craw the other day. Now, if we had done something of that sort at that time, I think it would have been worth nearly \$5,000, in the way of apples and pears, in the last ten years—I have a shrewd suspicion it might have been worth a part of that. I take great pleasure in seconding the motion.

THE CHAIRMAN. You have heard the motion, that there be made a demand upon the Legislature for an appropriation of \$20,000 for the special purpose of the search for parasitic insects to be imported to California and distributed among the fruit-growers. All those in favor please show their assent by saying "Aye"; contrary opinion, "No."

Motion carried unanimously.

The Convention then adjourned until Friday, December 9th, at 9:30 A. M.

PROCEEDINGS OF FOURTH DAY.

FRIDAY, December 9, 1904.

The Convention met at 9:30 A. M. President Cooper in the chair.

DR. DINSMORE. This is as good a time as any to introduce a motion which I wish to make. Last evening we were talking about asking the Legislature to make an additional appropriation for the object of increasing the quarantine force in San Francisco bay. Everybody, I think, appreciates the importance of that action. I therefore move that a committee of five be appointed, from different parts of the State, and I would suggest the name of Judge S. F. Leib, of this city, to be entrusted with the matter, and that the committee should be authorized and requested to make an effort to secure legislation on that point.

(Motion duly seconded and passed.)

PRESIDENT COOPER. I will name that committee during the morning hour.

THE GROWING OF GRAPES, FROM THE PRODUCER'S STANDPOINT.

BY W. J. HOTCHKISS, OF SAN FRANCISCO.

Because I see on the program of this Convention that the subject of wine is to be treated by one much more competent than the speaker, I have eliminated that from this article. In treating of this subject, I wish to divest it of all theories and obligations that might be thought to be entailed upon the grower in regard to the production of grapes that would build up a trade and a reputation for California wines, leaving these factors as the subject for the fostering and attention of the wine-dealer. I shall treat the growing of grapes as a business pursued by the grower for immediate profit, and viewed from the standpoint of present and past experiences.

The principal factors to be considered in the growing of grapes are, the section of the country, the varieties, and the soils.

Section.—First, grapes must be chosen that are adapted to the climatic conditions of the section in which they are planted. Heavy foliage to protect from sun-burn in hot sections, and thick skin, loose-

bunched, where early rains are likely to fall during the vintage time. The climatic conditions governing the fermentation at the time of wine-making are important factors to be considered in sectional selection. Grapes intended for dry wines can be produced as well in most of the hotter valleys, but should not be planted or grown there, as conditions are not favorable to successful fermentation of dry wines in those sections. The converse is true of grapes adapted for sweet wines.

Varieties.—Elements to be considered in the selection of varieties are quantity and quality of the production, and the ability to withstand vine diseases, and the requirements of wine-makers in the principal sections in which the grapes are grown. If a district is already producing grapes running to large gallonage and light in color and alcohol, grapes should be planted of dark color and high alcohol. These will bring a premium at the wineries as a blend for the light alcohol and heavy gallonage producers. The quantity of tonnage per acre up to this time has been the most important factor for the grower, and the differential between the price of light-bearing grapes producing the finest quality of wines, and the heavy quality producing the cargo wines, has never been large enough in favor of the former to justify the grower in producing better varieties instead of the heavy bearer. Whether this is bad for the wine industry and shows poor judgment on behalf of the wine-maker in so regulating the prices, are matters not to be considered in connection with this article, but from the grower's standpoint of production or producing for a profit under present and past conditions.

Some varieties will stand a multitude of the diseases which attack vines much better than others, and a careful investigation of the comparative growth and healthfulness of different varieties in the immediate section about to be planted is of vital importance to the intending vineyardist.

Soils.—Vines should be planted only on good land. Some soils are better adapted to the production of color, and others for white wines; but poor soil will give a poor return of whatever variety is planted. It is true that vines will grow and produce on poorer land than most any kind of fruit, but the grower farming this poor land will ultimately go broke in competition with the man whose vineyard is planted on good soil. Do not plant on soil where the vines die out from phylloxera or other diseases, until the land has been farmed to other crops or laid fallow until it partakes again of the character of new soil. More money has been wasted in attempting to replant and keep up vineyards as they die out than in any other way in viticulture.

In regard to the name, productiveness, and character of the different varieties best to plant, kind of soil to plant in, etc., these are matters governed entirely by local conditions, and the grower should be influ-

enced by conditions as he finds them in the location where he expects to grow his vineyard. This is true also in regard to the selection and method of grafting of resistant stocks. Good-sized books have been and are being written on these details; which are far beyond the purposes or possibilities of any general paper, like the present one, to handle.

NATIVE WINES, AND THEIR FUTURE.

BY PERCY T. MORGAN, OF SAN FRANCISCO,
President of the California Wine Association.

The future of the California wine industry is largely bound up in the earnest coöperation of the various elements—growers, wine-makers, and wine-dealers—in promoting a more general use of wine.

Each element now stands aloof on its own ground, and does not appear to have any interest beyond the immediate disposal of the product from hand to hand.

There is no "promotion committee" in the wine industry for the extension of its business. The grape-grower when he has sold his grapes lets it rest there. The wine-maker when he has made disposition of his wines to the large dealers thinks his mission has then ceased; and the large dealer, in his turn, when he has turned his wines over to the merchant and jobber, says "amen."

It seems to be forgotten that the wholesale liquor dealer deals in other products than wine. Most of them carry wines practically as a side line. Their particular interest is in the whiskies and other spirituous liquors which they distribute more largely than wine.

In this country, where wine-drinking is only incidental, instead of general like in the large wine-producing countries of Europe, wine shops where only light wines containing naturally fermented alcohol are offered, appear to be a commercial impossibility, because there are not sufficient patrons who are exclusive users of wine to make such an enterprise profitable.

The native wine business, therefore, is inextricably mixed up with the larger whisky interests which the wholesale liquor dealer is compelled to combine in order to render his capital and labor remunerative.

The gallonage consumption of whisky in this country per capita is three times as much as the wine consumption. This appears extraordinary when it is considered that wine is a beverage, while whisky is used largely as a stimulant. When a man takes a convivial drink it is usually whisky or beer.

The vital question to-day in the wine business is how shall we popularize the consumption of healthful native wines as beer and whisky have been popularized?

The answer which first comes to the mind is to advertise the benefits to be derived from wine as compared with whisky, beer, or other beverage.

Among the largest advertisers in the country are the beer interests. They have made it pay, else they could not continue the enormous expenditure for bringing the attention of the public to their product. The whisky men, also, are large advertisers. We can hardly turn in a street car or to a board fence, or take up the daily newspapers, without seeing the advertisement of this and that brand of whisky. The advertisements are got up tastily to catch the eye. The public sees this or that brand of whisky or beer constantly advertised, and comes to believe largely from such advertising in the excellence of the advertised article.

Patent medicines containing alcohol are also very largely consumed. They would not be consumed—they could not reach the public—unless they were properly advertised.

The question which arises, therefore, is, if the consumption of beer has reached eighteen gallons per annum per capita, and of whisky one and one half gallons per annum per capita, while wine in the United States is credited with only one half gallon per annum per capita, whether the low consumption of wine is not somewhat due to the fact that the public attention is not properly called to its merits?

Then, again, the question arises, if publicity will help the consumption of native wines, who shall pay for this publicity?

The mere advertising of California wines as California wines, without attaching any particular brand to them—and this, after all, is the only method whereby the public can, through articles in the newspapers, be educated up to the drinking of wine—would not benefit any particular house or firm except as it benefited the industry in general, so no particular concern or firm could afford to undertake an advertising campaign for the benefit of California wines in general. It must be done, if done at all, by the industry at large, each contributing his share to the general fund. Then if some firms prefer to advertise their individual brands as being better, and more carefully aged and matured than the general run of California wines, their advertising would reach an already educated public mind and bear such fruit as no individual effort could otherwise command.

The success of the advertisement of individual brands would by reflex action also benefit the general industry, because the higher the price obtained for the individual brand, the greater stimulus and impetus would be given to the growing of the better varieties of grapes, and the general uplifting of the tone of the industry.

The general comment of men of high position who come from the East and taste our fine wines on their native heath, is: "Why, I never believed that such wines as these could be grown in California. Where

can we get such wines in the East? If we could get them as uniformly good as these, we would drink nothing else but California wines, because they suit us better than most of the imported wines which we have been accustomed to drink. To us, hitherto, the name of California associated with wines has been synonymous with cheapness. We only hear that California wines are pure and cheap, to be drunk only by foreigners in place of the ordinary wines to the use of which they have become accustomed in their own country; but we seldom see a California wine on the wine list of the large Eastern hotels and restaurants, and if we do and try them they are frequently of a quality which would not induce us to repeat the experiment."

In other words, it appears to be a surprise rather than a regularly acknowledged fact, that California *can* produce and *does* produce as good wines as anywhere in the world, and the knowledge of this fact seems to be confined to the few, instead of to the multitude.

Eastern men are finding that it pays to advertise; that it pays to bring to the attention of the individual the excellence of their product; and in investigating material for the preparation of an address which I lately made before the International Pure Food Congress at St. Louis, I was surprised to find that almost one third of the sparkling wine, or so-called champagne, consumed in this country was of native origin. More than a dozen brands of Eastern champagne are being regularly advertised and largely consumed. The quality of the product is being improved every year. The cellars and methods of handling are being constantly enlarged upon.

Some brands of Eastern still wines are also being advertised, and one I have particularly in mind appears to have a very extended popularity.

There is no reason why California wines should not also have a vogue in the houses of the wealthy, for there are inherent qualities in a properly made and matured California wine which make it as good as any wine on the face of the globe.

There is, of course, in California a large amount of ordinary wine made, and it is necessary that this should be the case, for the man who drinks wine habitually at his meals is usually a foreigner who has acquired the habit from his childhood days, and in order to continue in the use of his beverage he must obtain it at a reasonable figure.

This is the man who has been the backbone of the California wine industry. He thoroughly appreciates that nowhere in the world can he get as pure and sound and generally excellent an article as the California wine, which is made readily available to him at a reasonable figure all over the United States; but this man, as I have said before, must get his beverage reasonably. It must be so available and cheap to him, as to permit him to make it an article as usual and necessary

on his table as is bread or salt. To raise the price to this consumer would be the height of folly, for it would alienate the greatest friend of the California wine industry, and induce him to turn to other channels for his daily beverage. Consequently we must look to the *general* public for our educational field; to the public which is willing to pay a fair price for a good quality.

The born wine-drinker does not need to be educated; he is already a convert. He does not need to be advertised to, because he himself will seek the beverage he has always been accustomed to, and if it is good and reasonable in price will continue its use. It is to those who do *not* habitually use wine, but who, by reason of these articles continually being called to their attention, constantly keep whisky or beer in their houses for social occasions, that a campaign of education through the daily newspapers and magazines would go a great way to accustom such people to call instead for California wines.

It does not seem impossible that an annual trade of one million cases of high-grade California wines could be attained in the United States, when you come to consider that this would be less than one seventh of a bottle per annum per capita of the population; but the sale of such a quantity of fine-grade wines would immensely stimulate the general value of California vineyards, for instead of the merchant considering a profit of two, or three, or five cents per gallon as a satisfactory goal to be reached, he would look, by the lessening of the unit from a gallon to a bottle, to five or six times this profit per gallon.

He would then be glad to pay more for his initial grapes or wines, because with public appreciation assured he would know practically to a cent what he was going to get for the aged and matured wines in his cellars.

To-day no such assurance exists. He may, believing that the outlook justifies it, pay in one vintage a large price for grapes and wine only to find that succeeding heavy crops have so depreciated the value of the stock of wines in his cellars as to bring him face to face practically with bankruptcy. He is not willing under such conditions to take these chances. It is not a commercial proposition. It therefore resolves itself into a question, not how *much* can he pay for wines for holding and maturing, but how *little* can he get them for, so as to minimize his chances of loss?

We are a long way, however, from shipping any such quantity of cased wines. Statistics of railroad and steamer shipments show that such wines sent from California rarely reach in any year fifty thousand cases, while bulk shipments reach nearly eighteen million gallons.

This means practically, therefore, that the reputation of California wines is left solely in the hands of the Eastern wholesale handler in bulk, who may or may not bottle it with the care and attention which

all fine wines need, or who may or may not give the wines the time in bottle which is absolutely requisite to the development of the finer qualities, the smoothness and the bouquet which characterize the better brands of wine from abroad.

In a word, nearly all this is left to the commercialism of handlers who do not depend solely upon California wines for their business success, but who most frequently handle also foreign and Eastern wines and are primarily whisky-handlers.

Should not the reputation of the finer California vintage wines be more jealously guarded by Californians? The renowned "Chateau" wines of France, and the "Schloss" wines of Germany, would never have attained the value and reputation which they hold in the public estimation, if they had been sent out in bulk and been bottled by strangers.

California is yet young, but to gain a national reputation for her wines she must emerge from swaddling clothes and take on the garb of a man; she must follow in the footsteps of older countries and adopt their methods.

There are magnificent wines to-day in the cellars of California which have been carefully selected and properly aged and matured, but the great consuming public in the East will not, unsolicited, reach out its arm three thousand miles to obtain them.

"If the mountain will not come to Mahomet, Mahomet must go to the mountain." And so must we carry our wares, in the most attractive form, to the consumer, in order to have them properly appreciated.

The direct marketing of these finer wines should not, and will not, interfere with the present business of those who now distribute California wines; on the contrary, the sale of all California wines, of whatever grade, can not fail to be benefited by a public appreciation of fine wines properly aged and matured in bottle in California cellars. For such wines the public will, when properly educated regarding their excellence, be perfectly willing to pay an adequate price.

To effect all this, however, concerted action is necessary. It is estimated that over eighty million dollars is at stake in the grape-growing and wine industry of the State. Can not this eighty million dollars contribute according to the benefit derived by each element in the business? It must do so, if it is desired to avoid the violent fluctuations in vine and grape values which now are common.

If vineyardists want grapes to rule high in price, they must cooperate with the distributors to obtain a stable price for the aged and matured article; otherwise a hand-to-mouth policy must continue to permeate the industry. No longer can each afford to stand in his own corner and refuse "to play in the other's backyard." It is only by cooperation of all the elements that any considerable and permanent success can be attained.

This year a disastrous slump in the price of all kinds of wines was only averted by an accident of the elements. At the commencement of the vintage everything pointed to another record-breaking crop of grapes, following two years of abnormally heavy yields. Eastern handlers of California wines had been advised that a drop in prices was imminent, and therefore were pursuing merely a hand-to-mouth policy in buying. Weak holders of wines, becoming scared, commenced to dump their wines upon the open market at ruinous quotations, and had it not been for the firm stand taken by the large wine-handling interests, nothing could have averted a panic such as has temporarily overwhelmed the raisin business.

The unusually hot weather in August, however, shortened the crop to some extent, and the unprecedentedly heavy rains also did their share toward causing a smaller yield. This has steadied the dry wine market, but the sweet wine and brandy markets, due to the efforts of producers themselves to market unmaturing wines and brandies direct to the Eastern trade, are in a very uncertain and demoralized condition.

The price of old and matured sweet wines and brandies, which are principally in strong hands, is being maintained, but quotations made by vineyardists who are also wine-makers, and by the so-called coöperative wineries, have precipitated very bad conditions for sweet wines and brandies of the new vintage.

Coöperation is also needed among the various elements in the wine industry for keeping in touch with matters at the National capital. These matters must not be left to individual attention, but should be taken up closely by all interested in the industry. We have splendid friends at Washington in the administration. President Roosevelt himself is a mighty good Westerner; then we have Secretary Metcalf of the Department of Commerce and Labor, and Secretary Morton of the Navy, all of whom have been in close touch with Western conditions, and who may, I am sure, be relied upon to see that the West is fairly treated.

In the newspapers last week there was a synopsis of the report of the Commissioner of Internal Revenue, recommending that a tax be imposed upon the brandies used in the fortification of sweet wines. This means practically the repeal of the sweet-wine law, under which the vineyards of our interior counties have grown up and flourished. Should this recommendation be adopted by Congress, a large part of the vineyards might just as well be uprooted, for the consumption will be greatly curtailed by the added cost of wines unless vineyardists are willing and able to take even less than hitherto for their grapes—which is of course out of the question—and the cost of wine-making will be so enhanced that all plans for marketing any surplus abroad will immediately be frustrated.

And still, mark you, I have yet to see a single protest in the California papers emanating from the vineyard interests. The imminence of the danger to their interests which would follow a practical repeal of the sweet-wine law does not appear to have been realized by them. All this is due to the fact that at present it is "every one for himself and the devil take the hindmost."

Can the vineyardists afford to remain in such a condition of apathy? Should not this California Fruit-Growers' Convention adopt stirring resolutions to our Senators and Congressmen, and embody therein an appeal to the President against the adoption of the recommendation of the Commissioner of Internal Revenue so completely destructive to sweet-wine vineyardists of the State?

The large handlers and distributors have already sent their telegrams to Senators and Representatives in Congress, but they are only one element of the wine industry. The vast body of grape-growers is far more interested in this matter than the wine men, and yet they have, so far as I know, remained silent.

Considering the difficulties of obtaining the passage of the sweet-wine law and the benefits which California has derived from it, one would have supposed that an intimation even, that the Commissioner of Internal Revenue had recommended the alteration or repeal of this beneficial law, would have caused mass meetings to immediately assemble to protest that if such recommendation were adopted it might mean annihilation of a large part of the present vineyards of the State, for under such conditions only the heaviest bearers would be able to survive.

As I have frequently said before in the annual conventions, "God helps those who help themselves," and if the vineyardists of California expect prosperity, they must go out to meet it, and must fight for it, and not wait always for prosperity to knock at their doors.

WHAT THE BUREAU OF PLANT INDUSTRY IS DOING FOR THE FRUIT-GROWERS.

BY PROF. P. H. DORSETT, OF CHICO.

Mr. Chairman, Members of the California Fruit-Growers' Convention, Ladies and Gentlemen: I am pleased to meet with you on this occasion, and feel highly honored at being requested to address you in connection with what the Bureau of Plant Industry, United States Department of Agriculture, is doing for the fruit-grower, the farmer, and others.

Since the organization of the Bureau in 1901, many bulletins have been published, setting forth the results of the work already accomplished. The work now being undertaken and planned for is as far

reaching as our country itself, embracing, as it does, agricultural and horticultural problems of interest and value to our people, from Canada to the Gulf of Mexico, from the Atlantic to the Pacific, and even extending into Porto Rico, Cuba, and the Philippine Islands. Time, however, will only permit of my mentioning some of the more important work of immediate interest.

The Bureau is maintaining a Pacific Coast Laboratory and Plant Improvement Garden at Santa Ana, California, in charge of Prof. Newton B. Pierce. Here much has been, and is being, accomplished for the horticultural interests of the State. His experiments at Biggs, California, in the treatment of "peach leaf curl," prior to 1900, as outlined in Bulletin No. 20, proved beyond question that there was no longer any necessity for the immense loss annually sustained from the ravages of this disease. It was estimated upon conservative data at that time, that the work inaugurated or set on foot by the Department of Agriculture saved to the fruit-growers in a single year three quarters of a million dollars; this amount is insignificantly small to what it would have been had every grower sprayed his trees.

Here the California vine disease received special attention, and while every effort, so far, has failed to reveal the specific cause of the disease, and no absolute remedy has been found to stay its ravages, much data and valuable knowledge have been acquired that will materially assist in the experiments under way and to be taken up in the future, looking to a possible solution of the problem.

More recently, Professor Pierce has taken up the study of the walnut blight (*Pseudomonas juglandis*), a bacterial disease of the English walnut, which, it is estimated, caused a loss of \$800,000 to the growers of southern California during the season of 1903. Spraying experiments for the purpose of checking or controlling the disease have shown that fully fifty per cent more nuts fell, on account of the disease, from unsprayed than from sprayed trees during the season. These results, however, have not been considered satisfactory, and at the laboratory a series of breeding and selection experiments is in progress, which it is hoped will eventually result in the production of commercial varieties resistant to disease, more prolific, and of better quality. These and many other problems of importance to the fruit-growers are receiving attention at this laboratory.

The Bureau within the last two years has established and is maintaining, under the management and direction of Prof. George C. Husman, United States Viticulturist, nine experimental vineyards of from ten to twenty acres each, located in various sections of the State, with special reference to soil, climatic, hillside, valley, and desert conditions; proximity to and distance from large bodies of water. The locations embrace the raisin and table-grape districts as well as those for the

production of wine and brandy. At these stations it is intended to determine by test experiments the adaptability of varieties to the different localities, and to afford opportunities for the testing of all classes of grapes, with reference to their resistance to disease; and in case it is found necessary for the purpose, of producing new varieties resistant to disease and adapted to specific purposes and conditions. It is also intended to make, at these several stations, a comprehensive test of all resistant varieties; to test and determine by practical experiments, if possible, the congeniality of vinifera varieties to the various resistant stocks. Sixty-three varieties are now being tested to determine their relative rooting qualities, which will determine their commercial value as stocks. It has been estimated that the viticultural industry of the State of California represents an investment of not less than \$100,000,000, and already more than 75,000 acres of vineyard in this State alone has been destroyed by disease of various kinds. The value of the work that will be accomplished at these stations, it seems to me, is self-evident, and the Federal Government, together with the California Experiment Station, which has agreed to cooperate in the work, should receive the hearty support and cooperation of every lover of the vine and its fruit.

The Bureau, in cooperation with the State Experiment Station, has recently established a date garden at Mecca, California. Some of the best known varieties of the world have been planted, and others are being collected and imported for planting. It is the purpose of this garden to demonstrate the commercial possibilities of date culture in California, by testing known varieties, and also by the production of new varieties, by breeding and selection, that will prove most advantageous for the commercial success of the work. This work, though but recently established, is giving promise of success, and a lively interest is being awakened as to its future success; so much so that the ever ambitious American, with capital to invest, is anxious for a chance to embark in this new horticultural enterprise. Prof. A. V. Stubenrauch, of the California Agricultural Experiment Station, who is in immediate charge of the work, realizing the possibility of disappointment and failure from premature investments in this connection, has issued a letter of warning to all those thus inclined, urging upon them the necessity of awaiting definite and practical results from the work already under way. That the enterprise will succeed there is but little doubt. However, the results thus far attained are not sufficient from which to draw conclusions that would warrant a reckless investment of time and money. Much remains to be accomplished, and many, practically all, of the problems connected with this as a commercial enterprise in California, are yet to be demonstrated.

Not until after the fruiting of the two "Washington Navel" orange trees at Riverside, California, in 1878, did this become a distinctive industry

of the State—one that has grown from an annual yield of about 225,000 boxes for Eastern shipment in 1884 to about 10,000,000 boxes during the season just past. The original parent tree of the many thousands of those contributing to this magnificent yield of the golden fruit stands to-day in the orangery on the grounds of the United States Department at Washington, a living monument of the value of the work of the Office of Seed and Plant Introduction of the Bureau of Plant Industry. The annual profits to the growers engaged in this magnificent industry are reduced by the losses annually sustained from the decay of fruit in transit, amounting, as it does, to many thousands of dollars. For the purpose of determining, if possible, the specific causes of the decay, and suggesting remedies for its reduction or prevention, the Bureau of Plant Industry, through Prof. G. Harold Powell, assistant pomologist in charge of field investigations, and assistants, will start a line of investigative work in southern California, in connection with the harvesting, packing, and shipment of citrus fruit, to determine if possible wherein the trouble lies.

The Bureau, through its workers, has been successful in working out some of the more important problems connected with the storing, packing, and shipment of fruits in the East, as a result of which our fresh fruit markets have been extended into Europe and the way opened for shipping peaches, pears, and other perishable fruits with good profit. The result of this work is set forth in Bulletins Nos. 40 and 48. There is every reason to believe that the work of the Bureau in this connection will result in the saving of many thousands of dollars to the citrus-growers of the State.

The Department of Agriculture, in coöperation with Mr. George C. Roeding, of Fresno, California, one of the leading nurserymen of the State, was successful in introducing and establishing the fig wasp (*Blastophaga grossorum*) which has revolutionized the fig industry of the State, and made it possible for growers of this fruit to produce figs equal in quality to the best imported Smyrna product; and yet this industry is in its infancy, with many problems to be solved and much yet to be learned.

For thirty-five years there has been, from time to time, introductions of hardy, glossy wheats, of the durum group, principally from Russia, but also from Algeria and Chile. However, it remained for the Bureau of Plant Industry, through Mr. Mark A. Carleton, Cerealist, to demonstrate the commercial value of the durum or macaroni wheats. Previous to 1901, elevators and mills, as a rule, refused this wheat at any price, and it was rarely grown except in small quantities for stock. The production has increased from 100,000 bushels in 1901 to at least 6,000,000 bushels in 1903. Macaroni factories have been established, and are now competing with the foreign product, of which it is estimated \$8,000,000 was

imported annually. Thus through the Bureau a new industry has been established in the semi-arid Northwest. California's product is extremely deficient in the qualities that give value to the durum wheats, grown in the semi-arid Northwest, and these wheats when grown here deteriorate rapidly in regard to their gluten content. These conditions, however, are subject to modification through methods of breeding and selection. I am glad to note that the State Agricultural Experiment Station has undertaken the solution of this problem. Gentlemen, let me urge upon you the importance of, according to Professor Shaw, the gentleman in charge of this important line of investigative work, every possible support, financial and otherwise.

Hop-growing is an extensive industry in the United States, and increasing quantities are annually exported to Europe. California is one of the principal producing States. The best American brewers, however, for the manufacture of their very best beers, prefer to pay from 60 to 65 cents per pound for imported Bohemian or Bavarian hops to from 24 to 32 cents for American-grown. In what is the American hop inferior, and what should be done to improve it, are problems that are already receiving the attention of the experts of the Bureau of Plant Industry.

In April of the present year the Honorable Secretary of Agriculture, through Dr. B. T. Galloway, Chief of the Bureau of Plant Industry, authorized the establishment of the Plant Introduction Garden. You are all no doubt more or less familiar with the selection of the site and the location of the garden. It fills a long-felt want, and under efficient management, with proper support and coöperation, it is destined to embrace the most important lines of investigative work yet undertaken by the Bureau. Here plants of all kinds, having economic value, will be assembled from all parts of the world for propagation and testing, to determine their value for further distribution, or to be maintained and used in breeding and selection experiments for the purpose of developing plants resistant to disease, adapted to specific locations or conditions, better in quality, more prolific and better suited to our needs.

Gentlemen, the practices of the horticultural and agricultural industries of the country, and especially of California, need *revolutionizing*. In some instances this is already in progress; for example, the citrus industry of to-day in the principal citrus sections of the State is entirely different to what it was ten or fifteen years ago. The more intelligent growers find it necessary to change the location of their orchards, the methods of tillage, etc. Some of the more advanced thinkers of the craft realize that their methods of picking, packing, and shipping must be modified. Few of them, however, have considered it necessary to plant trees of known recorded parentage (pedigreed

stock) having an established record for quality and fruitfulness, budded or grafted upon congenial stock, suited to specific locations and conditions. To-day, with most of us, a tree is a tree and a vine is a vine, regardless of its past history or condition. This is exemplified in the English walnut industry of southern California, where there is, perhaps, upwards of 10,000 acres of the best lands planted to trees, ninety per cent of which is seedling stock. The buds, scions, and cuttings that produce the stock of our horticultural industries are too often taken at random. We require of our nurserymen that the trees or plants furnished must be of such an age, height, and caliber, and these requirements are complied with. We fail, however, to require absolute assurance that such plants are from known disease-resistant stock, suited to certain locations and conditions, and of known fruiting quality or quantity. Here in California, where our good lands are expensive, the distance from large consuming markets great, and transportation charges in some instances almost if not quite prohibitory, competition with the same or other products from this or other sections to reduce the price, and combinations to prey upon the profits, are important factors, and as such are commanding the attention of our best specialists. Our extensive seed-growers realize the necessity of stock seed true to name and character from which to grow their products. Our best florists and market-gardeners growing their products under glass, the most intensive plant-growers of the country, realize the importance of special strains or pedigreed stock. Dr. Galloway, Chief of the Bureau of Plant Industry, has shown by experiments that in the growing of radishes under glass, one additional crop can be harvested each season by selecting the largest seed. Our attention has been called to the fact that an average increase of but a single bushel of wheat per acre would mean a gain of \$15,000,000 to the farmers of California. From personal experience and observation I believe I can say, without fear of contradiction, that without increasing the acreage, the yield of the majority of our products, if not all, can by judicious and intelligent selection be increased from ten to twenty-five per cent and at the same time be greatly improved in quality. The breeding and selection of plants, not only for an increased yield, but for resistance to disease, adaptation to specific needs, locations, soils, and climatic conditions, will be one of the prime features of the work of the Plant Introduction Garden. The introduction of new fruits and new and valuable plants, seeds, bulbs, scions, cuttings, etc., the improvement of the products of our present industries, and the establishment of new ones, will receive special attention.

We have now a very fine collection of figs at the garden, embracing varieties from Austria, Greece, Algeria, Asia Minor, Turkey, Italy, Malta, Smyrna, and California. These will be used for breeding, selection, and demonstration experiments. We have several hundred pounds

of pistache seed and 5,000 or 6,000 seedling plants. This nut in the United States, at the present, is used perhaps exclusively in confectioneries, while in European countries it is used the same as the peanut in America. The Bureau hopes to establish this industry in California.

Mr. Walter T. Swingle, in charge of the Laboratory of Plant Life History, has spent the greater part of six or eight years in studying the conditions of this industry abroad. In a recent letter relative to this matter, Mr. Swingle says: "I am sending you seed from Smyrna, Algeria, southern France, Sicily, Sahara, Syria, and northern Syria. This is the most valuable collection of seed that has ever reached this country, and it has taken me more than five years' work to get such quantities as we needed. I have the greatest confidence in the future of pistache culture for dry lands, and have just found a reference in an Arabic history to huge pistache orchards growing in the dry lands of southern Tunis. When the Arab conquerors moved westward through North Africa, in the innumerable conflicts which these contests entailed, these orchards were destroyed, but the fact of their presence in a region receiving only about ten inches of rainfall a year shows how promising the pistache is for culture in dry lands."

Mr. Thomas H. Kearney, one of the explorers of the Bureau of Plant Industry, is now in northern Africa, and will make a trip to Sicily, possibly in January or February, for the purpose of securing scions of the best Sicilian varieties, and he will also visit Tunis and secure the best varieties there. These will be used in budding and grafting the seedlings we have at the garden, preparatory to making a practical commercial test of the possibilities of this industry in California.

Another new fruit recently received at the garden is the Yang Taw (*Actinidia chinensis*). These plants, and specimens of their fruit preserved in alcohol, came through Consul-General L. S. Wilcox, who writes of them as follows: "These plants were secured from plants formerly obtained on the borders of Yunnan, in the foothills, in the southern part of the province of Szechuan (having a climate similar to that of southern California). The fruit is about the size of a hen's egg, has a thin, leathery, hairy skin covering it, and is full of meat. Seeds very similar to the gooseberry or fig, it is sometimes called the hill gooseberry. In bloom, it has a beautiful flower; when the fruit is picked and left for a few days until soft, it is very fine eating. It has the flavor of the gooseberry, fig, and citron, and makes delicious jam, pies, and sauce. I have packed in a box two bottles of the fruit, in order that the Department of Agriculture may get some idea of the two varieties sent; the larger variety seems to be the finest flavored. As the plants are carefully packed and strongly boxed, I trust they may arrive in good condition, and that the fruit may be more valuable for family use than the Navel orange." These plants were shipped

from Hankow, China, via Shanghai, early in March of the present year; they did not arrive at the garden, however, until July 8th. We now have several plants of each of the varieties, that are growing nicely and appear quite at home.

I could enumerate many new introductions with promising possibilities; also many problems of interest and value to the horticultural and agricultural industries of the country that are being investigated by the Bureau of Plant Industry; but deem these sufficient to show that these industries are not being neglected by the Bureau.

The Plant Introduction Garden is a Government institution, and while established for work along broad lines, we are deeply interested in all local problems relating to horticulture and agriculture. We will, therefore, be pleased if you will communicate to us the more important problems in connection with these industries in the various sections of the State needing demonstration or investigation, so that we will be in a position to render, if possible, assistance to the Agricultural Experiment Station in coöperative experiments, or otherwise aid in their possible solution.

We extend to you and to all those interested in miscellaneous plant life a cordial invitation to visit the garden whenever convenient; to inspect and become familiar with the many new and interesting introductions received from time to time. We want your hearty support and coöperation. We are working to help you, and want you to assist us, if in no other way, at least by the interest shown in an enterprise that is destined to play such an important part in the future welfare of the foundation industries of our country.

ADDRESS BY DR. VAN DER NALEN.

Mr. President, Ladies and Gentlemen: I am not a fruit-grower, but I am a lover of California, and of her prosperity. Being a Californian, I have, I think, some suggestions to offer which may be of benefit. I am simply an engineer, the head of an engineering school in San Francisco, who, after a hard summer, felt himself tired out and wanted to go away out of the reach of telegraph and telephone and go to Europe for a rest. Not having anything to do in Europe, I traveled about a good deal, and looked out for California products. They would ask me, "Why, are you a Californian? You make splendid wines there. You grow splendid fruit there, but where are they? We can not get them. We want them here." Well, I listened to all that, and then they told me why. They asked we when the new crop of apricots was coming on. They wanted some of them to make jelly with our dried apricots. What, make jelly with dried apricots? Yes, don't you know, we are already waiting for your apricots. We love them; we want them. Taste this,

and taste that. You have good prunes. We want them. California prunes are above all others. The Austrian prunes are going out of the market; the French prunes are going out of the market here. Why not ship them to us directly? We want your wines and your fruits.

I have here a paper containing an account of an exposition to be held in the city of Liege, Belgium, next year—an international exposition that is going to take place. A great many countries already have taken space there in that exposition—Denmark, Norway, Sweden, England, Scotland, Germany, Austria, France, Russia, and many others. You should exhibit your products there.

In Belgium, where that exposition is going to take place, it is densely populated; there are immense manufactories; most of the zinc and tin comes from there; glass works, iron and steel factories. Hundreds of thousands of workmen are employed. Well, you know there they have no eight-hour law; they work their men a great deal. Those people have always felt the necessity of a little stimulant. All of them drink alcohol; it muddles their brains, and then they go to work and break their glasses and do such bad work. Now the main industrial institutions of this country have formed anti-alcoholic societies, and they sell three or four thousand bottles of wine in their shops, or in their works, and this I think is wise. They encourage the drinking of wines; it does not muddle the workers' brains, and so far it is a magnificent success. The workman takes a drink of wine, which he needs, and his brain remains clear and unmuddled. There is wine in California. There is an immense population there, and why should you not send your wine there and get them to use it? These people drink lots of Burgundy. They only have a good crop of Burgundy once in seven years, and our Burgundy makes a superior color.

Now they told me that they wanted to deal directly with the producers of California. Send a good exhibit there next year and let them see and test your wines and fruits. Don't send a niggardly one. In Belgium there are eight millions of inhabitants and it is only about as large as Kern County. There are hundreds of thousands of people going to that exposition, and that is your opportunity, gentlemen. In the dry-goods stores and shoe stores in San Francisco five pounds of prunes are given away with each purchase—to help our poor fruit-growers. Do you want to see a sign on every street corner, like that of the Salvation Army, "Help our poor fruit-growers"? Oh, no, no.

You ought to send a good exhibit to Portland. Portland is doing good work, and you can get benefit from Portland. In St. Louis, also, I looked around for our California products, and I spent altogether there several hundred dollars for the benefit of California. Do not make a little bit of an appropriation for the Belgian exposition, for those Belgian fellows like your wine and will buy it direct, without any

middlemen. You ought to pass a resolution and make up an appropriation to send some one there. I don't want to go there. I want California to be prosperous. More of our young people should study how to become fruit-growers and not so much electrical engineering, and then you will get lots of money from those European people if you are wide awake.

APHIDS ATTACKING THE APPLE.

By PROF. WARREN T. CLARKE, OF BERKELEY.

Among the insects attacking the apple in California are three different species of aphids, or plant lice. Given in the order of their prominence, and probably of their economic importance, these are the well-known woolly aphid (*Schizoneura lanigera*, Haus.); the pyriform aphid (*Aphis pomi*, DeG.), sometimes known as the green aphid of the apple; and the globose aphid (*Aphis sorbi*, Kalt), also known as the rosy aphid. Any one of these species of aphids may become so numerous upon the apple trees that the value of the crop is much reduced, if, indeed, a complete loss does not follow. Probably every grower of apples in this State has had at some time the alternative of contending with these insects, or of losing a considerable portion of his crop. The control measures that have been used by the growers in the past have not been uniformly successful, and it may prove valuable at this time to point out some facts in regard to these insects and their control, in the hope that this review of the subject may lead to better results in the future.

The Woolly Aphid (*Schizoneura lanigera*, Haus.).—This insect, the woolly aphid, is most troublesome to growers of apples, though it occasionally makes its presence felt by the severity of its work on the roots of the pear, and a rather extensive discussion of it seems advisable. The wool-like masses of waxy material with which the insects cover themselves, and from which they take their name, are familiar to all apple orchardists. The insects themselves often escape observation. They are small, louse-like creatures, ranging in length from $\frac{3}{50}$ to $\frac{4}{50}$ of an inch, and can be most readily studied after being washed clear of their wool-like covering, using 80 to 90 per cent alcohol. This material entirely dissolves the waxy wool, and the exposed insects are seen to have a reddish chocolate color. This body color is also evident if a few of the living aphids are crushed. The observer will seldom find any but wingless specimens of these plant lice, as the winged individuals are only occasionally developed under exceptional conditions, probably depending on the character of the food supply. The presence of the woolly aphid is most evident upon the portions of the trees above

ground, and they may do an immense amount of damage to both trees and fruit when present in this situation. This may not be the greatest damage done by them, however, though it is the most evident. This aphid lives and thrives beneath the ground surface, upon the roots of apple and pear trees more extensively than on the visible parts of the trees. When the aphids are present here, they usually are found in greatest numbers at the root crown just beneath the ground, though they do not confine themselves to this situation, and their presence constitutes a menace to the life of the attacked trees. The cause of possible death is not usually to be traced to the diminution of the flow of sap, but to the fact that the attack of the aphids at the crown causes numerous suckers to start, and these new and tender growths are immediately attacked by the lice. This attack causes many of these suckers to form abnormal growths of soft and unhealthy tissue, which, in time, may crack open and become the lodging and starting place for toadstool fungus. When this infestation by toadstool fungus occurs, the tree often dies in a year or two, and rarely or never recovers from an attack.

It can be readily understood that this underground habit of life in the case of the woolly aphid renders it an extremely difficult insect to combat. Under ordinary weather conditions this aphid is usually to be found at all times upon the limbs and branches of the trees, yet, during the winter, the number of individuals present is so reduced that it is usually a simple matter to destroy completely those living in this situation. The root-attacking forms, however, can not be completely destroyed without killing the tree, and from here individuals can and do migrate to the upper parts of the tree when warm weather returns, and so the branch attack is renewed. When we remember that these insects in most cases reproduce parthenogenetically (that is, without the presence of the male insect, as do other members of the family), we can understand how even one migrating root aphid can found a colony. The spread of these aphids from tree to tree, and from orchard to orchard, occurs in several different ways. Birds may alight upon infested twigs, and the lice adhering to their feet may be carried to other trees. Occasionally winged aphids appear, and these fly to other situations. Many of the aphids, when crawling about, are dislodged by the wind, and on account of their fluffy, waxy coverings are carried occasionally to quite great distances. The writer has taken such wind-transported aphids at a distance of half a mile from the nearest orchard. The distribution of the woolly aphid is indeed quite readily accounted for.

The great losses traceable to the woolly aphid have led to much study of the insects, with a view to their control, and so far as the branch-infesting forms are concerned, this control is rather readily obtained. The control of the root forms is quite a different matter.

This is the only plant lice for which a serious attempt has been made to control by means of predaceous insects. The woolly aphid has quite an array of insect enemies, the most prominent of which are certain of our native "ladybirds," or Coccinellidæ, which are each year shipped into the Pajaro Valley in great numbers. The most common of these are known to science as *Coccinella californica* and *Hippodamia convergens*. The two species occur together, and are called the "red ladybirds," not being distinguished as different. In both species, the wing-covers are red, varying to reddish-yellow. In *C. californica* these wing-covers are unmarked, while in *H. convergens* they often possess black spots in many variations. The head and thoracic regions of both species are black, differently marked with white in the two species. There are several other species of Coccinellids present in our California orchards, but the two mentioned are the ones most frequently met with. Both the larval and the adult beetles are predaceous upon the woolly aphid, and are popularly supposed to do good service in our orchards in destroying many kinds of aphids, including the pest under discussion. They have the habit of bunching together in certain of our mountain regions, so that it is possible to gather them up in immense numbers and they can then be shipped into the infested orchards and there be liberated.

The history of all plant lice is one of ups and downs. They are all able to multiply with inconceivable rapidity. No other insect can compare with them. Fortunately they are extremely subject to external conditions, which reduce their fertility, and they then become victims of their natural enemies, and may be nearly exterminated. The work of aphid destruction done by ladybirds, therefore, will at times be quite satisfactory.

Lace-Wing Flies (Chrysopidæ).—The larvæ of the lace-wing flies (*Chrysopa* sp.) are energetic destroyers of the woolly aphid. The adults are graceful, rather large-winged insects, of a delicate green color, with quite prominent golden-colored eyes, and are occasionally present in considerable numbers in our apple orchards. The rapid, but not long-sustained flight of these really beautiful insects is very characteristic, and they are quite easily recognized. Hibernation of the lace-wing flies takes place in the pupæ form in protected locations, on or about the trees. The cocoons in which pupation occurs are spherical, about one-eighth inch in diameter, white in color, and rather shell-like in texture. The adult insects emerge from these in the spring, and egg-laying begins. The eggs are placed singly or in groups of fifteen or twenty, dependent upon the species, each egg being attached by a thread-like stalk to the leaf or other object where oviposition occurs. The larvæ hatching from these eggs are voracious eaters, and it is supposed that

only the fact that the later hatching eggs are each out of the way of danger on the end of the stalks saves them from the cannibalistic tendencies of their earlier appearing relatives. These larvæ of the lace-wing flies are rapid-moving creatures, six-legged and armed with prominent pincer-like jaws. They usually hold a place next in importance to the ladybirds as destroyers of the woolly aphid, and are to be numbered among the most helpful insects in finally disposing of a pest of plant lice in the apple orchard.

Syrphus Flies (Syrphidæ).—Hovering about the aphid-infested trees the observer will frequently see certain insects belonging in the group of true flies—two-winged insects. These creatures resemble some of the smaller solitary bees in general appearance and in the character of their flight, and indeed their appearance has been considered as a protective resemblance. These are the so-called syrphus flies, and are, in the larval form, predaceous upon the woolly aphid. The female syrphus flies place their eggs singly among the aphids on infested trees, and the maggot-like, slow-moving larvæ hatching from these eggs immediately proceed to devour the near-by lice, occasionally doing quite as much service in this way in reducing the number of the pests, as other larvæ of the lace-wing flies.

Other insects, both predaceous and parasitic, are present in our orchards assisting in the destruction of the branch-infesting aphids, but do not approach those just mentioned in efficiency. In the case of an attack of woolly aphid, the grower must judge, in the light of his past experience, whether it will be necessary to apply a remedy for the destruction of the pests, or whether the period of increase will be short enough to make it safe to place his reliance upon these helpful insects.

When it is decided to undertake control work against the woolly aphid, it should be begun early in the year, as soon as the lice commence to appear. In the experience of the writer, probably the most satisfactory and effective, and at the same time the cheapest, work can be done by what may be named the swabbing method. This consists essentially in carefully scrutinizing the orchard about once a week, and destroying the newly forming colonies of lice, by swabbing them with either benzine or gasoline. The apparatus necessary in this work consists of a cloth swab, at the end of a pole long enough to reach well up into the tree, and a covered receptacle in which to carry the liquid used. The really essential thing for success in this method is an operator who can be depended upon to do careful and quick work in finding and destroying the aphid colonies. A good operator can cover several acres of trees in a day, and by thus destroying the aphids when their attack begins, the orchard can easily be kept comparatively clear of the branch-infesting lice. If this work is not done thus carefully early in

the year, the lice may gain a strong foothold, and more expensive and less effective spraying operations may become necessary. The writer has conducted successful spraying work against the woolly aphid, using both the 28° distillate oil in a two or three per cent mechanical mixture with water, and with a spray of tobacco decoction and kerosene oil emulsion.

The tobacco decoction was made by steeping tobacco stems and refuse from cigar factories for from two to three hours in water that was kept heated to just below the boiling point. One pound of tobacco refuse was used to each two gallons of water, and by this steeping process a quite strong tobacco juice resulted. The *kerosene emulsion* was made by dissolving seven and one half pounds of ordinary laundry soap in fifteen gallons of hot water, and to this adding five gallons of kerosene oil. The soapy water and the oil were thoroughly churned together for from fifteen to twenty minutes. This was best done by pumping back the material on itself through the spray nozzle. The result was a fairly stable emulsion of a creamy consistency. The spray material was made up by taking forty gallons of the tobacco decoction, and to it adding three and one half gallons of the emulsion. This was kept well stirred in the spray tank while being applied, and proved quite effective in destroying the lice when care was exercised that all were thoroughly wetted by the spray mixture.

If we had simply the branch-infesting lice to deal with, there would be grounds for hoping to entirely eradicate the pest, but on account of the root attack, we can only hope to palliate the trouble. As has been previously mentioned, the great danger from the root attack comes from the aphids clustering at the crown, and rendering this region susceptible to the entrance of toadstool fungus. It has been known for many years, and entirely confirmed by our own experiments, that the aphids can be driven from this location by working into the soil about the trunk of the tree a liberal supply of wood ashes, and repeating this treatment about once in two years. Other materials have proven quite as effective—for instance, the use of tobacco stems and refuse. To apply this, dig the soil away from the trunk of the tree for a radius of two feet, and then fill this opened-up region with a mat of this tobacco material, covering it with an inch or two of soil. The effect of both these methods of treatment is to cause the aphids to withdraw from the crown of the roots where their presence is the greatest menace to the life of the tree. In the other situations where they find lodgment, their powers for harm are comparatively small, if the tree is well cared for. In the case of new plantings in regions liable to serious injury, stock grown on resistant roots should always be used. The Northern Spy appears to be the most satisfactory resistant in use. Undoubtedly properly selected roots of this variety are able to success-

fully withstand the attack of this aphid, and new plantings made upon this root in regions most susceptible to the injurious action of this insect can be kept thoroughly clean from the pest at a very small expense.

Two other species of plant lice, occasionally causing damage in the apple orchards of California, are found only above ground. They are known to science as *Aphis pomi*, DeG., and *Aphis sorbi*, Kalt.

Aphis pomi, DeG.—This aphid is sometimes known as the "green aphid of the apple," but is better described as the "pyriform aphid." It frequently does great damage to young apple trees in some parts of the State. The writer has seen many trees so severely injured by the attack of this plant louse that their removal and destruction were necessary.

This aphid winters in the egg form on the smaller twigs of infested trees. These eggs sometimes are so abundant as to be very conspicuous. They are shining black in color, quite small (about $\frac{1}{2}$ mm. in diameter), and are placed in quite exposed situations on the smooth bark of the twigs. Sometimes these eggs will be laid in such profusion that the infested twigs will have the appearance of being peppered with them, and can be easily distinguished from twigs not so affected. From these eggs wingless parthenogenetic female aphids hatch in the spring, and they and their rapidly produced descendants soon cover and either dwarf or destroy the new growth of the tree. Occasionally winged individuals appear among these, and by means of them the lice spread from tree to tree. Parthenogenetic reproduction continues until quite late in the year, when male and female aphids appear, and by these females the wintering eggs are laid.

The greatest damage done by this aphid is to young trees, and because of the fact that their attack causes the affected leaves to so curl that the lice are protected quite effectively, remedial work directed against them must be carefully and thoroughly done. At pruning time, all twigs bearing eggs should, as far as possible, be cut out and destroyed. No spray materials strong enough to destroy these eggs can be safely applied to the trees, so winter spraying offers little hope of control. When the lice first appear in the spring, very satisfactory control work can be done by bending down and dipping the affected twigs in tobacco juice prepared as already described. When this bending down is not possible, then the infested parts of the tree should be liberally sprayed with the same material. The writer has in his experimental work obtained a good degree of control in the way thus described. It should be borne in mind that delay in beginning the work renders the task of suppression much more difficult and expensive. The same series of predaceous Coccinellidæ, Chrysopidæ, and Syrphidæ noted as occasionally destroying the woolly aphid, also attack this, the pyriform aphid, but as this species increases more suddenly, they are of rather less value

in preventing injury. Occasionally also we find the eggs of this aphid destroyed by one of the parasitic Chalcid flies, and, indeed, in some parts of California, the great majority of the eggs of *Aphis pomi* were so destroyed in the fall of 1903. Unfortunately, however, enough aphid eggs escaped to start the infestation the next spring, and in many instances by midsummer the attack of the lice was as severe as though the eggs had not suffered so severely during the previous hibernation season.

Aphis sorbi, Kalt.—The third aphid that we have to deal with in our apple orchards has been called occasionally the “rosy aphid of the apple.” We believe, however, that the name “globose aphid” better describes it, and segregates it from the aphid previously described, that being pear-shaped, while the one at present under discussion is comparatively globose in form. The two species of aphids (*A. pomi* and *A. sorbi*) are sometimes found working together, and indeed, until quite recently, were considered as one species under the name *Aphis mali*, Fabr. Recent studies, however, have fully established the correctness of this separation into two species, and though they are frequently found in company, yet they are easily distinguished one from the other.

The species now under consideration (*A. sorbi*) is generally found upon the older trees, and while it seldom appears in sufficient numbers to reduce the growth of these, yet it does frequently cause considerable loss by stunting the growth of the apples themselves. We have had the opportunity to observe the work of this aphid in several different sections of the State, and find that its life is passed about as follows: Eggs are deposited on the twigs and trunks of the affected trees in the fall of the year, and the insects winter in this form. These eggs are never so numerous as is the case with *Aphis pomi*, nor do they seem to hatch so early in the spring as do these latter. The newly hatched lice seem to prefer to feed in the neighborhood of the young fruit, or even upon it, and often in this situation they can be found in great numbers completely covering the small apples. The individuals found at this time are for the most part wingless parthenogenetic females, and many generations of lice may be produced here with but few winged specimens appearing. During the early summer the winged insects are seen in great numbers, and a migration seems to occur. It is claimed by certain observers that at this time this aphid seeks some food plant other than the apple. While the writer has never been able to identify this aphid on any plant other than the apple, yet the fact remains that during the summer *Aphis sorbi* entirely desert these trees. In the fall, winged viviparous females and males appear on the apple trees, and these females give birth to oviparous females which lay the wintering eggs. The life cycle is an interesting one, and presents certain features

worthy of protracted study. The main damage done by this aphid, as has been previously stated, consists of a stunting and dwarfing of the affected fruits, and the apples so attacked never recover, but remain upon the trees small, distorted, and useless. We have examined some orchards where the loss caused by this aphid would average from one and a half to two boxes of fruit to the tree.

These lice also attack the leaves of the tree, causing them to curl and twist together and the lice find protection in these distorted leaves. As in the case of *Aphis pomi*, control work directed against them must begin early in the season, and must then be thoroughly done. If we delay operations until the leaves become well curled, our task is rendered much more difficult and expensive. The writer has found both the tobacco decoction and the mixture of this material with kerosene emulsion (described on a previous page) effective sprays for the destruction of *Aphis sorbi*, when used early in the season. If for any reason the spraying operations have to be delayed, then the 28^c distillate oil in a two to three per cent mechanical mixture with water, as used in combatting the woolly aphid, will be found more satisfactory.

The same series of predaceous and parasitic insects noted as attacking both *Schizoneura lanigera* and *Aphis pomi* are found at times devouring the aphid here under discussion.

Our studies then of these three aphids attacking the apple show that a great aggregate loss is caused by them annually in this State.

While in some cases a let-alone policy will often be followed with but little loss, notwithstanding the very small part played by predaceous and parasitic insects in assisting to reduce the numbers of the lice, we are forced to the conclusion that insecticidal materials and resistant stock are the only reliable and effective control measures yet at hand. This use of insecticides will be effective only when the orchardist is observant, timing his operations properly and applying the available remedies in the proper manner. When this is done he can cheaply control these pests, and be sure of the most satisfactory results.

APPOINTMENT OF LEGISLATIVE COMMITTEE.

PRESIDENT COOPER. I will announce the names of the committee that was requested this morning. Those who were not here yesterday evening probably have seen in the morning paper that two resolutions were passed, one for an increased quarantine appropriation in the city, and the other for an increased appropriation for the investigation of parasitic insects. The motion this morning was to appoint a special committee, having those matters in charge, to go before the Legislature next month.

DR. DINSMORE. You will pardon me for this slight correction.

The motion made by me did not regard that second proposition at all, only the first. The motion was that a committee of five be appointed, to be distributed over the State, and the name of Judge Lieb from here, to have charge of the matter of the increased quarantine appropriation for San Francisco.

PRESIDENT COOPER. I supposed there would be no objection to this committee attending to another matter.

DR. DINSMORE. No objection, but the motion did not cover it.

PRESIDENT COOPER. I will name Judge S. F. Lieb, of San José; A. P. Johnson, of Riverside; H. P. Stabler, to represent the northern district; John S. Dore, to represent the San Joaquin Valley; and A. N. Judd, to represent the apple district of Pajaro Valley.

ADDRESS BY JUDGE B. G. HURLBURT.

Mr. Chairman, Ladies and Gentlemen: In reading the President's message, I was particularly struck with that portion of it which referred to our present prosperity and our future prospects. It occurred to me that if he had attended this convention before penning that message he at least would have excluded the fruit industry of California. From the remarks that have been made here I think it would have conveyed to him the idea that the fruit industry is in a very depressed condition. It seems as though those who have participated in this meeting are not sanguine of any improvement; they are not sanguine that the condition may be bettered; that coöperation can be made successful; and in that event if it should be a failure, there is one other course which invites our attention—that is, retrenchment in order to avoid bankruptcy. Domestic economy can be practiced without coöperation. It is the province of every family to regulate its own expenditures; its members can restrict themselves to just what amounts to the necessaries of life, which means food and clothing. But political economy requires coöperation. Now, as a matter of fact, this science of political economy, or science of civilized government, is not well understood in California. The vote cast at the last election upon the constitutional amendments shows conclusively that we are not so well educated in the science of civil government as the people of our government should be. The vote upon those questions was not more than one half of the votes cast, and on many of them not more than one third. The reason assigned for not voting on those constitutional amendments by many with whom I have conversed was that they did not properly understand them, and did not fully understand what effect they would have upon our State government.

Now, much has been said about introducing agricultural education in our schools. I approve of it, although it can not be taught to any great

extent. We may, perhaps, create a taste for it which will lead many of our men, when they start out in life, to adopt agricultural pursuits; but agriculture, above any other science, needs demonstration. Object lessons must be called into requisition there. Agriculture can not be successfully taught through experiment, along with the learning which you derive from the books. Now I would suggest that this study be introduced into our schools; that the science of civil government should be pursued there; but to introduce it into our classes with our present curriculum would be a physical impossibility. The child is crowded to its utmost capacity; it would produce intellectual dyspepsia; it would be as destructive to the brain as physical dyspepsia is to the stomach. That has been the great fault of our educational system—cramming. We often hear them boast, those educators, of the great improvement which has been made in our system of education within the last fifty years. Why, Mr. Dore related here the incident where students were passed through the high school, had graduated and could not solve the simple rule of three—could not tell what the rate of taxation was necessary to levy upon a certain sum in order to produce a certain amount. Now, with all your boasted improvements in the system of education, you could go back fifty years and if you could find a boy of sixteen who had attended school four months in the summer and three months in the winter until he was twelve, and after that three months in the winter until he was sixteen, who could not solve that problem, he would be pronounced stupid. Those graduates are obliged, under our law, to prepare to enter the university. Are they prepared for useful lives? Are they prepared to go out into the world? Now, we have an ironclad law which provides that every student who enters our high school shall pursue a course of study which will enable him to enter our university.

Now there is the initiative. I can not say positively where this law initiative came from, but it bears all the ear-marks of the State University. Now, Mr. Dore has said that he thought no more than three per cent of the students who had graduated from our high schools ever entered the university. He said, to be liberal, he would allow five per cent; ninety-five of the scholars must be sacrificed in the interest of the five who finally enter the university, instead of pursuing such studies as will prepare them to enter the duties of life. Is not that foolish? The sentiment prevails to a great extent that when we have admitted our children to the grammar school, we should not be taxed any further. That sentiment is growing not in the interest of the educators, but in the interest of the taxpayers. Now what was this penalty? After breaking down the Constitution, after amending the Constitution to fix this penalty, they provided that those schools which were not admitted in accordance with the law, should receive no State aid. And there is

the penalty for you, where the law itself provides that they shall pursue such studies. That is why in my opinion our educational system is not all it should be.

Now I know there is, you may say, an educational boom, and we have in the State of California to-day an educational trust, which has as firm a grip upon the throats of the taxpayers as the coal trust, the oil trust, or the steel trust has upon the consumers, or the transportation association has upon the shipper to-day. They can demand the passage of any law by the Legislature; they have come to believe that when they have consulted the State officers and boards, the doctors, lawyers, and school-teachers, they have got the whole thing; that that is all there is in it; that the common people have no rights which a white man is bound to respect.

We have, perhaps, the most expensive State government and the most expensive State educational system of any State in the Union, in proportion to population. We pay out for education annually, to school teachers in salaries, \$5,113,222—to common-school teachers. That does not include the high schools. The whole expense of our common schools is \$7,888,173. Our high schools—these ironclad high schools, where all are required to pursue such studies as will qualify them to enter the university—cost us \$1,133,790 annually. Our normal schools cost us \$360,000 annually. Our polytechnic school costs us \$59,361; the school for the deaf, dumb, and blind, \$63,000; the State University, \$979,262. Perhaps, in justice, I ought to exclude the amount embezzled by the late secretary, which amounted to \$52,000, lost on horse races. [Laughter.] That leaves an annual disbursement of \$927,000. The grand total is \$10,862,586. That does not include our private schools. We have 37,000 students in the private schools of this State. It does not include the universities outside of the State University, which, taken altogether, might safely be estimated at \$2,500,000 or \$3,000,000. If education was all that was claimed for it, our almshouses would be empty, our prisons would be to let; but on the contrary, they are full to overflowing, and our penal institutions are well represented by that class who have received the benefits of higher education.

In addition to all this, we are called upon to levy an additional tax of over \$2,000,000 for the coming year; and of that, \$1,625,000 is to be a perpetual tax. They ask for a law which will provide for an additional tax of \$1,640,000 to raise the salaries of our school teachers—\$1,640,000. It is easy enough to estimate it. We have 407,000 census children in the State, and the proposition is to increase the county taxes from \$6 to \$8, and the State tax from \$7 to \$9, or \$4 a child. Now the school teachers in the State of California receive higher wages than in any other State in the Union, and forty per cent higher than the average wages paid in all other States in the Union.

The men receive \$73.87, and the women \$66.40 per month. This proposition of increasing the taxes will raise the salaries \$20 per month. Take into consideration the depressed condition of our fruit industries alone; but our wheat fields are becoming exhausted, we can not produce half the crop that we once did. And they ask to have our taxes raised, and for what purpose? As I told you, we have an education trust which extends from the University down to the teachers in the kindergartens; they command and they are obeyed. We, as common people, are not allowed to know anything about the taxes. We are not allowed to exercise our judgment about these most important matters, as are the scientific, learned men with a suffix to their names.

The Convention adjourned until 1:30 P. M.

AFTERNOON SESSION—FOURTH DAY.

FRIDAY, December 9, 1904.

The Convention was called to order at 1:30 P. M. President Cooper in the chair.

REPORT OF COMMITTEE ON RESOLUTIONS.

PRESIDENT COOPER. The Committee on Resolutions reports the following:

RESOLUTION ON INTERNAL REVENUE.

WHEREAS, The Commissioner of Internal Revenue has recommended that a tax be placed upon brandy used in the fortification of sweet wines; and,

WHEREAS, Relying upon the continuance in its integrity of the present sweet-wine law an enormous acreage of sweet-wine grapes has been planted, representing an investment of many millions of dollars, which will be jeopardized by the increase of cost in the manufacture of sweet wines, so limiting the market as to preclude the possibility of providing an outlet for the production from such planting.

Resolved, That the fruit-growers of California in convention assembled, believing that the benefits to the revenue of the General Government which would be derived from the adoption of the Commissioner's recommendation are not commensurate with the distress and ruin to a struggling California industry which would ensue therefrom, do request the Senators and Representatives in Congress from the Pacific Coast to respectfully implore of the President and the Administration not to press the repeal or alteration of the present sweet-wine law.

Resolution unanimously adopted.

PRESIDENT COOPER. The committee has another resolution which they report do pass—the resolution for the purpose of asking the Legislature to pass a law requiring instruction in agriculture.

RESOLUTION FOR TEACHING AGRICULTURE IN THE PUBLIC SCHOOLS.

WHEREAS, We consider nature study with special reference to agriculture of great value to all children of school age; and,

WHEREAS, It is, in our judgment, imperative for the best good of the children that all the teachers in the public schools be qualified to present such truths in the best possible manner; therefore, be it

Resolved, By the California Fruit-Growers' Association, in annual convention assembled in the City of San José, this eighth day of December, 1904, that we ask the Legislature of California to take immediate action requiring a thorough course of elementary training in agriculture as a prerequisite to graduation in all our several Normal Schools.

MR. WHEELER. What is the extent of the education to be imparted to the child? Is it to be of a practical form, in educating him to plow our fields and prune our trees, or is it in this theoretical education, book learning? I am opposed to the resolution. I hardly see how we can practically educate the youth of our schools, and get the teachers to go out into the fields and practically educate the children in plowing and pruning. The young lady school-teacher would not present a very pleasing appearance, and would not accept the work very graciously in standing behind the plow and showing the boys how to handle it. She would dislike a great deal to handle the long pruning-shears. Now, if you are to give them scientific education, as it is called, if you will take the history of the scientists in this State who went out to develop pruning, you will find that they have all been failures. I don't think there is an exception. Therefore I say, Mr. President, I hope that motion will not prevail. I hope there will be no more burdens added to our schools; I hope there will be no more misery added to the teachers.

MR. DORE. Ladies and Gentlemen: Those of you who heard what I had to say upon this subject the other day will understand clearly the purpose of this resolution. I am a little shocked that this Convention of fruit-growers should go back and be against anything that looks to be progress. And from the large gathering at the institute at Berkeley I believe I am safe in saying that that resolution received the strongest vote of any resolution presented. I have been abroad in the State at work in the farmers' institutes in Merced County, in Fresno County, in San Joaquin County, and in Sacramento County. It was, without a single exception, approved by the farmers of all the different institutes, where they saw the beneficial aspect of this proposition.

A MEMBER. I wish to speak for the Granges, the Patrons of Husbandry of the State of California and of the United States. The Granges are in favor of some agricultural education. Now if a child has to read out of a book, such as the State series, such stories as "Mary had a little lamb," why can they not just as well read out of a book which says something about what they love? Is there any harm in that, if they read about what they love? Why not talk about the birds? Why not talk about the animals? Why not read about those things

we are interested in? We do not ask that our schools in the city shall adopt this if they do not wish. Why should we not train the child to be interested in its home? Are you going to train your child to be interested in the things surrounding the city homes, or in its own home? If we must have our children read, why not have them read about those things in which they are interested instead of about "Mary had a little lamb"?

The Chairman put the question, and declared the resolution carried.

RESOLUTION FOR A REFERENDUM VOTE ON ORGANIZATION.

Resolved, That the Commissioner of Horticulture be requested to submit by mail, to the prune-growers of the State, a referendum asking for their vote: first, for or against any plan of control of the marketing of the prune crop; second, if in favor of such control, to vote either for the coöperative or profit-sharing plan submitted by the committee of this Convention, or if neither of these plans be satisfactory to them, to indicate a plan which would be satisfactory.

MR. STEPHENS. Without wishing to interpolate anything unpleasant into the proceedings of the Convention at this time, I wish to refer to the fact that there are two propositions, and Mr. Sprague takes one side and I take the other. We go on and discuss them and get very much interested, and the more we discuss them the more convinced we are right, and we form a firm opinion that we are right, so that when a selection is made, if my ideas are indorsed, Mr. Sprague will say, "No, I will have nothing to do with it." On the contrary, if Mr. Sprague's are indorsed, I would say, "I will have nothing to do with it." We beget differences of opinion during these discussions, and those opinions crystallize. They can not be eradicated by reason or otherwise; that in itself will be sufficient to prevent organization, I fear.

MR. SPRAGUE. The whole proposition must rest with the prune-growers. This is simply to submit the only plans that have been suggested within the last two years to the prune-growers of the State direct. In the first place, if they desire any change, or if they desire to leave things just as they are, it would be important to find out if they are satisfied. Secondly, if they do desire some such proposition, which of these they will favor. Thirdly, if neither of these plans, then to suggest a third plan which will receive their approbation. This movement is so far above personal claims that the prosperity of this great State rests on the issue, whether we are able to secure this control or not. If we can, we can pay our taxes; we can invite millions of other people who are not in California to come to our fertile acres and till them. All things are possible if we but arouse ourselves.

MR. STEPHENS. I will say to Mr. Sprague that the importance of this question, or the importance of any question, let it be what it may, were it introduced by the devil himself and he should come upon this floor and advocate something that was right, I would work shoulder to

shoulder with him and let no prejudice on account of personalities intervene or interfere with my action. [Applause.]

MR. SPRAGUE. That is good.

MR. STEPHENS. I do claim that a man should be above personal feelings or personal interests upon any occasion; he should raise himself to a higher level. And if there is any man in this world who can do it, I believe, sir, that I can do it. I do not differ from you on many propositions. I am willing to indorse anything that, in my judgment, is right, whether it emanates from you or anybody else. But if I think it is wrong I will not do so, even if it emanated from my brother or my father. [Applause.]

MR. SPRAGUE. That is right.

The Chairman put the question, and the resolution was declared carried.

RESOLUTION IN FAVOR OF AGRICULTURAL EDUCATION.

Resolved, That it is the conviction of this Convention of the horticulturists of California that our legislators should do more to promote agricultural education and our State College of Agriculture, and that adequate appropriations of money therefor are essential and should be made without unnecessary delay.

On motion, the resolution was adopted.

RESOLUTION IN FAVOR OF A STATE EXHIBIT IN BELGIUM.

WHEREAS, The late exposition at Hamburg opened up a great market for our fruits; and,

WHEREAS, Another opportunity will be presented at an exposition in Belgium to display our products to the densely populated kingdom of Belgium and the thousands from different parts of the world; therefore, be it

Resolved, by the State Convention of Fruit-Growers, That a committee be appointed by the Chairman to secure an adequate appropriation by the Legislature to defray the expenses of a creditable display of California fruits and wines at said exposition.

MR. STEPHENS. I am decidedly in favor of that resolution. I do not believe that the money of the taxpayers of this State could be used to a better advantage than to promote such schemes. This to me seems a practical scheme; it is along the right lines, and inasmuch as there are hundreds of thousands of dollars of our money spent for useless purposes, this certainly would be spent in a good cause and promote the interests of the State, and therefore I hope that the resolution will be adopted.

Resolution carried.

RESOLUTION OF THANKS TO THE SAN JOSE CHAMBER OF COMMERCE AND OTHERS.

WHEREAS, The Chamber of Commerce of San José kindly furnished the hall for meeting and arranged a very delightful excursion over the Interurban to Los Gatos and return; therefore, be it

Resolved, That the members of this Convention extend hearty thanks to the Chamber of Commerce for the courtesies extended; also,

Resolved, That this Convention extend thanks to the Board of Trade of Los Gatos, who so kindly and thoughtfully provided conveyances for showing their guests about that beautiful city; also,

Resolved, That the thanks of this Convention be extended to the Sorosis Fruit Company, through its manager, Mr F. W. Crandall, for courtesies extended to this Convention in showing the guests through their extensive plant and also in liberally supplying delicious coffee and doughnuts in their social hall for all who wished to partake; also,

Resolved, That we thank the ladies of the San José Grange for the delightful entertainment furnished on the evening of the 6th instant; also,

Resolved, That we hereby extend our gratitude to the transportation companies for the reduced rates given to delegates to this Convention; also,

Resolved, That we thank the press of California for the full reports of the proceedings.

Adopted unanimously.

PRESIDENT COOPER. Judge Hurlburt is asked to come forward and finish his address.

JUDGE HURLBURT. I am aware that there is considerable business to be done yet, and although I feel grateful for the appreciation of what I have said, and what I probably might have said, there are some very important subjects to be discussed. I therefore only wish to express my thanks and state my reasons why I do not propose to occupy the time of the Convention any further.

Now I might have continued my address for an hour and a half. But I have given you a few general ideas which may cause food for reflection. I do not think it would be courtesy to the members of the Convention, who are anxious to see the balance of the program carried out. Thanking you, I must decline to make any further speech.

MR. STEPHENS. I move that a vote of thanks be extended to the Judge for his magnanimity and for the address which he delivered.

Motion carried.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

PROF. FOWLER. The committee to which was referred the President's address begs leave to make a report as follows:

SAN JOSÉ, December 8, 1904.

To the Officers and Members of the Thirtieth State Fruit-Growers' Convention:

LADIES AND GENTLEMEN: Your committee, to which the President's address was referred, respectfully submits the following report:

That we indorse the advice and counsel given the horticulturists of the State through the President's address.

That we especially call attention to and commend the action of our President in the steps taken to guard our State against the introduction of infested or diseased Eastern nursery stock.

And we further heartily indorse the action in employing the partial services of Mr. George Compere in his search for parasites that may be introduced for the destruction of insect pests that now infest our orchards.

That this Convention memorialize the coming Legislature to amend the present pure-food laws, or pass a new law that may be effective in protecting the people of our State against the sophistication or adulteration of foods and food products.

All that portion of the address referring to transportation, the trust problem, and coöperation, has been acted upon by this Convention and needs no additional comment from your committee.

(Signed:) D. T. FOWLER.
W. E. WOOLSEY.
G. W. WORTHEN.

On motion, Vice-President Stabler put the question that the report of the committee be made the sense of the Convention, and it was carried unanimously.

REPORT OF THE CALIFORNIA EMPLOYMENT COMMITTEE.

Mr. Stabler read the report of the Committee on Labor, or Employment Committee, as follows:

To the California Fruit-Growers' Convention:

GENTLEMEN: Your Employment Committee begs to submit the following report for the season of 1904:

The apparent light fruit crop which confronted the growers in this State during the spring shows very conclusively to this committee that any particular efforts directed toward securing agricultural help from the Eastern States was, in all probability, unnecessary. The coöperation of the California Promotion Committee with the Employment Committee has resulted in the fruit-growers of the State of California receiving large numbers of people from agricultural districts of the Eastern States, and the only efforts that have been made in exploiting the Eastern field during the past season have been thus put forth by the Promotion Committee.

Our work in the Eastern field has shown us conclusively that desirable agricultural help is just as scarce in the Eastern, Middle, and Western States as it is in California. In fact, as we reported a year ago at the Fresno Convention, our representatives in the Eastern districts found farmers and fruit-growers searching for help with as much avidity as our own agents.

In order to attract the better class of young men and families from the East, this committee desires to insist that the fruit-growers and farmers of California must arrange for caring for these newcomers in a manner better than the conditions now existing on many of the farms, orchards, and vineyards of California.

The efforts of the California Promotion Committee in inducing our landholders, throughout the State, to cut up their possessions into small holdings will very materially assist this committee in its work of inducing small farmers, with their families, from the East, to come to California, purchase homes and become permanently settled on our soil. We feel that our troubles in securing efficient help will be largely overcome when we have in proximity to the orchards, vineyards and farms a permanent class of settlers, rather than the transient help on which we now depend for carrying on so much of our work. In fact, we have discovered that very many farmers in the East are anxious to come to California when they can be assured of securing small tracts, and developing them, securing employment in bearing orchards and vineyards in the vicinity.

The fact that our first year's campaign in the East was productive of good results, bringing into our State nine hundred and seventeen people who were placed in positions, and indirectly bringing in probably twice as many more who were attracted to us as the result of our advertising efforts, proves to us that when the necessity again arises, a similar effort can be made, which will very much alleviate conditions of shortage of help necessarily existing in years of bountiful harvest. The committee therefore organized permanently, for the purpose of being in a position to again assist the fruit-growers in this State, if necessity arises, and has the assurance of the Promotion Committee that its efforts in securing immigration will always be devoted to bringing into our State families of agricultural workers who desire permanent homes.

Both the Southern Pacific Railroad Company and the Santa Fé Railroad Company have assured our committee that they realize the importance of an adequate supply of efficient agricultural help during the fruit season, and stand ready to fully coöperate with us when called on to do so.

All of which is respectfully submitted.

H. P. STABLER, Chairman.

Upon motion, the report was adopted.

Mr. Worthen then read the following:

RESOLUTION INDORSING PROFESSOR CHILDS.

WHEREAS, We were greatly interested in the address of Prof. C. W. Childs relating to his experience at the St. Louis Exposition and in visiting many points in the East, particularly touching the high price at which our prunes are sold by the retailers, and also condemning the practice of over-processing our prunes, thereby causing them to mold; therefore,

Resolved, That we express our opinion that correcting these evils should claim a large share of the attention of the prune-growers of this State, as both practices seriously curtail the consumption of our prunes.

The Committee on Resolution moved its adoption, and it was adopted by the Convention.

ADVERTISING CALIFORNIA'S CURED FRUIT PRODUCTS.

BY EDGAR M. SWASEY, OF SAN FRANCISCO.

This is my first attendance at a convention of fruit-growers, but from what I have learned since coming to San José, it is evidently a matter of long standing with many of you—yet the price of prunes seems to be going down.

The people with whom I have been closely associated for the last ten years do not attend many conventions, except so far as they may disseminate general knowledge, or to meet in social intercourse for the purpose of promoting harmony. When it comes down to a matter of business, to a matter of dollars and cents, most of us are carrying an ax for the other.

Gentlemen, you have spent years trying to find the answer; you meet regularly and you read papers about coöperation, and you nod your heads in approval. Each one of you reads a paper which is supposed to solve the problem entirely, yet you have not yet changed the conditions and the price of prunes is still going down.

The god of success loves a man who can and will do things, a man who will think and then act—a man for the occasion—and that is just what you have got to do if you want to get more money for your prunes.

The coöperation we have heard so much about here this week is absolutely meaningless, unless you really coöperate. There can be no coöperation without something to coöperate with, and that's for you to decide—some definite plan—some end in view that is recognized by business minds to be the proper and successful end.

The condition of the prune industry is unsatisfactory, and you have no one to blame but yourselves and the peculiar conditions of the trade.

Here we are to-day in the beautiful city of San José, the center of the prune region, and not a single one of us can buy for good American money a dish of preserved prunes ready to serve. Try it to-night when you go to dinner, and it is safe to wager that if you are successful in getting a dish of prunes, you will not eat them after you get them. There isn't one hotel or restaurant cook in forty who knows how to cook prunes.

If you have not convinced the people of San José and the Santa Clara Valley that prunes are a table delicacy, you ought not to blame some one in Pennsylvania for not eating more prunes. The prune business is a good deal like charity, it ought to begin at home.

Listen to what I tell you—roll it around your common sense and hang it out on the line of reason for further thought—you haven't convinced your own people that prunes are good to eat. And now you complain that there is an over-supply. Indeed there is, and always will be, as long as a single prune tree remains in Santa Clara Valley and you continue your present methods.

You have tried to raise the price of prunes by all sorts of methods except the right ones. You have tried to blame the dealers. You have tried to corner the market. You have blamed the apathetic spirit which has made coöperation difficult. You have done everything to charge this responsibility to some one—but you have pursued your quest with your eyes focused afar off.

The answer is before you—staring you in the face, laughing at you, if you will, and it stands out in letters of gold on a beautiful background of common sense—the commonest kind of common sense, too. This is what it says:

Create a demand on the part of the consumer and control your trade.

There it is, gentlemen—a proposition as plain as day—holding out the hand of success, trying to point your way. Why don't you observe it?

Gentlemen, I have been thinking about your industry for some time. My business puts me in close touch with the keenest minds in the business world. I have seen a small business on a back street grow to a world-wide affair. I have noted the rise of many a business from comparative insignificance to a business doing millions of dollars annually. I have learned the reasons for these successes in the school of practical experience, and I will stake my reputation as an advertising specialist—my most valuable asset—on the truth and practicability of what I am going to say to you to-day.

If you will develop your markets by proper advertising, by business

shrewdness, by the careful follow-up methods, and by the employment of energetic salesmen, such as successful business men do the world over, then and only then will there be peace and plenty in the prune districts of the valley of the Santa Clara.

Instead of you having to seek the buyer and beg him to buy your goods—to be put off and jollied with, to have your crops rejected until you lose all faith in human nature—if you will advertise, and advertise right, you may enjoy the comforts of your cosy sitting-room, and smoke your good cigars, while you send word to the buyers standing in line out in your front yard that you are really too busy to talk business with them to-day.

You get the worst of it, Mr. Farmer, you always have. You bring eggs to market and ask the grocer what he pays, and when he names the price he will pay you for your product you turn the other cheek toward him and ask him what is the price of sugar. You don't have anything to say about your business nor his.

There is no greater business force in the world than advertising. The force of advertising bears the same relationship to business that electricity does to mechanics, and both are in about the same state of development.

Advertising has made more merchants and more manufacturers successful than any other power. Advertising has made them free and independent, because it has created a demand for an identified brand and trademark. He has appealed to the consumer, and the consumer has responded with his good will and trade. Ladies and gentlemen, I think it safe to say that seventy-five per cent of the things you spend your money for are advertised in some shape or form.

When a manufacturer erects a big factory and gets his equipment in producing condition and he is ready to sell his goods, do you think that he calls all of his fellow manufacturers together in a convention and resolves to do business? Not much.

He sends for the advertising man, and this is about what he says to him, "I'm making Ivory soap, and I am making it a little bit better than any other soap is made, and I am putting better material into it, and I am making a finer looking package. It costs me three cents to turn it out and deliver, and I want to get ten cents for it. Turn yourself loose in the factory, and give me a report on what you think can be done, and how much advertising will it require for the next five years. I don't expect to make a dollar before then."

After the advertising man had made a careful study of the business and submitted a report on the advertisable points, he plans his campaign and outlines in detail what is necessary for him to do, and what it will cost to do it, and he takes it back to the manufacturer—and manufacturers of that caliber generally say yes or no right then and

there. Such men think nothing of spending half a million dollars a year, which is charged up to the original investment and factory equipment.

The right to use the word "Royal" on a can of baking powder is valued at \$20,000,000 to-day.

For \$5,000,000 you could not purchase the right, and the right only, to put up a soap and label it "Sapolio."

These are but two illustrations of the value of a trademark—an advertised name—an asset which exists wholly in good will.

Gentlemen, I tell you these things to make you ponder over the wonderful possibilities of advertising.

Now, to go back to our soap manufacturer. Let us sit in his office for awhile and watch him work—and the half million dollars' worth of advertising is placed in the newspapers and magazines, in the street cars and on the billboards, and a corps of energetic salesmen go forth over the land visiting the retailers, wholesalers, and jobbers. The advertising has gone before them and has yielded its influence on the dealer, and the salesman not only loads him up with goods, but fills him with enthusiasm, until the dealer echoes the manufacturer's sentiments about Ivory soap, and Ivory soap sells, and advertising pays, and there is the brief story of success—easily told, but full of work. My goodness! gentlemen, you don't realize how much work is involved in such a campaign—and the worry and sleepless nights and endless annoyances, but all a part of success.

I'm not much on statistics, but I want to give you something to think about, and when you are on your homeward journey to-morrow, with nothing to bother you, think this over.

A few months ago, Mr. Hearst's New York "Journal" came out editorially and stated that the fruit-growers of California were greatly depressed owing to no outlet for their fruit, and asked the readers of that paper to buy these dried fruit products and thereby stop the falling market.

Seigel & Cooper, the biggest department store in New York, constantly alert to every trade-bringing opportunity, put prunes and raisins on sale at the cost price, and sold 13,000 one-pound packages in a single day. What do you think of that? Thirteen thousand pounds in one day! How is that for creating a demand!

But listen, shortly afterwards the San Francisco "Examiner" published similar editorials, and Weinstock & Lubin, S. N. Wood & Co., and others, put on special sales and sold 200,000 pounds in two weeks.

You know what I said awhile ago about apathy. Here it is again. The advertising manager of S. N. Wood & Co. is Mr. Rollin Ayers, one of those broad-minded, enthusiastic, right-idea sort of fellows—I wish he were here to talk to you to-day. Well, Mr. Ayers was red hot on the trail

of the prune excitement, and he fell into line with the "Examiner" editorial, but he wanted to go the full limit and really help the grower by buying his prunes direct from the Santa Clara Valley instead of from the San Francisco brokers, so he telephoned down here to one of your leading prune-growers; he told him of the excitement in San Francisco and endeavored to impress upon him that the public were "prune crazy" for a few days and that that was the time to take advantage of public opinion and make a ten-strike for the prune-grower. This leading grower 'phoned back that he could supply him with eighty pound-boxes of prunes in thirty days. So Mr. Ayers telephoned to several other dealers and packers down here in the valley, and finally became so discouraged that he went to the brokers and bought all the prunes that he needed. Seventy-five per cent of the people who bought prunes from S. N. Wood & Co. had never bought them before, and all of them asked for a book of recipes, as they didn't know how to cook them after they bought them. So Mr. Ayers tried again. He spent a few more hard-earned dollars telephoning to growers and packers for recipe books, but the growers seemed to be interested in something else besides the prune industry at that time, consequently the prune-buyers of San Francisco had to eat their prunes raw if they were not fortunate enough to find some one who knew how to cook them.

These dealers, who put on these special sales with only one reason in the world, and that to help the grower, received no thanks for their pains. Even the broker raised the price as soon as there was any stimulated demand, and the enthusiasm died out, and now only the moral remains.

I don't advocate the selling of prunes at cost by all sorts of dealers as a regular thing. As introductory advertising it was all right, but what I want to point out to you are these figures:

The total sale of prunes in the United States last year, as near as I can learn, averaged about two pounds per capita for our entire population. The sale of beer averaged about one barrel per capita. Sugar and coffee run to about 100 pounds per capita. With a little advertising and extra stimulation, 200,000 pounds of prunes were sold to San Francisco's 400,000 population in less than two weeks. Now, if you will take a little mathematical exercise with me, we will readily calculate that it figures down to 26 pounds per capita per year, or more than thirteen times what you are selling under your present coöperative methods. If you will multiply this by the total population, and carry it out to its logical conclusion, you have a consumption of over one billion pounds per year, or about seven times more than you can produce if you work overtime.

Gentlemen, there is a way to go about this proposition that is simple and easy for you, but requiring a vast amount of detail for some one

else. But details can be purchased and good men of sound business sense are available, and if you want to actually coöperate, go down in your pockets and put up your money to form a duly organized, legally perfected incorporation for the purpose of growing, processing, packing, selling, and advertising prunes—put your private fortunes to the stake. You know what James Graham, Earl of Montrose, says:

“He either fears his fate too much,
Or his deserts are small,
Who dares not put it to the touch
To gain or lose it all.”

When you will do this, you can reasonably expect capital to give you a hearing; and when you can lay aside personal prejudices, and disregard the methods of the politician, and employ the best manager money can secure, with full power to act, and you will promise yourselves that you will pack under an attractive label and carton the choicest prunes raised in your valley, and advertise them all over the country in connection with a distinct and proper trademark, and you will make up your mind to send the best salesmen you can get to go over the country selling to dealers, showing hotel chefs how to cook prunes and arranging for demonstrations—when you can give such business as this the same business-like attention that successful business men give their business, then you will have a right to ask for dividends. And as soon as you do this there will be many more brands advertised by more companies which will spring into existence, and there will be a fight for the business, but you will be the leaders, and if you start now your pioneer brand will be established and in demand, and the other fellow will have to fight twice as hard as you for the business he gets, and while all this is going on, the price of prunes will steadily go up and keep on going up, and then there will settle down over this beautiful valley a supreme satisfaction that can be best expressed by the ready-money smile on the countenances of your prune-growers.

Before I close, gentlemen, I want to say that I have not attempted to outline in detail to-day an advertising campaign. There are thousands of ways and means to successfully advertise prunes, all of which can be carefully laid out for due consideration when you are ready to go ahead. In the meantime, you have the opportunity, the greatest business opportunity for money-making on a large scale that has ever been presented in these parts. Not only is it an opportunity for money-making, but it is absolutely necessary if you would save your industry.

Gentlemen, I thank you.

BEST METHODS OF ADVERTISING CALIFORNIA.

By E. W. HAZEN, of PHILADELPHIA, PA.

The following suggestions as to what can be done to make the production of fruit in California profitable are given after a careful investigation and study of the conditions existing at the present time. One solid month of time has been spent in different sections of the State interviewing a large number of your most intelligent and progressive growers and packers.

Primarily your troubles arise from the fact that your products have no identity in the eyes of the public. Some of your fruits reach the consumer with no individual package or trademark, while others reach the consumer in packages with a multiplicity of trademarks—the second class being nearly as bad as the first.

I fear your efforts to improve conditions have been misdirected. No improvement can be hoped for unless the effort is directed at the market end.

With nearly ninety millions of people in this country, and other markets in your reach, it is absurd to talk about overproduction. The United States alone will take many times your present production in California fruits of all kinds, if the market is properly developed, but this development must be done by systematic, intelligent advertising and business management.

You must absolutely look for relief by *developing the market*, and this can be done only by going to the *consumer*. It is unnecessary, of course, to say that the coöperation of the retailer and wholesaler is very desirable, but the *consumer* is all important.

If the people are with you, no one can block your way. What can be done when you have the people with you was very emphatically demonstrated by the election on November 8th. President Roosevelt was a well-advertised man, and the people were with him. The attitude of capitalists and trusts had apparently but very little effect.

Hence the solution of your difficulties must be secured by directing your attention to the market. Secure control of the market and everything else will be easily regulated.

Why has Baker's Chocolate been such a large success? Why do Procter & Gamble make one sixth of all the soap used in this country? Consider what has been achieved by the Cream of Wheat Company, Sorosis Shoe Company, Oldsmobile Company, N. K. Fairbank Company with Gold-Dust, Fairy Soap and Cottolene, Royal Baking Powder Company, and many others. All of these were successful because they gave their attention to securing the market in a systematic and intelligent way. They each give to the public a first-class article, and identify their goods by some well-known trademark.

When I mention Baker's Chocolate, you think of the Chocolate Girl; Procter & Gamble, you at once think of Ivory Soap; Cream of Wheat suggests the Colored Chef; Gold-Dust, the Gold-Dust Twins, and so on. All of these products were vastly more difficult to handle and market profitably than fruit, because of the sharpness of competition with which they had to contend.

It has been demonstrated over and over again that if you have the people with you, every one else must fall into line—the retailer, the wholesaler, and the broker.

You must, however, sell only good fruit and in first-class condition, always bearing in mind that the market is more valuable than the price that you can get for a little poor fruit.

You must have an individual package, and a distinctive trademark, and see to it most scrupulously that the package and the trademark are identified with quality.

There is no question but that package goods appeal to the women. Tell me why candy is packed in packages and sells for more than the same goods in bulk?

It is a demonstrated fact that the housewife discriminates in favor of package goods against those in bulk, especially if advertised. She has learned by experience that advertised package goods, identified by a trademark, are reliable and of superior quality. Otherwise it would not pay to advertise them.

I understand that in New York State a movement has been started recently for putting up dried apples in cartons, with a trademark; and there is no question that if they put up a good article, advertise and manage the business intelligently, it will be a marked success, notwithstanding the fact that any farmer's wife can dry her own apples, and most people can secure the fresh fruit at any time.

Take prunes as an illustration. What may be done by advertising a brand of prunes in from one- to five-pound cartons, is clearly shown by precedent in other lines. This form of handling the product makes it possible to hold trade against the fiercest kind of competition.

There are, however, other important conditions besides the method of packing which must be met in order to insure success.

First, you must have a business organization, a permanently incorporated body, which will establish an efficient business management, with power to plan a definite selling campaign, as well as to control the methods of packing. One central, efficient and permanent business management is indispensable to large and continuous success.

A first-class sales manager must be secured—the best man possible, no matter what the cost. Give the wholesaler a fair profit and the retailer a reasonable margin; establish the retail price yourself, marking it plainly on the package.

Grade your fruit by a system that means something to the consumer. Pack only two sizes, and the purchaser will know there *is* a difference in size, and *why* there is a difference in price.

You probably know that the consumer does not get her prunes any cheaper from year to year by variation in the price which you receive; the size of the crop apparently does not affect the retail price; the broker, wholesaler, and retailer reap all the benefits.

The grower and packer are entirely out of the reckoning in selling, and simply take what they can get.

Under the package and trademark plan, with proper selling machinery, you will be able to dictate your own prices and run your own business. It is undoubtedly true that there will be many difficulties to overcome. So there are in every line of business, otherwise anybody could conduct a successful business. All that is needed is a determination to solve the problems and to study them intelligently. This applies to both the packing and selling ends. The solution of the difficulties to be met justifies the best ability you can employ.

Suppose you should organize and incorporate a new company, with a capitalization of, say \$2,000,000; include in the company all packers or growers who desire to come in; this will enable you to utilize the packing-houses already established, and save a large loss in valuable property.

Elect the best man you can find as a general manager, at whatever salary may be necessary to secure his services. Hire a first-class sales manager, the best you can find. Give these men power to run the business under a general policy, decided by a board of directors and officers.

Select a good trademark, one easily remembered and appropriate. Pack all your good-quality fruit in cartons marked with this trademark, also a mark indicating the quality and retail price. The word "California" should appear prominently on every carton.

Abolish the present system of grading, which means nothing to the consumer. Make, say, two grades: Fancy Prunes and Fine Prunes, or some such distinction.

Pack in cartons none of the very smallest and inferior prunes, which may be used instead for by-products, or sold in bulk for the cheap trade—boarding-house prunes.

If it is impracticable to pack all the fruit at once, because of sugaring, you may pack from time to time, as needed. This will make the packing season more permanent, require less help and less machinery, and be more economical.

Efficient machinery can be easily secured to pack prunes in cartons; if such machinery is not now being manufactured, it will not be difficult to have it made.

All abuses now prevalent in handling fruit must be abolished, and the

greatest care exercised to give the consumer a satisfactory article, so that you may elevate the trade, getting members of the better class of homes to eat prunes.

Make an advertising appropriation of one tenth of a cent per pound, based on the previous year's crop. This would afford an appropriation for 1905 of about \$150,000, of which \$100,000 should be used in the magazines for a permanent campaign; the balance may be used in newspapers and other ways locally where it is necessary to stimulate local trade temporarily. Many times the retail man is very much influenced by a little money spent in his immediate neighborhood, in addition to the magazine campaign; many times he will pay half of the expense himself, and in many other cases will pay the entire expense, provided you furnish him with electrotypes.

The advertising campaign must be conducted along educational lines, together with large display of the package and trademark, impressing on the public mind that this trademark guarantees quality and cleanliness always. Considerable of the balance of the advertising appropriation may be wisely expended in literature of one kind and another, which will be auxiliary to the general campaign.

Now, with reference to the details for selling the goods: There will be no serious opposition to the carton on the part of the jobber or retailer, if they know the character and magnitude of the campaign you contemplate. They will recognize the fact that they must get into line.

Deal with the jobber, or wholesaler, if he will give you satisfactory service. If he will not work with you—which is altogether improbable—I would suggest the following line of action:

Under present conditions, the packer has this year paid the growers an average of less than 2 cents per pound, some as low as 1 cent. The packer figures $\frac{1}{4}$ cent per pound for his services, the railroad takes 1 cent for freight, and the broker, jobber, and retailer take the balance. A total of $2\frac{1}{4}$ cents per pound remains in California.

From the information I am able to secure, I judge the average retail price is about 10 cents. If you sell all this year's crop, which I understand is about 150,000,000 pounds, you will keep nearly \$3,575,000 in California, and the broker, jobber, and dealer will get about \$11,000,000.

Supposing the new company were to pay the grower 3 cents, take 1 cent for packing and handling here, 1 cent for freight; establish distributing stations under your own control in New York, Boston, Philadelphia, Chicago, St. Louis, St. Paul, Cleveland, and Denver; ship your product in carload lots to these points, and distribute direct to the retailer.

Allow $\frac{9}{10}$ cent per pound for the maintenance of these stations and salesmen who shall drum their respective territory. This would provide \$168,750 for each station, which I believe is more than is necessary for the purpose.

You can allow the retail merchant 3 cents per pound, which would be twenty-five per cent of the retail price; he is generally satisfied with twenty. You can sell the "extra prunes" at 18 cents, and "fine prunes" at 10 cents—an average, say, of about 12 cents per pound for the entire output.

Supposing these figures to be accurate and practicable, the grower would receive 3 cents, packer 1 cent, freight 1 cent, the stations $\frac{9}{10}$ cent, dealers 3 cents, and advertising $\frac{1}{10}$ cent; a total of 9 cents.

With an average selling price of 12 cents, this would show a margin of 3 cents per pound, representing \$4,500,000, which would be ample to meet any other expenses, or any variations in these estimates, and a good balance to the stockholders of this organization in the form of dividends. Three cents to growers, 1 cent for packing, with 3 cents profit, would mean 7 cents per pound for California, or \$10,500,000, against less than \$3,000,000 as now handled. These figures mean not only prosperity to the corporation who operate, but prosperity for all California, especially the territory where the prunes are grown.

These figures are not accurate, but you may rest assured that if the average sale under the present conditions is 10 cents per pound, 12 cents can easily be secured under the better conditions as outlined.

In addition to this, you will also establish the business on a firm basis, and will be able to double and quadruple your sales if the production is sufficient, and at the same time maintain your prices. The greater the magnitude of business, the smaller the cost of handling each pound; therefore, the greater the profit, the special gain being in the distributing expense. At the same time, you would be building up through this organization and your advertising campaign, a most valuable asset called good-will, a very tangible asset recognized by all merchants.

Should you operate through the wholesalers, the $\frac{9}{10}$ cent per pound allowed for distributing centers would be more than ample for their profit. It might be found desirable to combine the two methods—establishing your own distributing centers in some localities, and operating through the wholesale dealers in others.

This organization would be equipped to handle other dried fruits, such as apricots, economically and profitably; the same selling organization could also be utilized with economy for distributing and marketing these products, which must, however, be subject to the same conditions as outlined for prunes; they must be packed in cartons, with the trademark, and advertised by the same general plan.

The marketing of prunes, by appealing to the consumer, is the only permanently satisfactory solution to your difficulties. I am absolutely confident that such a plan as I have outlined is entirely practicable, and will work out in a manner satisfactory to all concerned. I would

be willing to stake my reputation as an advertising man, which is the most valuable asset I possess, on the success of a prune-advertising campaign, if conducted along proper lines, and in connection with a good business management and selling organization.

It is absolutely indispensable that prunes shall reach the consumer in their original package: First, because it must be possible for the consumer to know that she is getting the good article that you advertise; second, to remove the ground for her present prejudice, and lift the product to a higher plane in her mind; third, to prevent manipulation by the retailer; fourth, to make the distinction clean cut between inferior prunes and a selected article.

I understand that this year the grower of raisins received about $1\frac{1}{4}$ cents per pound; the packer takes $1\frac{3}{4}$ cents, and the consumer pays from 12 to 15 cents per pound; a difference of from 9 to 12 cents per pound. Evidently a large profit goes to the wholesaler or retailer, or to both.

If the crop this year is, say, only 100,000,000 pounds, California gets \$3,000,000, while from \$9,000,000 to \$12,000,000 goes elsewhere.

What has been said about prunes is to a large extent true of raisins. It is possible to influence and educate the public so that they will demand only seeded or seedless raisins. It is well known to the trade that seedless raisins are grown, and seeded raisins are very generally found in market, yet I am sure that there are many housewives who do not even know that seeded and seedless raisins may be purchased.

There are countless brands of package raisins on the market, yet none are known to the consumer and asked for.

The consumption of raisins is not capable of the expansion possible with prunes, but it might easily be doubled, or quadrupled, by proper educational advertising.

There should be one well-advertised brand, and standard prices. It may be impossible to secure coöperative action, but one concern controlling from sixty to seventy per cent of the present output can make a strong bid for the trade, and develop it to a point where they would control the market.

Oranges and fresh fruits are not so easily handled, because they are perishable, but the same principles apply. Many thousands of people East do not eat oranges, because they find it difficult to get satisfactory fruit. The people of this country would eat all the oranges California can produce, if they had some practical way of knowing that they would get what they order and pay for.

In the first place, it is a great mistake to send green fruit to market simply to get there early. It kills off more trade than you realize. It is not practicable to handle all fruit under one brand, because there is such a wide variation in quality in different localities. Each section—

Riverside, Redlands, and others—should establish a brand for its own locality, and then see to it that the brand stands for quality with the consumer.

It is certainly not good business judgment to ship a perishable fruit to market before you have even a prospective purchaser. It is better to lose the fruit at home than to owe the railroad when the season is over.

Oranges and other fresh fruits should be distributed by the grocer, and not by the fruit stand or vender. The housewife will order from the grocer without even seeing the fruit, if she knows that a package may be secured with a mark on it which guarantees quality every time. You could then sell all your fruit before shipment, and know that you would receive remunerative prices. This can be certainly and easily demonstrated, and I believe will be in the near future.

Oranges may be packed in boxes, or baskets, holding from one to three dozen, and marked with a good trademark. These, if properly advertised, will sell through the grocer with great satisfaction to the purchaser and the grocer, and profit to the grower. A popular package would be from 18 to 24 oranges.

Such a plan would result in large increase in consumption, not only because of the knowledge that reliable fruit can be obtained, and in attractive, convenient form, but also because more fruit will be purchased at one time. You know a good supply encourages consumption in most cases. This will be popular, not only with the consumer, but with the grocer, because it will encourage trade with him instead of with the fruit vender or stand, and because it is easy to handle and avoids shrinkage.

This plan will also encourage regular instead of spasmodic consumption, because the grocer's clerk makes regular calls, and has only to take the order.

This plan will also operate so that the fruit will be ordered in advance, and the distribution can be easily regulated with great economy and profit.

This general plan applies equally to pears, peaches, grapes, etc. But all finally depends upon advertising to interest the consumer, and show her where, how, and why she can get what she desires.

This calls for distributing stations and good management, but puts the business on a permanently profitable basis.

INCREASING THE DEMAND FOR CALIFORNIA CURED FRUIT PRODUCTS BY ADVERTISING.

BY H. P. STABLER, OF YUBA CITY.

This is the age of advertising. All lines of business in this country, except the fruit industry, recognize that successful competition is impossible without resorting to publicity. At the outset, the writer would lay down the proposition that all of the ills now confronting the California fruit-grower would be remedied if the consumption of our fruit products were doubled.

Fruit-growers of this State have demonstrated to the world that their methods of production can not be surpassed, and they have displayed an intelligence and energy which, to people in older communities, is little less than marvelous. In fact, we have stimulated production to that point when our warehouses are overflowing, and for several years our brightest minds have been devising ways and means for relieving these unfortunate conditions. For many years, enterprising and energetic citizens of this State have spent much time in the solution of this problem, and with one accord have agreed that a thorough coöperation would be the desired solution. In many instances, notably in the Santa Clara Valley, the effort at coöperation has been demonstrated to be a success. But the very fact that fruit is grown over such an expansive area of the State, and our cosmopolitan population, has made it impossible, in the opinion of the writer, to ever place a sufficient percentage of our products on the market through coöperation. In theory, the coöperative idea can not be assailed; but the experience of the past fifteen years has demonstrated to many of us that coöperation is an iridescent dream, that it will never obtain in the horticultural industry of California.

Even with every pound of our cured fruit products in the State handled on the coöperative plan, something more would have to be done to increase the consumption of our products. All manufacturers and producers, other than fruit-growers, realize that the broker, jobber, and dealer, while important in the distribution of our products, are not the factors to be cultivated as much as is the consumer. Fruit-growers must realize that the consumer must be told of the merit and value of our products, and furthermore, how to prepare them for the table. An up-to-date campaign of advertising, appealing directly to the consumer of this country, would, if properly conducted, so stimulate the consumption of coast products that our orchards and vineyards would be taxed to supply the demand. This statement is true both in theory and in practice. How many carloads of Postum Cereal would be used in this country if the manufacturer had depended on controll-

ing his product, and waiting for the jobber to come to his warehouse and buy the goods? How many carloads of these cereal products would the retailer use in the course of the year, if his customers were not educated up to the point of asking for the goods over the counters of the retailer? These products are shipped not only in carloads, but in trainloads, and are found in great multiplicity on the shelves of every retail grocer in the United States. But the manufacturer, through his advertising, has brought the consumer to the retailer, and has made it profitable for the retailer to carry these products. I ask any member of this Convention, or any citizen of this State, to show me that an intelligent advertising campaign will not result in an increased consumption. It has been argued that this effort would not be successful until the products of the State were under one immediate control, and while I will admit freely that this would be desirable, our experience has proved it to be an impossibility; so I ask, why should we neglect to take advantage of existing conditions, while waiting for the development of an impossibility?

It is not my intention, at this time, to anticipate all the minor details of a campaign of advertising, because I feel it would be a waste of time at this stage of the proceedings. Undoubtedly many obstacles will have to be overcome before a general educational campaign of advertising of our products can be arranged in this country; but if the fruit-growers of California will give up striving for the impossible, and will adopt the methods of all progressive business men, and talk to the consumer about the merits of our products, more will be accomplished in the way of solving our difficulties than has resulted from this long campaign of inducing the grower to see the benefits of coöperation.

Some weeks ago a representative of the Babbit Company of New York called at the writer's home, and began to demonstrate the merits of the caustics made by that firm. He had sold a local dealer a carload of Babbit's Lye, and was then devoting a week's time to an educational campaign among the fruit-growers, asking them to use this product in their business. He was not depending on cutting the price to the dealer in order to make him buy the goods, but in endeavoring to effect his sale he contracted to spend several days in assisting the dealer to sell the goods. In reply to a question, he assured me that not only his own company, but that all concerns in the United States were striving, through advertising, to influence the consumers to use their products. If this is a good business proposition for the manufacturer of other products, what objection can any fruit-grower make to an attempt to influence the consumers of this country to eat more fruit?

A hundred thousand copies of a booklet entitled "Eat California Fruit" has just been issued by the Southern Pacific Railroad Company, and intended for distribution among the consumers in the Eastern

States. In the preparation of this booklet, the greatest difficulty was encountered to secure recipes for the preparation of most of our California cured fruit products. From an effort made in this valley some years ago, a hundred recipes were evolved for the preparation of the prune, but no literature was found covering the processing of other cured fruits for the table. An examination was made of fifteen standard cookery books, many of them written by cookery experts of national reputation, and the writer was astounded to find that twelve of these volumes made absolutely no mention of the preparation of cured fruits of any kind for the table. Two of these books contained less than one page each, devoted to cured fruits, while one volume seemed content to worry along by offering the reader one recipe for the preparation of the prune. This modest booklet published by the Railroad Company is to-day the most complete treatise on the preparation of cured fruits for the table.

The fruit-growers have been content to let the consumer go to the groceryman, purchase the fruit, which is usually kept in an unattractive form, and have made no effort to tell him of the merits of the goods. In no other line of business has this system been adopted; but on the contrary, vast sums of money are continually being expended in showing the consumer the advantages of various commodities, and making it easy for him to learn how to prepare them for his use. While we have been content to let the consumer discover our goods, manufacturers in all lines have for many years spent their energy and talent in talking to the consumer.

Advertising is an art. Many of the men engaged in it are making fortunes annually by exploiting articles of indifferent merit, which do not compare in merit with the products which we find ourselves unable to market at a price profitable to the grower. Men versed in the science of advertising, on investigating fruit conditions on the Pacific Coast are simply amazed at the indifference of the grower to the possibilities that exist in a proper exploitation of fruit products. Unless you have given some attention to this question, you will be amazed and astounded at the possibilities of advertising. It has developed the low-priced magazine of this country to an astonishing degree, and to laymen the prices charged for space in these publications is marvelous. The current issue of the Ladies' Home Journal, a periodical with a circulation of 1,000,000 copies a month, carries an advertising patronage in the Christmas number of \$144,000. Seven full-page advertisements are published in the December issue, at the cost to the advertiser of \$4,000 a page for one issue. Remember this money is spent by business firms, not from any sentimental point of view, but because business wisdom has taught them that their investments in publicity are not only necessary, but are more profitable than any expenditure they can make. Will you give

me one valid reason why our own industry would not be equally benefited by adopting the methods resorted to by the best known firms in this country?

If I were to tell this audience a narrative which had for its central figure the taking of a photograph, and would pretend to forget the word of the instrument used in taking pictures, no doubt more than half of you would immediately respond from your seats the word "kodak," and yet the word you should supply is the word "camera"; but by the expenditure of hundreds of thousands of dollars the Eastman Company of Rochester, New York, has made the American people associate the word "kodak" with "camera." This is the acme of advertising, and has resulted in making millions of dollars for the firm manufacturing this instrument. But to come nearer home, to the people of the Santa Clara Valley, were I to tell you that after the escape of some bandits, the Sheriff succeeded in capturing them when covering them with Winchesters, there is not a man, woman, or child in this audience, or in the State of California, or in this entire country, who would not recognize at once that the word "Winchesters" means "rifles." This is a word familiar to all of you. You all know people by the name of Winchester, and there are counties and towns in these United States by that name, but by an intelligent campaign of advertising, with a liberal expenditure of money, the American people associate the word "Winchester" with rifle. If you do not think the effort has been a successful one, I would simply ask you to drive a few miles out of the city of San José and see there one of the finest suburban homes in California, which is owned by members of the Winchester family. Millions of dollars have been made by the manufacturers of this firearm, because by their clever publicity they have developed the association of ideas, as it is called in advertising, and made us appreciate that the word "Winchester" means rifle.

I could give you many more illustrations as remarkable as these, and I would like to have the time to so thoroughly impress you with the idea that a proper advertising of our products with the consumer would result in so increasing the demand for our products that you would one and all, before leaving this meeting, resolve to start a movement that would result in securing a fund for this purpose.

In closing, I would like to ask this Convention to at least appoint a strong committee of eleven, with power to act, to set in motion the machinery which will raise the funds and engage in a publicity of our fruits. This question appeals to all citizens of California, and I would ask that when the committee is appointed, it consist of representatives of the transcontinental railroads, the packers, and the fruit-growers of the State.

REPORT OF THE ADVERTISING COMMITTEE.

BY H. P. STABLER, CHAIRMAN.

To the Chairman and Members of the Fruit-Growers' Convention:

GENTLEMEN: At the Convention held in Fresno a year ago, a committee of fifteen was appointed to consider a plan of coöperation for marketing our fruit products.

At a session of this committee held in San Francisco last spring, a sub-committee of three was appointed on advertising, to outline and put into operation a plan of increasing the consumption of cured fruit produced in this State. This committee consisted of H. P. Stabler of Yuba City, chairman, Arthur R. Briggs, and A. L. McCray of Fresno.

For several weeks this committee endeavored, through coöperation with shippers, to secure the necessary funds. They were asked to arrange for a fund of 25 cents on each ton of fruit shipped East, this amount to be paid to the railroad companies at the time of shipment. The railroad companies were to act as receivers and custodians, until the money was expended through the advertising committee. Though it involved some expense and much labor, the railroads agreed to take care of their part of the plan without cost. For good and sufficient reasons offered us by many shippers, the plan was decided to be impracticable, and then, after discussion, your committee decided to call related interests to its aid by enlarging the committee.

The new committee was named the California Fruit-Growers and Shippers' Advertising Committee. On this committee we appointed Mr. E. O. McCormick, Assistant Traffic Director of the Harriman System, chairman; Mr. W. A. Bissell, Assistant Traffic Manager of the Santa Fé Route; Mr. George N. Armsby of the J. K. Armsby Co., Col. Philo Hersey of the Santa Clara County Fruit Exchange, Mr. D. J. Guggenheim of Guggenheim & Co., Mr. W. P. Lyon of the Edenvale Fruit Co., Mr. A. Rosenberg of Rosenberg Brothers & Co., and Mr. L. F. Graham of the J. H. Flickinger Company. To these were added the three members of the original committee.

Before the creation of the larger committee, your original committee had decided to ask the assistance of the railroads in collecting any advertising tax decided upon, because in no other way did a feasible plan occur to us whereby the fruit advertised would be equitably assessed for such advertising.

After many meetings, a plan was suggested whereby to raise one dollar advertising tax per ton of cured fruit shipped from California to points in the East, taking the so-called postage stamp or higher freight rates. Absolutely no expense for salaries or collections was involved in this plan. The California State Board of Trade generously offered the

committee the use of its offices in the Ferry Building, San Francisco, its stenographers, stationery, postage, printing, and telephone service. The railroads agreed, if the plan became operative, to collect and account for the same without any expense. The members of the committee, in their endeavors to make the plan a success, had absolutely no expense which could come out of the fund collected. Altogether, in securing the collection of a maximum amount at a minimum expense, with absolutely equitable assessment, the plan proposed could not be bettered.

It was proposed, in carrying out this plan, that the committee should own a copyrighted trademark, which would be used in all advertising done. To use this trademark any packer of cured fruits would have to maintain a high standard under such supervision as might be found necessary, or otherwise forfeit the privilege, which would be a valuable one, inasmuch as its advertisement would create a demand for the fruit associated therewith.

After careful investigation of the results of the wide advertising done by cereal food companies, and other industries, your committee unqualifiedly concluded that advertising of properly cured and packed California fruit, preferably in packages that could be taken into the home, would result in an immense increase in the consumption of our fruit at much higher prices to the producers.

Unfortunately, certain objections have arisen to the execution of the plan for collection of the tax as proposed, and until these are settled your committee can not report that the plan is in a progressive state. In the meantime the various members are striving hard to develop new plans which they hope will result in securing the desired funds.

MR. SPRAGUE. As chairman of the committee of fifteen, will say that we regarded the matter of advertising of so much importance that we created a special committee, and mark you, gave them power to act without reporting back. This shows the confidence we had extended to that special committee. In the report of the committee which was made to this Convention, this matter of advertising was specially investigated as one of the objects to be accomplished by the coöperative or profit-sharing plan.

MR. STABLER. I would not reflect upon Mr. Sprague at all. I was simply trying to show that in the marketing of our products and the question of getting them to the consumer, my friend Mr. Sprague was quite content to say nothing about advertising. That was the point I was trying to make. I will say further, in proof of what I have said, that in all of Mr. Sprague's discussion during the past four days, he talked upon all questions but the question of getting our goods to the consumer, which means advertising. That is the point I am trying to make. When the fruit-growers of this State see

that in order to make our products profitable we must tell the consumer about them, then we shall advertise.

PRESIDENT COOPER. I have been requested to call for Mr. Freeman, as he has just returned from Europe.

ADDRESS BY MR. FREEMAN.

Mr. Chairman, and Members of the California Fruit-Growers' Convention: I do not know that I can say anything of interest to you. You have had a long day of it. I have listened to everything that has been said from the desk and from the floor, and have been very much interested, and I think it is all good. I want especially to comment on Mr. Stabler's talk. I think his ideas are splendid.

Now in regard to Europe. I don't see what we can do without the European trade. For the last three or four years the prune industry has not been very successful, but it has been very much more successful because we have had the European trade. The reason is because of the failure of the crops of the Mediterranean countries. I have eaten prunes in the various places where I have been, and they charge from 10 to 50 cents a dish, the prices at the fancy hotels being that high. They were well served, rather better served in the cheap places than in the dear.

There is an item of interest to us all in regard to prunes that perhaps is not thoroughly understood in this country. The French prunes were originally largely eaten from the hand. We often hear people say, "I don't care for California prunes. I don't like to eat them from the hand; they don't make a good confection." Now the truth is, French prunes are produced along the northern shores of the Mediterranean Sea, in a country that has a heavy rainfall in the autumn. There is not a pound of those prunes dried in the sun to completion. Sometimes curing is started in the sun, but never finished. They are dried in ovens. The prunes are all thoroughly cooked when they are dried. Years ago those in the prune business on the Danube, in Austria, Hungary, and Servia, found out that they cooked them in France, and they did the same thing. So now nearly every pound of prunes that is packed in Europe is cooked twice and is quite ready for consumption when it is offered for sale by the retailer.

Now I have heard, I believe, a little something about marketing our prunes as they come from the field, and I want to tell you, ladies and gentlemen, that no greater mistake can be made than to do it, and one of the reasons why our prunes are not thought so well of in America, where we produce them, as in Europe, where we have got to fight for a market, is that we market them without cooking them. Generally speaking, people do not know how to prepare prunes to eat them.

Some take them direct from the field; they should be cooked; processing is not enough. It would pay if the prune producers of the State would arrange to cook them by a dry heat to a far greater extent than is now done. And if you would do that you would have more trade in America; and if you would refuse to sell a single pound until it has been put through steam or heat for the longest time it will possibly stand and then dry it, I am sure as can be that you will have more trade. Now these statements are correct as to the European article; it is not only cooked, but cooked twice.

I went East and spent seven months in Europe to sell California dried and canned goods. In England I heard that our prunes were not as good as those produced in Europe; that was a fact. And they are not as good as those produced in France. Those were the statements I heard all the time I was over there. "Your prunes are not as good as those we buy from France." I am confident that if our prunes were cooked more, and not presented to the consumer in a less cooked state than those of Europe, we would sell much more. The European people are very economical. They work in the iron and steel mills, cotton factories, mines, and all kinds of factories, and they get a very low wage, about one third or one fourth of the wage of the same operative in America, and so they have much less to spend for a living; and anything that is sold to those people as a food product must have merit—must be a No. 1 article from the standpoint of health and every standpoint. They look at our prunes and all our products from that standpoint, and also from the standpoint of the amount of money they have to spend for their daily bread. Now, we can not market our prunes there in a large way unless we do so at a low price. When the European crops are small—and I am glad to say they have been small for several years—we have a chance to sell and take advantage of the market; that is when we take advantage of their small crops, and I think we get a pretty fair price for our prunes. Now here, in some parts of the country, we had the heaviest fruit crops this last year that we ever did, and some of the European countries also had the heaviest they ever had. California was short. But our position is not dominating enough so that our shortage would enable us to get a reasonable price for our products. We had to face this tremendous crop in Europe for the first time in ten years, if not in the whole history of the country. They produced something like a hundred million pounds of prunes in Europe, and it seems as though we have done very well to make as large a profit on our product as we have this year.

We are at a great disadvantage in freight. On their railroads they charge less than they do here in this country. Here we have to pay a cent and a quarter a pound gross to get our prunes and other dried fruits to the European market—that is the average price—while the

French and Austrian and Hungarian people only pay an average of a quarter of a cent a pound. That is a big thing to overcome. We have our labor—and I don't want to see the wage rate get any less than it is—we have our labor at three or four times the price of European labor. But we have the Yankee ingenuity, or the American ingenuity, to help us. But with all this we are able, actually able, paying higher prices for labor, paying interest on the money invested in machinery—we are able to put up our prunes at an actual cost as cheap as the French, Austrian, or Hungarian people do, and get their green fruit for nothing. Some think their labor is cheap, but they use up a tremendous amount of it. They are economical in everything but the amount of labor they use; they throw that away.

The German people are comparatively small producers of fruit and large consumers. The agrarian party in Germany has endeavored for many years past to restrict the importation of food products that can be produced in Germany, and through the efforts of that party laws have been passed and rules made about the importation, among other things, of our dried fruits. They first passed laws in regard to the San José scale, the idea being that the dried fruits we have sent over there contained San José scale that would help to infest their orchards. Perhaps the idea was a good one. Perhaps if we had used as much care in the past we would have less of these pests. But they actually had officers, who did not know the difference between the San José scale and a June bug, condemn thousands of dollars' worth of peaches, pears, and apricots for having San José scale that I don't suppose there was ever a San José scale within a mile of.

Now in regard to sulphuric acid. There is a law in Germany that apricots, pears, and peaches containing over 0.0125 per cent of sulphuric acid can not be sold. In spite of this law, people connected with educational institutions in Germany investigated the matter at their own expense and found that 0.0251, or about a quarter of one per cent, or even much more than that, of sulphuric acid in apricots, pears, and peaches was wholly without injury to persons.

There is something that this Convention can possibly be able to do. The time will soon come when the German government will ask our Government to formulate a new treaty, and when that time comes the duties on California dried fruits will be one of the main things to look after, and it will be an important thing in the treaty. The question of what restrictions they will place on the importation of our dried apricots and dried peaches will also have a place in that treaty, and I hope that when the time comes proper pressure will be brought to bear upon the people in Washington who have this matter in charge to enable our Government to give a fair show to the producers of fruit in California.

The Germans have placed such a high duty on imported canned fruits that the consumer can not afford to pay the price, and it is actually prohibitive. One of the greatest helps in California is the canning industry. In other words, if it were not for the fruit which we are able to dispose of to the canners, nothing like the amount of deciduous fruit produced here now could be raised. And England has for many years and is still ready and willing to pay a fair price for a very large amount of our finest grades of canned fruit. More than 700 cars in one year have been shipped to England from California, and the average is more than 500 cars per year—a great big trade. I will say this much for England: On account of being a small producer of fruit, that country is sure to be a good market for our fruits, dried and canned, for years to come. And we should closely look after our relations with that country in regard to the restrictions that may be made on the importation of fruit from this country.

We have been robbed for years by the railroad companies, and they gave us the most abominable service in the years 1902 and 1903 that was possible for a railroad company to give. They had all manner of excuses. They took a car of fruit from a shipping point in California and would be sixty days in landing it in a port in Europe. That was about the average. This year they have made a most complete reform. The schedules of the arrivals of cars that our people have been sending me lately show an average of thirty days, which is most excellent service, and we are to be congratulated that the railroad companies have finally come to know that unless they give us good time on our products, the grade of it will certainly retrograde.

Now, there is a point in Europe that I saw, which I think is of great interest to you prune-growers. I saw all over Europe prune-butter. I had heard about it before I went there. I looked into it to see what it meant. I found that they took a lot of our small prunes that we shipped over there in 1903, the carry-over prunes, and made them into prune-butter. I found that they would take a very large percentage, practically all, of the small prunes in France, Austria, and Hungary, and make them into prune-butter. They take the prunes and boil them, take out the pits by hand, then boil them down as we used to maple sugar in the East, adding a little sugar. Now I would be glad to do something in that line myself as a manufacturer. It would be a good thing for the farmers and fruit-growers who are here to-day, to see if some company can not be formed in San José or somewhere that will start a manufactory to make our small prunes into butter. It would be much better than putting your small prunes on the market, and your good-sized prunes would bring more.

I wish to say one word about the transportation of fruits. It seems to me that we are very much ahead of the European in this matter.

Of course they dry their prunes and don't let them go to waste; that is true also of their fresh fruits. Those that they do not sell fresh are dried and do not go to waste, unless they have a surplus. If they have a surplus they have no way to take care of it. And there is one advantage we have over all other fruit-producing countries, as we have a rainless season and can usually take care of our largest crops by drying them in the sun without artificial heat. And on account of that we are able to market our surplus, generally, at a small margin of profit to the producer, while in Europe thousands of tons in a prolific year go to waste. There they sell apples, pears, and sometimes grapes, which are produced all over England and on the continent of Europe, at one cent a pound in small handful lots from the retail stands. That was the ordinary price on a good stand. I thank you all very much.

DISCUSSION ON ADVERTISING.

DR. DINSMORE. There is one thing about this advertising I have thought about a great deal that is much confused by some people. Now this advertising of an article like prunes in newspapers and magazines and so on is an entirely different thing from that of advertising Ivory soap or Royal baking powder or Winchester rifles. It is not special enough. Now I think two or three years ago a gentleman came here from St. Louis and got \$30,000 or \$40,000 to advertise prunes. I would not say that there was absolutely no returns from that, but I never heard much. You might as well advertise oats or pork or anything else in the newspapers or magazines as to advertise prunes. You have got to specialize the ideas. The suggestions of Mr. Stabler I like better. You take all of these breakfast foods, as we now know them. When I was young we never heard of such a thing. Now we never see a breakfast table without mush. I suppose that most of the breakfast foods come from wheat or oats or some such staple article. Advertising prunes would be like advertising such staples. They advertise some special brand of breakfast food, and the purchaser knows he is getting some special variety, and for that reason he buys it.

You take the wife of a mechanic living in the East, the man earning say \$3 a day, and she knows just how much she must spend for food. The woman goes into a grocery store to buy her supplies. Now, what will induce her to buy prunes? She has heard about prunes. Everybody knows about prunes, just as they know about beans or anything else. Now, the groceryman may keep his prunes in a back room with oats and hog-feed and such things; he comes back with a sack of prunes—I would not say California prunes—and he pours them out on the counter; or he may pull out a box from under the counter, and there are the prunes. May be they are processed, or they may be sugared, or

look as though they were moldy; they are utterly uninviting. How much are they worth a pound? Well, they might vary: two pounds for a quarter, or 15 cents a pound. Well, she can't afford to buy them at that price. Suppose they were put up in neat one-pound packages, in an attractive manner, like one of these packages of breakfast food, or a bottle of Heinz's pickles. Suppose they are put up in a one- or two-pound package, for 10 or 20 cents, so that the grower would realize 3 cents a pound for them. No reason in the world why he should not receive that much. The woman notices them and likes the appearance. She asks how much they are. "Why," she says, "I can afford to buy them at that price." She buys some and likes them; inside the package she finds a little pamphlet telling how to cook them.

Now it seems to me that this is the principal thing about this prune situation. The main point is the consumption. I don't think it makes a particle of difference whether they are carried on the cars of the railroad company or on a private car line, provided they are reasonably and expeditiously carried.

A groceryman in the East that I used to deal with—I went in there one day and I said to him, "I don't see any prunes here." I used to buy them myself for 22 cents a pound when I was there. They were put up then in nice little packages, and they cost a great deal more than they do now. "No," he said, "we are not carrying prunes very much any more." He had some in the back room. I went back in the other room, and there was a lot of hog-feed; they were all dirty and not fit to eat. I asked him what those prunes were worth. "Fifteen cents a pound." They were not fit for human beings to eat. You ought not to ship the small grades of prunes back there; the Easterner does not know the difference in the grades as we do here; to him a prune is a prune. If they can have good prunes at a reasonable price, put up in an attractive manner, they will buy them and lots of them, and you can not supply the demand. I am as sure of that as I am of anything, and until we do that we will have a glut at this end of the line. [Applause.]

MR. JAMES. I have been a grocer for something like thirty years in this city, and I guess I have retrograded a little. I am nothing but a prune-grower now. I have advertised for twenty years in this city. But when we advertise we must have something to advertise that is attractive. If you advertise Royal baking powder, that is something definite; if you advertise baking powder, that would not accomplish anything. Every old lady from Maine to California knows what prunes are. We can not advertise prunes. I would like to know the plan that this gentleman proposes to advertise these prunes. Now, take Ivory soap; that is a different thing. I believe in coöperation. If these prune-growers would coöperate, each in his own immediate neighborhood, and

get together and put up the prune market, and then give them the money to advertise, it will be a success. But there is no use in charging these people a dollar a ton who only raise a carload of prunes; it will cost them something like \$30 for advertising. If you go to work and stick an advertisement of prunes into a newspaper or magazine, it would not amount to anything. We want to know the plan of advertising. I believe in advertising thoroughly. The gentleman says it has brought many a merchant from the back alley to the front street. I think advertising will bring the prune-growers into the front ranks, but we want to know what we are going to advertise before we attempt anything of that kind.

A MEMBER. A number of us were in St. Louis for some time last summer, and two or three of us always ate at the same restaurant; probably thirty or forty Californians ate there; and there was not one product from California on those tables. We thought we would ask for wine. We had lots of French and German wine. Let's say we will have a little sauterne. We can't get it. We said we did not like the foreign wine, and unless we get what we want we will not have any. So they went down town and got some California wine. We asked for prunes. We could not get them. Afterwards some of them went over to the exposition and made arrangements to get some of the California prunes, and then we had prunes. We must advertise, as Mr. Swasey says, judiciously, and advertise everywhere, wherever we go. There is one thing stated here, I think, that is wrong. A poor article well advertised will sell. In the patent medicines that you put into your stomach, half the cost is for advertising. Good advertising will make you buy what you don't want.

QUESTION. If you advertise a poor article one season and sell that, next year it will not sell, will it?

ANSWER. That is right. I believe that the best thing for us to do is to put up good prunes, put up a good article, and advertise and make the people know that what we say about our goods is true. That is the idea for us—furnish a good article, and the rest will take care of itself.

MR. SWASEY. I am sure this gentleman misunderstood me. I do not advocate the advertising of anything that has not got merit. I would not advocate advertising something that would not be a success, simply for the temporary profit it would make me. Ninety per cent of the money, I am sure, that is spent for advertising is absolutely wasted simply because they have not the right idea, or they don't go into it with the idea of what is necessary and stay with it. Advertising without coöperation is simply worthless, a waste of money. So far as advertising prunes is concerned, I do not wish to be understood as advocating the advertisement of prunes from a sentimental standpoint. It is only for the purpose of helping the grower to help himself. If you

went to work and put an advertisement of prunes on a fence, it might get one or two people to buy prunes, but it would not be profitable to do so.

MR. McDONALD. Some one has said that we could not buy prunes in our hotels and restaurants. I made it my duty, on Tuesday morning, as I do every time I come to San José, to ask for a dish of prunes for breakfast. And I get a dish of prunes with some good Jersey milk, and it is a delicious dish. When I go down to San Francisco, I go to the Bohemian Club, and I call for prunes. I always get a most delicious dish of cooked prunes with the richest milk, and a nicer dish I never tasted in my life. Every morning I ask for prunes at the St. James Hotel, and I get them every time, and they are delicious.

DR. DINSMORE. Mr. Shoup has had some experience in the promotion of prunes. I think we should like to hear his experiences.

MR. SHOUP. Mr. Chairman, Ladies and Gentlemen: I am the chap that had the trouble with the cook books. When we were all talking about advertising some time ago, I thought I would make a little experiment and investigate a little. I wrote a little pamphlet about how to eat California fruit, which has been printed and circulated somewhat. I found that no attempt had been made anywhere to interest consumers in eating California fruit. I went through fifteen cook books, and found twelve that had nothing at all about California cured fruits. And a little investigation showed that only two of those had anything about prunes. In different parts of the country prunes were not served at all, and most people did not know how to prepare them properly. We were making great efforts at this end of the line to control the crops and create a better demand and higher price, but no efforts were made to show people how to prepare fruits in the best way. That gave me a strong idea that something must be done to make people eat California fruit. I remember, also, of looking up some statistics at the time on the subject of the increase per pound of the various articles of food that had taken place in the United States since 1850. It showed that through advertising breakfast foods and such things, there had been an enormous increase, while in prunes and cured fruits there had been scarcely any. I believe that the use of breakfast foods has to some extent interfered with the growth of the demand for our prunes, because when a busy man eats breakfast he is not going to eat something such as H O and prunes too.

I think that if you would even advertise your prunes in the papers and magazines of the United States and say nothing more than to call attention to the nutritious and delicious qualities of California sunshine fruits, in a very short time, without a word about prunes, you would increase the demand for them enormously. Prunes should be put up in packages in such an attractive way that when a woman buys a pack-

age and takes it home and puts it upon the shelf in the pantry, she sees that package every day and the advertisement is so fixed in her mind that when she again wants prunes she will ask for that brand. Now, the fact that a brand would be necessary was overlooked, and I believe that is what should be advertised.

A MEMBER. It seems to me that we have overlooked that we, as a whole, are fruit-growers and not advertising men. When a manufacturer, for instance, offers an article for sale he calls in a specialist in advertising. The specialist prepares his plans about advertising. It seems to me that if the fruit-growers would call in a specialist to work out the details of these matters they would get results. The manufacturer certainly does not work out the details of advertising his goods, and the fruit-growers should not, either.

APPOINTMENT OF COMMITTEE ON LEGISLATION.

PRESIDENT COOPER. I will now name the Committee on Legislation, created by motion this morning, for the purpose of asking the Legislature for a further appropriation to increase number of inspectors in the quarantine office of the State to prevent the introduction of insect pests or dangerous animals. There is another committee on the question of an increased appropriation for the purpose of securing beneficial insects for the State. Also, there is a suggestion, made by Professor Fowler, about the pure food law. That may be important concerning food products in the next Legislature. I will name J. O. Hayes of San José, B. V. Worden of Yuba, John Markley of Geyserville, B. E. Hutchison of Fresno, and General Jennison of Covina. The Committee on Transportation was left without being discharged.

MR. SPRAGUE. As the Committee on Transportation has served this association faithfully and most energetically in past years, and as it seems to have arrived at the limit of usefulness, perhaps it would be well to discharge this committee. Therefore, I move that the Committee on Transportation be discharged.

PRESIDENT COOPER. Are you going to do without a Committee on Transportation?

MR. SPRAGUE. I suppose it would be subject to the authority of the Commissioner of Horticulture, who is really the head of this Convention, and who has authority to appoint a Committee on Transportation at his discretion.

DR. DINSMORE. If we adopt this motion, we might amend by requesting the President to appoint a committee.

PRESIDENT COOPER. The Committee on Transportation will be discharged. A motion is made and seconded that the President be

authorized and requested to appoint a Committee on Transportation to serve for the coming year.

Motion carried.

PRESIDENT COOPER. I have to thank the Convention and the people of San José and elsewhere for their attendance here, and for the good-will manifested at this Convention. We will take an adjournment *sine die*.

ELLWOOD COOPER,
Chairman.

JOHN ISAAC,
Secretary.

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M. Mese

