38TH ANNUAL REPORT

OF THE

State Horticultural Society

OF MISSOURI.

MEETINGS AT

Willow Springs, June 4, 5, 6, and Neosho, December 3, 4, 5, 1895.

L. A. GOODMAN, Secretary,
WESTPORT, MO.

JEFFERSON CITY:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS
1896.

Missouri State Horticultural Society.

To His Excellency, WM. J. STONE:

This report of our society work, of the meetings held, of the moneys expended, and of the local societies and counties reporting for the year 1895 is respectfully submitted.

L. A. GOODMAN, Secretary,
Westport, Mo.

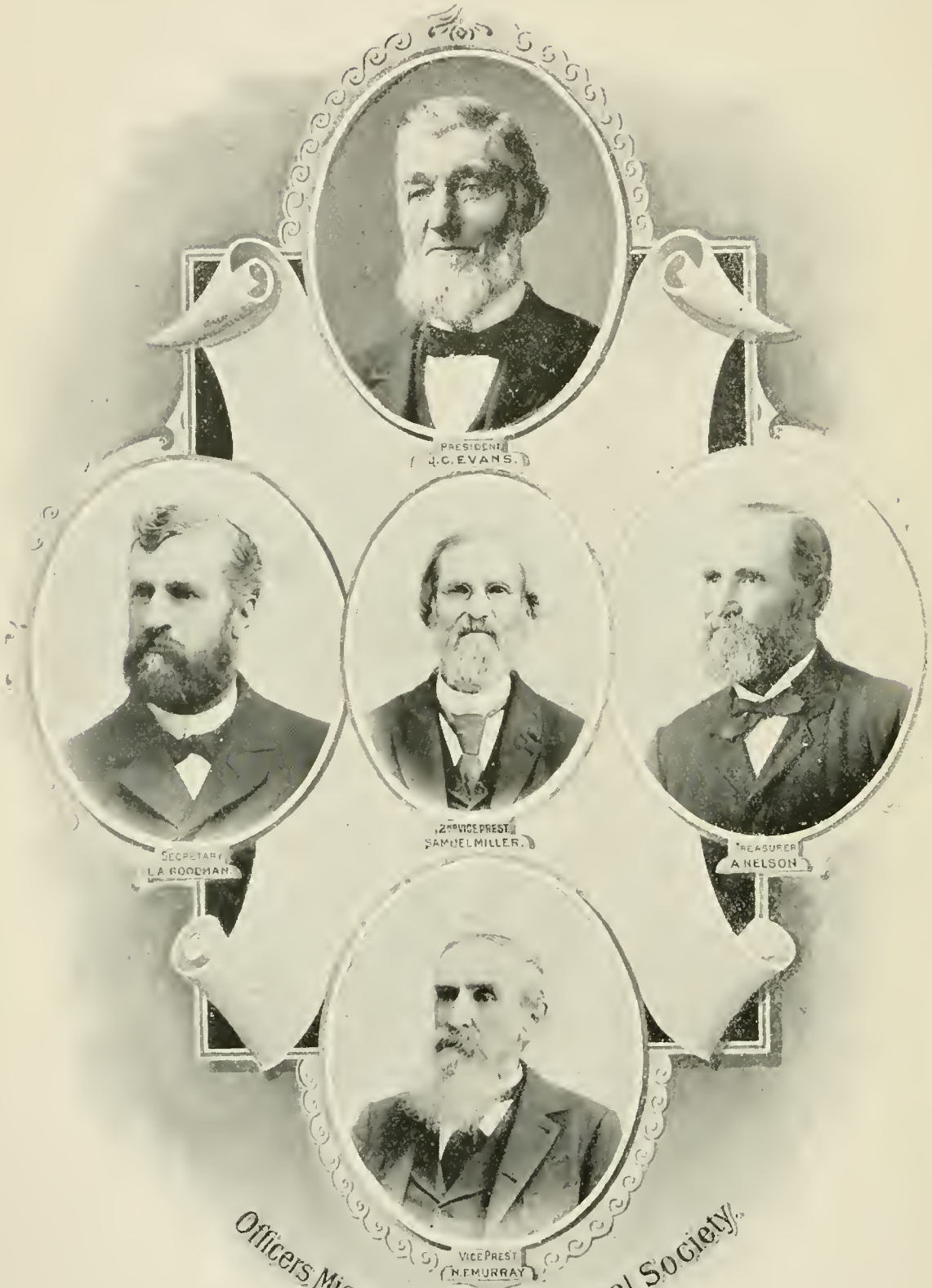
CITY OF JEFFERSON, January 31, 1896.

To the Commissioners of Public Printing:

I require for the use of my office 3500 copies of Missouri Horticultural Report—2000 bound in cloth and 1500 in paper—which I desire printed as per accompanying sample.

Respectfully,
L. A. GOODMAN, Secretary,
Westport, Mo.

Approved:
A. A. LESUEUR, Secretary of State.
J. M SEIBERT, State Auditor.
LON. V. STEPHENS, State Treasurer.



Officers Missouri State Horticultural Society.

Officers for the Year 1896.

J. C. EVANS, President ..... North Kansas City
N. F. MURRAY, Vice-President ..... Oregon
SAMUEL MILLER, Second Vice-President ..... Bluffton
L. A. GOODMAN, Secretary ..... Westport
A. NELSON, Treasurer ..... Lebanon

List of Honorary Members.

R. H. JESSE ..... Columbia
Hon. A. A LESUEUR ..... Jefferson City
MISS M. E. MURTFELDT ..... Kirkwood, Mo.
GEORGE HUSSMAN ..... Napa, Cal.
T. T. LYON ..... South Haven, Mich.
C. W. MURTFELDT ..... Kirkwood, Mo.
Hon. N. J. COLMAN ..... St. Louis, Mo.
SAMUEL MILLER ..... Bluffton, Mo.
Prof. M. G. KERN ..... St. Louis, Mo.
Prof B. T. BUSH ..... Independence, Mo.
Prof. B. T. GALLOWAY ..... Washington, D. C

List of Life Members.

WM. MUIR, old member ..... Fox Creek
H. CLAGGETT, old member ..... Kansas City
J. C. EVANS ..... North Kansas City, Mo.
L. A. GOODMAN ..... Westport, Mo.
D. M. DUNLAP ..... Fulton, Mo.
D. A. ROBNETT ..... Columbia, Mo.
CHAS. HUBER ..... Seneca
C. H. EVANS ..... St. Louis
W. R. WILKERSON ..... Altenburg

Standing Committees.

Orchards.

J. A. DURKES, Weston; HENRY SPEER, Butler; H. W. JENKINS, Boonville.

Vineyards.

JACOB ROMMEL, Morrison; C. TEUBNER, Lexington; J. W. FLEEMAN, St. Joseph.

Small Fruits.

G. W. HOPKINS, Springfield; J. N. MENIFEE, Oregon; HENRY SCHNELL, Glasgow.

Stone Fruits.

S. W. GILBERT, Thayer; Z. T. RUSSELL, Carthage; ARTHR PATTERSON, Kirksville.

Vegetables.

C. M. WILLIAMS, Marceline; A. J. DAVIS, Jefferson City; W. E. LILLY, Chillicothe.

Flowers.

E H. MICHEL, St. Louis; Mrs. G. E. DUGAN, Sedalia; C. I. ROBARDS, Butler

Ornamentals

F. A. HUBBARD, Carthage, F. MCCOUN, St. Joseph; R. E. BAILEY, Fulton.

Entomology.

MISS M. E. MURTFELDT, Kirkwood; J. T. SNODGRASS, West Plains; G. F. LUCKHARDT, Oregon.

Botany.

Prof. G. C. BROADHEAD, Columbia; B. F. BUSH, Independence; J. KIRCHGRABER, Springfield.

Nomenclature.

W. G. GANO, Parkville; E. L. POLLARD, Olden; J. H LOGAN, Nevada.

New Fruits

J. B. WILD, Sarcoxie; A. H. GILKESON, Warrensburg; J. F. WILCOX, St. Joseph.

Ornithology.

Prof. L. T. KIRK, Warrensburg; C. W. MURTFELDT, Kirkwood; C. HOWARD, Willow Springs.

Injurious Fungi.

Prof. J. C. WHITTEN, Columbia; Prof. W. TRELEASE, St. Louis.

Packing and Marketing Fruits.

W. A. GARDNER, West Plains; E. T. HOLLISTER, St. Louis; HENRY ADKINS, Sarcoxie.

Transportation.

J. M. RICE, Sarcoxie; C. C. BELL, Boonville; L. A. GOODMAN, Westport.

Horticultural Education.

Chairman, G. B. LAMM, Sedalia; L. A. GOODMAN, Westport; Prof. J. C. WHITTEN, Columbia; Mrs. G. E. DUGAN, Sedalia; Miss M. E. MURTFELDT, Kirkwood; Prof. WM. TRELEASE, St. Louis; Prof. J. R. KIRK, Jefferson City.

INCORPORATION AND REORGANIZATION

Of the Horticulural Society by an act of the General Assembly in 1893.

The following law was passed by the last Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi annual meeting of the Society at Columbia, June 6–7–8, 1893, the act was adopted as part of the constitution of the Society.

MEMBERSHIP.

Under the new constitution the law requires the payment of $1 per year for membership fee. We hope that we shall have a good long list of members under our new plan for business. The plan under which we have been working, of giving each local society the privilege of paying their fee into their local society, thus making them a member of the State Society, cannot now avail. Each person must become a member of the State Society and keep up his membership each year.

We should like to see a good number of life members also; it is very desirable.

L. A. GOODMAN, Sec'y.

ACT OF THE GENERAL ASSEMBLY.

The Missouri State Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri State Horticultural Society shall be composed of such persons as take an interest in the advancement of horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an executive board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society; the Governor of the State shall be *ex officio* a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the Treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of the reports of the proceedings of the Board, Society and auxiliary societies as may, in the judgment of the State Printing Commission, be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than four hundred pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

Constitution.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society. Its object shall be the promotion of horticulture in all its branches.

ART II. Any person may become a member of this society upon the payment of one dollar, and membership shall continue upon the payment of one dollar annually. The payment of ten dollars at any one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the society. And any lady may become a member by giving her name to the secretary.

ART. III. The officers of this society shall consist of a president, vice-president, second vice-president, a secretary and a treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall begin on the first day of June following their election.

ART. IV. The elective officers of this society shall constitute an executive committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers of similar organizations.

ART V. The regular meetings of this society shall be held annually on the first Tuesday in December and June, except when otherwise ordered by the executive committee. Special meetings of the society may be called by the executive committee, and meetings of the committee by the president and secretary.

ART. VI. As soon after each regular annual meeting as possible, the president shall appoint the following standing committees, and they shall be required to give a report, in writing, under their respective heads, at the annual and semi-annual meetings of the society, of what transpires during the year of interest to the society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit, and Transportation.

ART. VII. The treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the president of this society (forfeiture to be made to the society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two thirds vote of the members present at any regular meeting.

List of County Societies.

Adair County Horticultural Society—
R. M. Brasher, Pres't, Kirksville.
A. Patterson, Sec'y, Kirksville.

Atchison County Horticultural Society—
C. W. Coe, Pres't, Tarklo.
R. Lynn, Sec'y, Tarklo.

Barry County Horticultural Society—
J. B. Hutchens, Pres't, Seligman.
G. G. James, Sec'y, Exeter.
(35 members.)

Bates County Horticulrural Society—
C. I. Robards, Pres't, Butler.
Henry Speer, Speer, Sec'y, Butler.

Barton County Horticultural Society—
C. Fink, Pres't, Lamar.
D. B. Hayes, Sec'y, Lamar.

Boone County Horticultural Society—
D. A. Robnett, Pres't, Columbia.
Thos. L. Beazley, Sec'y Columbia.

Buchanan County Horticultural Society—
J. H. Karnes, Pres't, St. Joseph.
F. McCoun, Sec'y, St. Joseph.
(50 members.)

Butler County Horticultural Society—
D. C. Kitteridge, Pres't, Poplar Bluff.
E. R. Lentz, Sec'y, Poplar Bluff.

Christian County Horticultural Society—
M King, Pres't, Billings.
R. C. Hendricks, Sec'y, Billings.

Crawford County Horticultural Society—
Conrad Martin, Pres't, Cuba.
W. S. McKinney, Sec'y, Cuba

Camden County Horticultural Society—
J. W. Burnham, Pres't, Stoutland.
H. I. Hunt, Sec'y, Stoutland·

Central Missouri Horticultural Society—
L. Geiger, Sr., Pres't, Boonville.
C. C. Bell, Sec'y, Boonville.
(10 members.)

Callaway County Horticultural Society—
R. T. Murphy, Pres't, New Bloomfield.
R. E. Balley, Sec'y, Fulton.

Conway Horticultural Society—
W. H. Getty, Pres't, Conway.
R. O. Hardy, Rec. Sec'y, Conway.

Cole County Horticultural Society—
J. W. Edwards, Pres't, Jefferson City.
A. J. Davis, Sec'y, Jefferson City.
(35 members.)

Greene County Horticultural Society—
Rev. Dr. Boude, Pres't, Springfield.
G. W. Hopkins, Sec'y, Springfield.
(40 members.)

Republic Horticultural Society—
T. W. Wade, Pres't, Republic,
R. C. Villes, Sec'y, Republic.

Henry County Horticultural Society—
M. L Bonham, Pres't, Clinton.
J. M. Pretzinger, Sec'y, Clinton.
(39 members.)

Holt County Horticultural Society—
N. F. Murray, Pres't, Oregon.
S. Blanchard, Sec'y, Oregon.

Howell County Horticultural Society—
G. Comley, Pres't, Willow Springs.
F. Tyler, Sec'y, Willow Springs.
(25 members.)

Jasper County Horticultural Society—
S. S. Riley, Pres't, Carthage.
Z. T. Russell, Sec'y, Carthage.

Sarcoxie Horticultural Society—
J. M. Davidson, Pres't, Sarcoxie.
H. Adkins, Sec'y, Sarcoxie.
(85 members.)

Lafayette County Horticultural Society—
Dr. W. A. Gordon, Pres't, Lexington.
G. Robins, Sec'y, Mayview.

Laclede County Horticultural Society—
A. Nelson, Pres't, Lebanon
E. B. Kellerman, Sec'y, Lebanon.
(40 members.)

Lawrence County Horticultural Society—
J. B. Logan, Pres't, Marlonville.
B. Logan, Sec'y, Marlonville.

Linn County Horticultural Society—
A. P. Swan, Pres't, Marceline.
H. Long, Sec'y, Marceline.

Livingston Horticultural Society—
W. E. Lilly, Pres't, Chillicothe.
J. T, Jackson, Sec'y, Chillicothe.
(30 members.)

Mound City Horticultural Society—
D. B. Browning, Pres't, Mound City.
J. M. Hasness, Sec'y, Mound City.

Mercer County Horticultural Society—
H. R. Wayman, Pres't, Alvord.
J. A Kennedy, Sec'y, Ravenna.

COUNTY SOCIETIES—Continued.

Madison County Horticultural Society
A. A. Blumer, Pres't, Fredericktown.
H. M. Whittemer, Sec'y, Fredericktown.

Montgomery County Horticultural Society—
F. Gutman, Pres't, Hugo.
C. Haussor, Sec'y, Hugo.

Mount Grove Horticultural Society—
A. Gugel, Pres't, Mountain Grove.
J. C. Moore, Sec'y, Mountain Grove.
(50 members.)

Missouri-Arkansas Horticultural Society—
C. Barnard, Pres't, Thayer.
P. P. B. Hynson, Sec'y, Mammoth Springs, Ark

Miller County Horticultural Society—
J. H. G. Jenkins, Pres't, Spring Garden.
N. J. Shepherd, Sec'y, Eldon.

Neosho Horticultural Society—
J. M. Purdy, Pres't, Neosho.
H. S. Sturgiss, Sec'y, Neosho.
(22 members.)

Oregon County Horticultural Society—
I. M. Culver, Pres't, Thayer.
J. E. Alderson, Sec'y, Koshkanong.
(16 members.)

Pettis County Horticultural Society—
G. B. Lamm, Pres't, Sedalia.
L. T. Kirk, Sec'y, LaMonte.

Polk County Horticultural Society—
G. W. Williams, Pres't, Humansville.
J. L. Strader, Sec'y, Humansville.

Phelps County Horticultural Society—
Robert Merriwether, Pres't, Rolla.
W. W. Southgate, Sec'y, Rolla.

St. Francois County Horticultural Society—
R. C. Tucker, Pres't, Farmington.
W. F. Hoey, Sec'y, Farmington.
(16 members.)

Tri-county Horticultural Society—
J. H. Holloway, Pres't, Richland.
S. Kellar, Sec'y, Richland.

Ripley County Horticultural Society—
J. G. Hancock, Pres't, Doniphan.
S. Kellar, Sec'y, Richland.

South Missouri Horticultural Society—
W. A. Gardner, Pres't, West Plains.
J. T. Snodgrass, Sec'y, West Plains.

Saline County Horticultural Society—
J. T. Stewart, Pres't, Blackburn.
Thos. Adams, Sec'y, Marshall.

Vernon County Horticultural Society—
A. Ambrose, Pres't, Nevada.
J. H. Logan, Sec'y, Nevada.

Missouri Valley Horticultural Society—
J. C. Evans, Pres't, Harlem, Mo.
A. Chandler, Sec'y, Argentine, Kas.

Shannon County Horticultural Society—
C. W. Cochran, Pres't, Monteer.
Rob't Boran, Sec'y, Monteer.

Pelree City Horticultural Society—
D. W. George, Pres't, Pelree City.
J. B. Jones, Treas., Pelree City.
G. W. Brace, Sec'y, Pelree City.

Webster County Fruit Growers' Ass'n—
———, Pres't, Marshfield.
E. F. James, Sec'y, Marshfield.

Wright County Horticultural Society—
J. W. James, Pres't, Mansfield.
Mrs. Sarah Bell, Sec'y, Mansfield.

Wayne County Horticultural Society—
L. F. Moore, Pres't, Wappapello.
John Ware, Sec'y, Wappapello.

Benton Co. (Ark.) Horticultural Society—
J. R. Cordell, Pres't, Bentonville.
G. B. Lawton, Sec'y, Bentonville.

SUMMER MEETING.

The Missouri State Horticultural Society held its semi-annual meeting at Willow Springs, June 4, 5 and 6, 1895.

The greater part of the delegates came on the train from the north at 9:30 a. m. The Reception Committee met them at the depot and escorted them direct to the hall, where the ladies and gentlemen of the city were busy decorating the hall and arranging the fruits and flowers.

The citizens were very cordial in the reception of the members, and made them all feel at home. The hotels had arranged to care well for them all, and altogether the meeting opened with very favorable promises.

At 11 a. m. the meeting was called to order by the President, and the opening prayer was offered by Rev. John Brerton.

Mayor J. A. Brown delivered the welcome address, a synopsis of which the stenographer failed to take, and which I cannot now report.

The response was made by the President, and followed by three minute speeches from a number of the members.

The committees were appointed and the meeting adjourned until 2 p. m.

SEC'Y.

COMMITTEES.

Fruits—V. H. Gilkerson, S. I. Hostetline, D. A. Robbinet.
Flowers—H. C. Irish, Mrs. Nelson, Mrs. Trowbridge.
Experiment Station—J. C. Witten.
Finance—S. W. Gilbert, N. F. Murray, J. T. Snodgrass.
Final Resolutions—V. Nelson, Dr. Lane, C. J. Trowbridge.

President Evans' Response.

From observations taken on recent trips about the State, I feel that the fruit-growers have great reason to be thankful that providence has again smiled on us. While we hear of failures from various causes in many of our neighboring states, the outlook for a fair crop of most of the fruits is good in nearly all parts of our own State. Geniton and Winesap apples that bore full last year are resting this year. In some sections all varieties have fallen some and in a few places all have dropped. There are some peaches in most parts of the State and a full crop in many parts. Plums and cherries are a fair crop nearly all over. Strawberries have yielded a fair crop of good quality and brought good prices, and as far as heard from, grapes are generally promising. The anthrack on our raspberries is giving way somewhat and we have promise of a half crop. Prices on some of the leading articles of commerce are advancing and knowing ones say they will go still higher and that others will follow until all branches of trade will take on a healthy condition. City real estate will become more active; farm lands will bring better prices, and the laboring man will be better paid for his work. Then the products of our orchards and vineyards will meet more ready sale at better prices. In view of all this, it stands us in hand to see to it that our orchards receive proper treatment and the products be handled to the best advantage. The enterprising buyer is already in the field and making offers for the products of orchards; and remember, he knows his business better than you do, and will always give himself the benefit of the doubt, if you allow him to in a deal. If you have a nice block of any of the leading varieties of apples, you will have no trouble in disposing of the product any time between this and picking time. As usual the buyers all ask about Ben Davis first, and it is a fact that an orchard of Ben Davis (all things being equal) will sell more readly and for better prices than any other variety. I see in my travels this season a great many orchards that are being managed in a way that must result sadly to their detriment and to their owner's loss. I have seen many nice young orchards that seem to have been well cared for up to last fall and then sown to rye, wheat or oats this spring. I don't think a member of this State or any local horticultural society, or a reader of any of our leading horticultural journals would do that, and I am truly sorry for any who do not know better. Just as well give a babe broken doses arsenic and expect it to develop

into a man or woman. After awhile they will be wondering what ails their orchard.

We are often asked what is the best crop to grow in an orchard, and I think the very best answer we can give, is apples. There is but one thing that may be profitably planted in an orchard after it has come to a bearing age, and that is stock peas, and it remains to be tested wheter they will be profitable anywhere in the State except in the red lands, but they have been fairly well tried here in the Ozarks, and are proving a great success. They may be drilled in and cultivated, or sown broadcast and turned under or cut for hay at the proper time, or be allowed to mature and be picked for seed and other purposes, or fed down to hogs, and in any case the land seems to have been equally benefitted and more elements of fertility restored to it than could be obtained from clover or any other crop in the same time or with any fertilizer at the same cost. The mechanical action of the roots seems to have the power to make the land lively and fertile. We are often asked, will not this business of fruit growing be overdone? We answer emphatically no. There are so many thousand of these trees that have been and are being planted that will never come to a profitable bearing age, and so many who have planted trees and cared for them for a few years will become discouraged and say, "I can't afford to cultivate and prune and spray and look for borers and all these things. I have planted the trees and tended to them till they are old enough to bear, and I can't do any more." This class of fruit-growers will never glut the markets of the world with good fruit, but they will tend to keep up the nurseries and give the progressive orchardist an open market for all his products. When I was a boy and my father was planting trees in Jackson county, some people said the business would be overdone in a short time, and he would have to cut his trees down. From that time to the present the market for our orchard products has gradually grown better and larger, and now it is easier to sell a thousand barrels than it was then to sell a bushel. There is an old but quite true saying that no one is so far from market as he who has nothing to sell.

TUESDAY, June 4—2 p. m.

After the assembling of the members the President took up the first matter on the program and called for a paper by J. Kirchgraber.

Orcharding.

By J. Kirchgraber, Springfield, Mo.

The above subject assigned me for a paper has been gone over time and again, and I think our worthy Secretary selected the wrong man to write about the above mentioned subject, for I am afraid of not imparting much to benefit any one; but I can only fail in the attempt of trying to give my observations, being a rather close observer of everything pertaining to horticulture. For the past thirty years in this State and especially in the Ozark region, the home of the Big Red Apples, many things have come under my notice, particularly as regards orchards. Now, what is orcharding? Is it simply to plant trees and the thing is done? If anyone construes it in that light he will make a failure as an orchardist. For successful orcharding there are a number of very essential requisites. To begin with, a person engaged in the business must have a love for the calling—not merely for the money there is in it, although that commodity is what everybody is after in any kind of business. Now, after having decided to engage in orcharding, the first thing to consider is the location of the orchard. Most any land is good to plant trees on. True, some writers recommend a northern exposure. While correct in the main, not all lands fit for orcharding have that. My observations show tnat it makes no material difference, so long as the land is high and not wet; for wet and low lands are not fit to plant fruit-trees on. Even the rocky hillsides—hardly fit to grow any other kind of crop—will do for an orchard, but it takes more work to plant and cultivate. There are thousands of acres in this southwestern section of the State which will in the near future be converted into productive orchards. The better the land, however, the better the results. The selection of the trees is also an important consideration. I prefer two-year-old trees to any other age, and fall planting if possible, for trees planted then make a better growth the first season than when planted in the spring. The work can be done more satisfactorily. In planting don't be afraid of digging the holes too deep; spread the roots out evenly; set the tree from three to four inches deeper than it grew in the nursery row; press the soil firmly, for on this depends much of the successful orchard. Trees properly planted should not fail to grow. Now a few words on pruning young trees. Some planters don't prune their trees in setting out and leave them just as dug from the nursery. This is all wrong, for in digging the trees many roots are cut off, and in order to equalize, some

of the tops must necessarily come off also. On the proper pruning of the young tree depends largely the future welfare of the tree. Every twig or limb should be cut away, and the head of the future tree started not less than three feet apart from the ground—if a little higher the better—if a clean, straight, single-stemmed tree is wanted. Some planters claim many advantages for the low-headed trees, but it is a sad mistake. Of course I have reference to the apple and standard pear. No one in speaking of an apple tree means an apple bush. Nature, in the course of time, will correct all such treatments, but many a promising orchard is ruined. Again, I say, it is wrong to start an apple tree with a low head so often seen, for various reasons. Trees so treated are very inconvenient to cultivate and handle afterward. When the trees are in bearing then it becomes necessary to cut away large limbs, and often the tree is spoiled by so doing, leaving large wounds, and decay follows. With low-headed trees, with the branches near the ground and looking like a brush pile, and in many instances no better than such, how difficult to wrap them in the fall to kept the rabbits off, which should be done every season until the trees are large, or what a task to look after borers, and, if found, to dig them out, which should not be neglected. Look for them in June and again in September. Some planters argue low-headed trees are not so liable to blow over by high winds or get sun-scalded. I think this is a great deal imaginary. If a tree is properly planted and pruned while young it will take care of itself—high or low winds. The careful planter sees that his trees are firmed in the early stage of the orchard's life after a heavy rain-storm, should any be blown over a little. Why are such grand and noble looking trees, fruit trees with straight stems and fine spreading heads, seen in the Eastern states? The winds blow there about as much as in Missouri. A few years ago, while on a visit to Ohio, I observed an orchard planted thirty-three years past when I left that state and came West—perfect specimens and truly magnificent trees, with clean stems, fine head and beautiful fruits—none of the brush-pile looking so-called trees so often seen in the West. The owners of low-headed apple trees claim the fruit is so handily picked without the use of the ladder. So far, so good; but in a few years of bearing the finest fruit is found on the top. The lower branches sweeping the ground may have apples on, but what are they good for? Hardly fit for vinegar—small, insipid, colorless and I should say worthless. And how disagreeable to go on all fours crawling under the brush-pile to gather the fallen fruit. The proper way in orcharding is to start a tree right while young and very little pruning is required afterward, save occasionally when a limb crosses another, or to cut away the water

sprouts. The successful orchardist looks to the welfare of his trees the same as the successful stock-breeder does to his stock. He must take a personal interest in his trees. He should see that their every want is promptly supplied. A tree in full bearing should make an annual growth of from twelve to eighteen inches of new wood. If much less, the orchard needs feeding in the shape of manure, or cow peas or clover turned under. Give good cultivation and your labor will be rewarded with bountiful crops. Another very important point in orcharding is the distance apart the trees should be planted. Opinions differ greatly on this. Some orchardists claim twenty-four feet the proper distance. While this may do for some of the upright growing kinds, thirty-three feet is not too close for such as Ben Davis, Huntsman and Willow Twig. One of our most successful orchardists near Springfield would plant forty feet apart had he to plant his orchard over again. Too many of our orchards are planted too close under the mistaken idea that close planted trees protect each other better, while doubtless the harm is much greater than the benefit. Trees need air and sunshine to bring them and the fruits thereof to perfection. In close-planted orchards the soil becomes exhausted. Too much shade and no sunlight means ruin; the soil becomes moss-covered and the trees become unproftable, and in many instances worthless. In conclusion, I would again say, trees properly planted, pruned while young, thoroughly cultivated, fed and cared for, and after they come into bearing, sprayed to prevent scab and to destroy the worms, success is sure to follow, and an orchard so treated is a beauty. The owner of such can feel, and does feel proud, and makes money; but it requires work, and often hard work, too, to accomplish that. Now, in regard to the peach; low-headed trees are all right, as the peach is a short-lived tree at best and bears pruning better than most any other fruit tree. The pear for orcharding is rather a hazardous undertaking on account of the destructive blight, for which there seems to be no prevention or cure. Out of over seven hundred pear trees planted by me some twenty-nine years ago, not more than twenty-five are alive today—rather discouraging for that delicious fruit, the pear. Now, if in the foregoing few observations any discussion can be drawn out so as to benefit or instruct the would-be orchardist, I may have accomplished a little.

DISCUSSION.

Mr. Chapin—One very important point is that we want to make orchards that will be a benefit to the country instead of a detriment to it. The question is asked, "Is it possible for us to so handle our

orchards as to hold them back in the spring thereby preventing their early development?" Along this line I will say that I had a plum tree that I had piled rocks around it, or mulched it, and it did not put out its buds until after all the others were out. If we could only hold our trees back in the spring we would be sure of a crop of apples every year. I think this could be accomplished, or rather their early blooming could be arrested to a certain extent, if we would mulch with rock. We have plenty of them here.

Mr. Gilbert—A part of my orchard is mulched with rock and they bloom there just as early as anywhere else. Of course they are not piled up in piles over two feet high. It is not over all of my ground, but several acres. I tried holding back some peach trees this winter when the ground was frozen and I mulched two trees with straw, putting the straw about 2 inches deep over the snow, and these trees bloomed just as early as those not mulched. The snow laid probably for ten days, but I could not see any difference in the time of blooming or leaving, and there are no more peaches on these trees than on trees not mulched. Here in South Missouri we have a great many different kinds of climate, and our friend Kirchgraber's paper recommends that the head of the apple tree be not less than 3 ft. and from that to 4. Now this may be the best at or around Springfield, but 50 or 60 miles south of there, we think that the low-heads are the kind we want, and I beleive, from my observation in visiting orchards and gathering fruit, that the heads of apple trees should start about 6 inches high. If they were properly branched when taken from the nursery they would need very little pruning, and the per centage of trees dying from root-rot and from the effects of borers, will not be so large. In fact, I never have seen trees of bearing age that the limbs touched the ground on all sides of the trees but what were clear of borers. I have yet to find the first tree that had a borer in it or had died from root-rot. The rabbits will not injure the trunk of a tree if they can get at the limbs. They prefer the limbs. There would be no water sprouts if the pruning was done at the proper time. Now, as to the distance of planting. On rich land I think about 2 rods or 25 feet about the proper distance.

President—I think it is a mistaken idea some of the fruit-growers have that mulching a tree around the roots will keep it back. I think if you would mulch the top of it you would come nearer hitting it. If you plant a tree in an ice-house, that tree would bloom at the proper time, provided the tops were out to the sunlight.

Mr. Smith—In regard to the heading of apple orchards, it appears to me that Mr. Gilbert is a little extreme. My idea would be to start

the head about 2½ feet from the ground. We find in almost all successful orchards trees with medium low-heads. I beleive that borers will not attack trees that are headed low.

President—Now, Mr. Smith, you have given your reasons why you would head two feet from the ground. Give your reasons why you would not head nearer the ground.

Mr. Smith—It makes a better looking tree. There is no doubt but what it would produce a nicer apple, but the fruit that fell on the ground would be hard to get. Besides, the trees have to have some air.

President—Don't you think they would lay on the ground?

Kirchgraber—Mr. President, my idea is that the limbs have a tendancy to grow upward. If you cut these limbs they are hardier. I have an orchard that has been treated that way and it is pretty old.

President—Mr. Kirchgraber, have you an orchard of profitable apples? Have you any Ben Davis apples?

Mr. K.—Yes, I have some Ben Davis trees that are pretty old.

Question—How old?

Answer—15 or 16 years.

Question—Have you any 30 years old?

Answer—No, sir.

President—I do not think you will find any profitable orchards as old as that. They live so long because they are not profitable, and die because they are profitable.

Kirchgraber—I know of a Ben Davis orchard that is 24 years old.

Hazeltine—I would like to have Mr. Kirchgraber tell us all about his large Ben Davis orchard. How high does he start the head.

Kirchgraber—The heads are started about 2½ or 3 feet from the ground.

Hazeltine—I have an orchard of 30 acres of Ben Davis apples and I started the heads very low. I find that where trees are headed low the limbs hang too low, and it is almost impossible to get under them to pick up the droped apples. A man has to lie almost flat on the ground. In an older orchard belonging to my father, trees that were set too close together have died. I trim a great many of these limbs off. They produced fruit that was colorless. I thought I would rather have mine produce good fruit. I had been pruning a little higher when I first headed my trees. I find that where a tree is pruned too high, exposing the body of it, the borers are more apt to seek it out. In the early growth of the tree I recommend low-heads. After they commence to shade themselves or their root, I would trim them higher.

President—Mr. Hazeltine, let me ask you a question. If you were planting another 80 acre tract of Ben Davis apples, what would you do to the trees when you planted them?

Answer—Prune them thoroughly.

Question—What next?

Answer—I would cultivate it.

Question—How, as to forming a head?

Answer—I should allow all the branches to grow from 1½ to 2 feet from the ground. Then when the trees were 5 or 6 years old, I would cut away the lower branches.

Mr. Gilkeson—I have an orchard of 30 acres that was set 20 years ago when the craze was on for low-heads. It was headed very low, 15 or 18 to 24 inches. I cultivated the orchard and took care of it until I got 6 or 7 crops. Then the limbs began to spread out so I had no room to cultivate. I tried it 2 or 3 years without cultivating and the fruit on the cultivated ground I saw was getting better. The apples were large and merchantable. I set 30 acres more of Ben Davis in the same way.

Mr. Warren—I have 20 acres of orchard but do not cultivate it. I let the hogs run in it. The apple trees are planted 30 feet apart, and have it planted in clover. I do not think it a disadvantage to have the orchard sowed in clover. I keep from 20 to 100 head of hogs in it.

Dr. Lane—I have had something to do with orchards for the last 9 years. I knew nothing of horticulture. I have wished many times since that I had known something about it. I have an orchard of 140 acres, and have 3060 Ben Davis trees. When I began the enterprise, I was lost to know what kind to select. I was advised by some to head my trees high and by others low. I had the lower branches pruned off. The orchards of to day, I think, are headed low.

Mr. Smith—We have got to head trees low so that the bodies will be protected from the sun. I think there is less chance for borers if the body of the tree is protected from the hot sun.

Mr. Goodman—Low heads, a good center stem, branches at right angles, good cultivation and little pruning is the key to success.

Mr. Kirchgraber—This low-head business may suit Howell county, but I know an orchard west of Springfield and I do not think there is a tree there headed less than 5 feet. It belongs to a man named Powell. I have also seen limbs of the Ben Davis tree dragging on the ground.

Mr. Goodman—They never had care then.

Mr. Kirchgraber—I don't know what kind of care they had. The way some people take care of an orchard it is no wonder they only last about 15 years.

A member—Is there any such thing as cultivating an orchard too highly so as to bring an over-production? Or would high cultivation cause too much fruit and not enough wood?

Mr. Goodman—High cultivation gives tree growth and not fruit growth.

Mr. Brereton—I want to ask a question about trees in the nursery row. I think a great damage is done by planting to deep in the nursery row. I planted a grape pretty deep in the nursery row and the roots died. I suppose it depends a great deal on the soil.

Mr. Kirchgraber—I set pretty deep in the nursery row. One year I set them 4 or 5 inches. It is best to allow the roots to hunt the ground, that is the most favorable. This fall and next spring I am going to plant about 80 acres more orchard, and will subsoil.

Mr. Nelson—Is it possible to grow any fruit in this State if you have not what is called hard-pan to close to the surface? When I came here I had more money than experience. Suppose I set out an orchard and I find that I have hard-pan near the surface. Now what shall I do? I will have to dig through that to let the roots have a chance to grow. Perpaps it will cost 4 or 5 cents for every hole, and that is expensive business.

Mr. Lamm—I came in with a gentleman from Springfield and he was showing me his plan for setting out an orchard, and I wish he would give the Society the benefit of his plan. This gentleman who read the paper planted his trees 25 feet apart. The gentleman from Springfield plants his differently, and I think he could give us his plan to our advantage.

Mr. Tippin, from Springfield, was called for and responded:

I can only criticise the gentleman's paper on account of the distance he has planted his trees apart. But as our soil in Southwest Missouri may be very different from that up here, it may be that the conditions that produce the best results there are not the conditions which produce the best results here. In our part of the State, 25 feet apart is not far enough for the trees in an orchard. Our trees would lap into each other from that distance in a short time; though I do not know how it would be in North Missouri. But what Mr. Lamm wishes me to explain, is the way I planted my 60 acre orchard and have each tree 30 feet apart.

We go 52 feet apart in the rows going north and south; the next row would be 15 feet east of that. We go 15 feet in order that the

trees in the alternate row may be opposite the trees in the first row. Standing looking south, the rows, after the trees are all planted, are 15 feet apart; standing looking west, the rows are 26 feet apart; standing looking north, the rows are 30 feet apart, and standing looking east, they are 30 feet apart. The rows are really 30 feet apart each way; 30 feet across and 30 feet diagonally apart either way. Each tree is 30 feet from another tree, and you have nine trees more to the acre this way. I think the best feature of this way of planting an orchard is the distance the trees are north and south from each other. The trees have to have air and sunshine to do the greatest amount of good, and planted in this way, each tree in the orchard has the full benefit of the light and heat of the sun and the air. One tree does not disturb another and prevent it from having the full effect of the sun or air. We are trying this plan and are much pleased with it thus far, and think it the best plan we have ever seen. I will say that from my experience I don't think 25 feet apart would be satisfactory to any of you in any part of Missouri, unless the soil is very thin, as I don't think it gives the trees room to spread and get the full benefit of the sunshine and air, as they get when planted further apart.

Mr. Lamm—I would like to ask the gentleman how does that method of planting the rows leave the condition of the orchard at the ends of the rows? How far do you start from the fence with the first row?

Mr. Tippin—The first row we start 15 feet from the fence, and the next row we start 26 feet; but when it is all planted, you will see that each row is 30 feet apart which ever way you view it.

Mr. Chubbuck—I would like to say to the gentleman that our North Missouri soil is very good and rich.

Mr. Lamm—I would like to know, Mr. Tippin, if you know exactly how many more trees you can get in planting the orchard this way to the acre than you can by planting the trees 30 feet apart on the square?

Mr. Tippin—You can get nine more trees to the acre by planting this way.

Mr. Hartzell—I have seen an orchard in Andrew county, Missouri, a few miles north of Savannah, that was planted in this manner over 20 years ago, and I have much to say in praise of the plan. I have been in the orchard and it looked all right. It was perhaps 15 years old or more when I saw it. It seemed to be uniform in rank. It was in a very thrifty and flourishing condition, and was doing well. The fruit developed well, and the owner said he never would have an orchard planted in any other way.

The President—This question of distance is a very important one before we undertake to plant a commercial orchard. Those of us who have had experience have come to the canclusion that 25 feet apart is distance enough from the fact that we don't expect to let the trees get over 20 years old; and in 20 years' growth they will not be large enough to be of any material disadvantage to each other, if planted at that distance, to hinder them in their growth, or to keep the sunlight and air from them. There is no variety of apple that is profitable but that the trees are short-lived trees necessarily. For if they have been handled properly from the first, they have done their work by the time they are twenty years old; and, therefore, we have adopted the distance of 25 feet apart for our orchards, even in this good North Missouri land, and experience tells us we are right.

Mr. Murry—Mr. President, Ladies and Gentlemen: I had not thought of speaking on this subject, but is a question that is being discussed all over the State and people are not decided about the proper distance to plant the trees in an orchard. In our rich Missouri bottom land we differ. We plant the trees in our orchards 30 feet apart; and in other land they plant them 25 feet. I have an orchard ten years old that is planted 30 feet, and another one planted 25 feet, and the trees have never grown together. I did not grow them for timber. I grow them so as to have enough fruit every year and to be in bearing condition the next year. I had enough fruit from the orchard to dwarf the trees, and they have never grown together. Some other gentlemen down there planted their orchards about the same number of feet apart, and planted them about the same time. But they kept on pruning their trees, would prune off the fruit-bearing spurs at first until they got their trees in the shape of an umbrella. They got their trees to cover the ground well—that is, if they did not die. I had a man come to me and ask me why it was that their trees did not bear fruit and grow like mine did. They said: "We got them from you, and have planted them and given them good care and attention, and while our trees are larger than yours, you have a number of bushels of apples on yours and we have not got a peck. We don't see why our trees don't do as yours do." I said: "I don't know why it is," and I invited them out to look at my orchard. When they got there they said, "You have not pruned your trees like we have ours." I said, "Yes you have pruned out the fruit bearing spurs and your trees could not bear fruit, and so, of course, have grown and developed in size without bearing fruit; while I let mine bear fruit." There is a great deal depending upon the way you manage your orchard for the first ten years. I think I can get more money and expend less

work from an orchard planted 25 feet to the acre than any other way. There is another difference. I don't go much on replanting an orchard. It is a good deal of trouble, and, as a general thing, you don't look after the replants. I prefer to have the trees planted 25 feet apart at the first, with the idea of getting all the fruit you can for the first twenty years, and then you can afford to plant a new orchard at the end of twenty years. Of course, new varieties come in. I am speaking of commercial orchards, and of apples that are salable. I have nothing to say against the plan Mr. Tippin has given. It may be a very good plan. But I am in favor to planting the trees 25 feet apart, and believe that we can get the best results from that method of planting than any other; and, I believe, if I were in a hurry to get the best possible results in ten or twelve years, that I would plant the trees even closer than that. But land is not very costly in Missouri, and unless I wanted to get the benefit of the orchard at once, I would plant the trees 25 feet apart, believing that that is the best plan.

Mr. Lamm—A gentleman from St. Paul is here, who has an idea that the best way to plant an orchard is 20 feet apart and cut out every other one. I would like for the gentleman to give us his idea.

Mr. Haden from St. Paul—I am young in the orchard business and cannot say much about it. I came here to learn and not to teach. But my idea is to plant the orchard with the trees 15 or 20 feet apart at first and in a few years cut out some of the trees, as many as seemed to be for the good of the remaining trees. That is simply my idea; I have had no experience in it. I have not seen any one try it, but just thought it could be done to advantage.

Mr. Nelson—I would like to ask Mr. Haden if he would cut out a tree if it was good and flourishing.

Mr. Haden—I think I would if I thought it would enable the others to develop more rapidly and bring better results.

Mr. Tippin—What I have said I say from experience. You all have doubtless heard of the Hazeltine orchard. It is near where I live. That first orchard was planted 90 acres and they have not pruned any, and I am safe in saying that where they have one bushel of commercial apples in the orchard they have 4 or 5 bushels that are not good.

Mr. Goodman—How old is that orchard?

Mr. Tippin—It is 18 years old, and it has been that way for several years.

By the President—Was that orchard handled properly from the first? Has it been pushed for all it was worth from the start?

Mr. Tippin—No, sir; it was never crowded. But Mr. Hazeltine has a young orchard which is the premium orchard of that part of the country, which has been pushed. It has been planted 8 or 9 years, and inside of four years the whole orchard will have the limbs to touch.

The President—Suppose that orchard should bear four or five successful crops of fruit, it will not go together then, will it?

Mr. Tippin—No, sir; I suppose not.

Mr. Murray—I will tell of the experience of a gentleman, Mr. Woods, living near me, who has an orchard with the trees planted 15 feet apart. The first orchard was planted by the father of the one that has it now about 22 years ago. I had a talk with Mr. Woods about a year ago. I said to him, "what have you got to say after 20 years' experience about planting trees 15 feet apart," and I asked him if he cut them out. He said he did not cut them out. He said, "I would never do that; of course it might be worth it, but as a general thing I don't take much to that." "Regarding my pruning," he said, "I don't say I don't prune any; I do prune some, but leave the limbs very thick until they get to bearing heavily; I let them stay as they were; when they get big and could bear I prune them; I frequently sell my fruit without culling at all for 40 and 50 cents a bushel; I sold one crop for 45 cents a bushel, picking a little, but taking every apple, when my neighbors sold theirs for 25 and 35 cents a bushel."

Mr. Nelson—In regard to this tree planting, I have been in Missouri for ten years and commenced planting nine years ago. In that time I have planted 210 acres. I took as my guide a gentleman living near me, Col. M. W. Johnson, whose orchard was planted 20 or 25 years ago. It was planted on Mr. Tippin's plan, only his first line was 24 feet. He went from east to west and north to south 22 feet, so when his trees were all planted he had some 80 or 82 trees appearing to grow all 24 feet apart. He has continued planting nearly every year since I was there, and now has 160 acres planted on that plan. His old orchard was planted in as good ground as any in Missouri. But there are certain varieties of trees whose limbs interlap today. In all my planting I have planted the trees 24 feet apart, and am ready to agree with Mr. Murray and Mr. Evans that we can afford to put about 80 trees to the acre and have them bear for 20 years, and then let them go and plant a new orchard. I don't believe in replanting in Missouri. If I was planting an orchard and expecting the trees to stand and bear for 50 or 60 years it might be well to plant them that way, but I don't think it best to do it, but to plant them so they can get the best results in say about 15 or 20 years, and then plant new orchards.

Q. Would not there be a little advantage in fertilizing in having the trees planted 20 or 25 feet apart over 30 feet apart?

A. You could not fertilize without mixing the fruit. That is the way I do. I mix the rows with Ben Davis and other kinds. I think that is the best way to plant an orchard. My last 120 acres I planted in that way.

I would like to throw out a few suggestions—a few points for the consideration of this Society. The first is regarding the direction in which you are going to plant the trees in your orchards. I think there should be exceptions to the rule of having the rows run north and south, east and west. That would depend on the topography of the ground. I think the direction of the rows should depend on the lay of the land. In this kind of country you will not have furrows going up and down the rows. I find the difficulty in the washing of the gulleys; I think I would change the direction of the rows and make the tillage according to the lay of the land. This system of laying off orchards in hexagonal and octagonal shapes will give you the opportunity of cultivating the trees in four different directions, and you can guard against washing. One of the gentlemen here has presented a plan of his orchard to this Society. I will have another plan to show you. I have planted many orchards, and each time the people would say to me, "What is the use of your planting an orchard, for you will never live to get the fruit." But I have planted them nevertheless. If I had my way, I would do it again. On the kind of land we have here, I would make the rows according to the lay of the land according to the gulleys and washing. In this way they get the best exposure and have a better chance of growth, I think, than any other.

Then in regard to planting trees and getting them to pay: I tried once planting an orchard in apples, pears and cherries. I planted it with the view of utilizing all the ground to the greatest advantage. I planted it, and cultivated it and took a great deal of interest in it, as I have in all the orchards I have planted. My experience is that when you have planted and cultivated an orchard, attended to it with your own hands that you have a tender regard for that orchard and each tree is dear to you—you feel almost as if it were your child. After you have given your time, labor and energy for the trees, have watched their growth and development, and have sacrificed for them, to give away one of them or to cut it down is like sacrificing one of your children. And my experience would lead me to believe that if the trees were planted too close together to permit of them remaining after they have attained their growth, it would be very hard for a man who had planted and tended both to decide which one to sacrifice, and that he

would likely hesitate about cutting either down until both would be ruined. So, in view of these facts, I would not advise that the orchards be too closely planted so that the trees could not remain as planted after they were grown.

Mr. Goodman—I am sure that that is the very reason the trees should be so planted. I have planted them that way, and it is not hard for me to thin them out, and cut one out here and there as wisdom would dictate, in view of the fact that I planted the orchard for commercial purposes and it would bring me in more money to plant them thick at first, and afterward cut out where they were crowded. I have planted orchards with the trees 16 feet apart, or less, and have got enough money out of the orchard to pay for the orchard, the land and all, and then would chop them down after they had served their purpose. One time I had persons come to me and state that if I did not stop chopping good trees down they would have me arrested. But it was not any of their business how I managed my orchard, and I thought I had a right to plant and manage my orchard in the way that would bring me the most money, as that was what I was after. And I was making money out of planting it that way and continued it. The best way to manage a commercial orchard is to have the trees planted close together when they are young. In my opinion that is better than giving them enough room to grow in and have them widely separated when young, and let them grow until they get 8 or 10 years old, or 7 years old. If you can get them to bear at five years you can get two or three or more good crops by that time. I consider that if I can get a few bushels of apples from a tree that it pays for itself and the orchard. I always plant my orchards in squares both ways. That is the best plan for me. I can angle the other two ways. I like this plan better than any other, for I can give up the land better that way. The great trouble is growing fruit trees too long in an orchard. If you have planted your trees 15 or 16 feet apart, you will give up that ground to the orchard much sooner. That is the best way—not to keep the same land for the orchard too long at a time. That is the trouble and cause of the failure of many orchards all through the west, for the reason that they let the orchards grow too long and get such bad shape. It is best to take the virgin soil and raise just as few crops off it as possible, but let the trees have the whole benefit of the land. If I could afford it I would plant an orchard and never grow but one crop on it, and that would be apples year after year. As long as that orchard stands you will have fruit from it. In 20, years if that orchard fails to bear, it is no trouble to plant it again. Fruit trees are

very inexpensive. You can get them for $35 a thousand. You can plant them, let them grow five years and bear, and get eight or ten bushels of apples from each, and you are through with them. In planting a commercial orchard, I think the idea is to get your money out of it as soon as possible, and then you are through with it. The same is true of a stock man. Or, I will say, the same rule could be applied to orchards and to stock—let them mature as soon as they can and then sell them. I would have the young trees produce what they are capable of at once, and then let them go.

Mr. Tippin—Pardon me for speaking again, but the scripture says, "Out of the mouth of two or three witnesses" a thing shall be established. It seems to me that the sentiment of this Society is against me in my method of planting orchards. But even then I find that things are working in my interest. I am a seller of trees. And if the gentlemen plant their orchards 12 or 15 feet apart, it will take more trees to fill their orchards, and I will have a chance of making more sales; and also, if they plant them and cut them down in a few years, they will have to have other trees to plant again. So, I say, although the sentiment seems to be against me, I have some compensation.

Mr. Marion (to Mr. Goodman)—Don't you think that to plant the trees 12½ feet apart would produce the best results, and still be far enough apart to do away with the necessity of pruning the trees and cutting them out?

Mr. Goodman—No, sir. I think that is too close together, unless they are cut out as they grow larger.

Mr. Lamm—I had an orchard planted that way, and it produced good fruit. But it is dead now. It did not grow but five or six years.

Mr. President—On the question of fertilization, we have an orchard of Ben Davis apples, which is seven years old, and last year had borne two good crops of apples. They have fertilized themselves without being mixed with others. I will tell you a circumstance connected with it. I went down to this orchard one time after there had been a big rain. It was during the season when peach trees were in full bloom. I went down there and found the people to be filled with wonder and very superstitious about the orchard. I said, "What is the matter?" And they said it had been raining sulphur; the air was filled with sulphur. They were very much wrought up about it. I laughed at them and told them that it was only the pollen from the peach trees. The air was filled with the pollen for miles. I don't think it a good plan for apples to be mixed with other fruit.

Mr. Lamm—How about Wild Goose plums?

Mr. Goodman—There seem to be some varieties of Wild Goose plum that don't fertilize themselves; and there are other kinds which do fertilize themselves.

Mr. President—I want to make an impression in regard to my remark about a man cultivating his orchard until it is large enough to bear and then letting it alone. I want that fact well understood. He must not, if he wishes to make a success of his orchard, bring it up to bearing age and then quit taking care of it. But he must keep on cultivating it as long as he expects to make anything out of it. There are too many persons who are trying to raise an orchard who treat it that way. But that is a great mistake.

Mr. Tippin—On this point I think perhaps another point will be well to advance. I believe we have as great an evil in the practice of cultivating the orchards for a number of years and then not cultivating them for a long time, and then turning in and cultivating them too much. Mr. Haseltine has used a plan referred to by Mr. Lamm. In 1880 he planted an orchard and did not cultivate it except by mulching for five years after he planted it. It was in grass. When the trees got big enough he had crops. I think he got $1500, or 3000 bushels two years ago. The next year he had a fine crop, and last year only half a crop. Last year he gave it fine tillage, repeating it week after week, and the result is he has produced an overgrowth of foliage and has no fruit at all. I agree with you, Mr. President, in regard to keeping up the cultivation. I believe it should be commenced with the beginning of the orchard and kept up as long as the orchard is continued. It is like feeding a child and expecting it to become a man—you must begin feeding it at first and keep it up.

Mr. Murray—I thank the gentlemen for their compliments to my paper. I am willing to concede a little to the other side. I will say I was describing an orchard of different formation from his. It is on bluffs and hills. I will say for the orchard I was describing that it is the orchard I have on my home place in North Missouri, and it is at the end of 20 years from the time it was planted. It averaged $40 net per acre per year. I cultivated it and the more the trees grew the more I cultivated it; I mulched it and gave it barn-yard manure, wood ashes, which latter I hauled for several miles distant. The people all laughed at me and said I was foolish. Finally I came to the same conclusion that my friends did. The trees were so thrifty and doing so well I thought I would quit cultivating them. They did still do well, and the first year after that they bore a good crop; came near bearing themselves to death. I went to cultivating them and got a fine crop for two years, amounting to $200 per acre. Those trees at five years

old had apples everywhere from a peck to five bushels. I measured the apples from the best tree and it was exactly five bushels. I never had a failure on the orchard for 15 years; I had light crops and heavy crops, but never a failure. I am not boasting of my orchard. There are others I know of that are as successful. I know one 12 miles from St. Joseph where a man planted 80 trees per acre on six acres. They are mostly Ben Davis. After he had had it planted 18 years he told me he had received a little over $1200 for the sales. I know we have an old fashioned orchard, apples that are old fashioned, that never paid for the ground they grew on and never will. I have two Baldwin's 20 years old. One never has borne a bushel of apples, and the other, perhaps, has borne two barrels all told.

We have the last year been going through the school of experience, we have had all kinds of discouragements and backsets, and failures; but men in North Missouri who have followed along with the tide and kept up with the leading varieties to plant and have planted those choice kinds on their farms on the bluffs and hills, especially near streams where it was well drained, where they have planted good varieties, there has never been a complete failure for ten years—or twenty years, I will say—though the crops have varied considerably from time to time. So now when we are having such peculiar weather, and have failures once or twice, we must be willing to bear it without complaint. These are times of adversity, but they will not last always. We must buoy up and bear it for the present. It will come around all right in the end. I agree with the President in his idea of the necessity for the continuous and persistent care of the trees from the time they are planted, clear up to the time they are given up. I think that is the only way to have them produce the best results. I don't consider that I gave my crops the opportunity he did, but I got good crops. I hoed around them, and raked them and cultivated them. It will pay a man to spend something on his orchard, even if it costs a good deal, to obtain the best results. But with the right kind of treatment we can successfully cultivate an orchard at very little expense. There are many other things that I might say, but I don't want to take up the time of others. I will say in regard to pruning that I would rather have no pruning at all than too much. A little is good, and very necessary; but too much is very injurious.

Mr. Hartzell—I will ask Mr. Lamm if he plowed the ground first before planting his orchard. I am in favor of plowing the ground before planting the trees, as well as of cultivating it after they are planted. If we would have a successful growth of an orchard, whether we cut them down or let them grow old, we must be careful in regard to the

preparation of the ground before the trees are planted, and also must pay attention to the ground and the tree both after it is planted. I want to know of Mr. Lamm whether he plowed the ground first or simply planted them out on the prairie. I know one person who planted an orchard out on the prairie and forgot to plow the ground first. The result was he had no orchard. The trees lived a little while and then died. I do not know where his place is, but whether it is on the hills or in the valleys, I would say that the ground ought to be plowed first. It ought to be plowed a foot and a half, if not two feet, deep.

Mr. Goodman—I will offer a word on this subject. We can tell as dark stories as anybody. I can tell of as much failure as Mr. Lamm has. I have made rank failures and been disappointed and discouraged. But we are aiming to tell what could be done in this State. That was our idea in bringing out the discussion of the subject—to speak of the possibilities of our State. But if we want to discuss our failures, it is a good time to do it now. The gentlemen who have spoken are not alone in their failures. One year I planted 2800 trees, and the grasshoppers came and ate them all up. The next year I planted 2800 again, and there was a drought and they all died. But that did not make my orchard a failure. For all that I did not feel that I had entirely failed. I think if we do the best we can in any department we ought to be satisfied to leave the results in other hands. I know of an orchard planted in prairie land in Jackson county, Mo., which is the same age as the orchard Mr. Lamm has been telling about. The man who owns it has not had any apples. But if he has done the best he could, he cannot help the back-set, and must accept it and hope for better things in the future. In Michigan, when I was buying, I passed through the same experience. We thought that was a good fruit country. But a friend and neighbor had an orchard for ten years, and never had an apple. He got disgusted and sold out, and the next year the man who bought the orchard made more money than he paid for the whole farm.

Mr. Lamm—I will state further my position on this question. I am in the position in which I have spent a good deal of money on my orchard. I took the best land I had for my orchard and spent a good deal of time, energy and money in trying to make my orchard a success. The land I took for my orchard I could have raised a good crop of wheat or corn on every year since, I believe, if I had planted it in corn or wheat. I said if I had waited for that orchard for my living I would have made a miserable failure.

Mr. Blake—I think very valuable lessons are to be got out of this discussion. The successful horticulturist is not what troubles us, it is the failure. I was in hopes that Mr. Gilbert would be here. He has no hesitancy in telling of failure. The trouble with horticulturists is that they don't tell of failures. Their successes do not help us a bit. It is their failures and how they overcame them that helps us. If they would give us real benefit they should tell of their mistakes and failures. For one thing, I will say that I think Mr. Lamm made a mistake in taking one of his best cultivated fields for his orchard. He said he did that. Now, I believe, as a rule, that the best land for orchards is not the richest land. It is poor land where orchards, as a rule, flourish most.

Mr. Robnett—I would like to go back a little bit if you will allow me. I would say that while Mr Lamm has seemed to make a failure of his orchard so far as making money is concerned, I, who have been over the road only about half so long, would like to give a little of my experience. I have spent six years on the road to making an orchard, and have spent $40 an acre for it. But I have been offered enough money to pay me $60 an acre profit on my orchard. If he wants to sell his orchard—

Mr. Lamm—I don't want to sell it. I don't have to depend on my orchard. If a person had set his whole farm in orchard, he would have the blues the way things look now. But we all have other things we can rely on when our orchards fail to come up to our expectations. Mr. Murray has his nursery. I have my Jersey cows. So we all have something else and don't have to starve, even if our fruit crop is a failure.

Mr. Murray—I enjoyed Mr. Lamm's remarks. He brought out some good points. I would not advise a man, unless he is very rich, to wait on his orchard for his support. I don't wait on anything. I go ahead with my business and give it proper care. Don't think of the idea of waiting six or seven years. If we look at it right, the time will pass by very soon. In regard to the value of our orchard, we should look at it as an investment. An orchard, even before it has borne any fruit, is valuable. We must not be discouraged. It is really but money put in the bank at interest, compound interest, and leaving it there to our credit to be drawn out in a few years. I have had the same experience Mr. Goodman spoke of. I have had failure, too. In 1875, if my property had been put up and sold, I would not have had anything. In speaking of the dark side, I will say I came to Missouri a few years ago with a few hundred dollars, a wife and two children, and bought 80 acres of land. It was not the best land, but it was not

such poor land, though it was not the best farm land. But I thought it was the best kind of land for a fruit farm. Some people laughed at me, and said I would starve if I depended on it for a living. The land would not bring much corn. But I found it had not been plowed. I got it and plowed it and planted my orchard. I planted it in small fruit. Out of the first crop I sold fruit to one of the men who had predicted that I would starve out. He left the country and I am there. I own the same place. I raised small fruit. When the grasshoppers came I borrowed money at 15 per cent, and in the 24 years I have lived here, I have paid out $5000 interest.

I will say that the fruit business, in my experience, has proved it can beat 10 or 15 per cent interest, for when I was in debt the heaviest I paid that amount of interest. I sold, one year, $200 worth of Wild Goose plums, $200 worth of berries, $1800 worth of peaches, and $800 worth of apples. I also sold $200 worth of hogs that was grown on the waste clover and fruit. It may seem real egotistical for me to tell this; but I understood that we were relating our experiences, and I am just telling mine. I take it that if a man starts out with little or nothing, raises a family, feeds them, gives them a show in the schools, pays his honest debts, and comes out out of debt, it proves it beats 10 or 15 per cent interest, for if it did not, and he was paying that interest, he would have gone under. I said awhile ago that money from an orchard was made by having varieties that would ship well, and sell well, and grow well. I was talking to a gentleman in our part of the country about rich land for orchards. He said he never would plant an orchard in that kind of land—not a commercial orchard, any way—in rich prairie land. He said that kind of land is not fit for an orchard. I said I helped this same man put out a family orchard of 100 trees, and we took pains that we should have it planted in the richest spot of his prairie land, and at the end of eleven years he had never had three bushels of apples from any tree. I planted an orchard on different kind of land the next year, and got a lot of apples, and many of them are as large again as those on the rich land. You should take your best and richest land for something else. It is likely it is too rich to raise a good orchard. I believe when an orchard once gets to bearing it is hard to get it too rich, but up to the time the orchard has attained its growth I think rich land is too rich for it. So I would not advise a man to take his best and richest land and plant it in an orchard. If he has a part of his farm that is bluff and worn, I think that is a good place for his orchard.

Mr. ————I know there are some people who raise orchards in our country who are opposed to the honey bee. In fact, I have read

of those who when growing a crop set dead-falls to catch the honey bees when the fruit was ripe, thinking the bees were robbing them of their crops. The bee is no robber; he is one of our best friends. If you ever expect to make a success at growing fruit, you must depend on the honey bee to do the fertilizing. You gentlemen have been talking of certain varieties of apples that fertilized themselves. One gentleman spoke of the time when the whole earth was covered with pollen from the fruit trees. Well, that happens some years, but still they are compelled to contract this marriage; this necessary ceremony has to be performed, and God in his wisdom has brought in the little honey bee to perform this ceremony, this necessary office. If you rule the little honey bee out of your orchard you may as well expect failure. The little experience I have had in the culture of the honey bee has taught me that they generally pay for themselves.

But I am not to speak on that subject. You gentlemen of this Society, and all others engaged in similar business, should be the warmest friends of the little honey bee. I want you to be, and will urge the subject. If you will place a few hives of bees in your orchard right where they can get at the flowers when rainy weather comes and the pollen is washed to the ground instead of being carried away. If you have honey bees there you will have a place there on the trees near the hives. I know this from experience. Close to my apiary is situated an orchard. Last year that orchard was a failure, and the next year it had a good crop of apples. If the apiary had been closer to the orchard, I have reason to believe that the crop would have been even larger. The truth of this is demonstrated in the cherry crops of California. It excited the country at one time, and almost everybody went into the business. But that was at a time when bee culture had not been as largely indulged in as it is today. They had failure after failure until some gentleman came along and told them, "You need the little honey bee to perform the right or ceremony," and the bees were introduced in the orchards, and now in the valleys of California can be found the hives sitting as high as two or three yards back all around the orchard for that purpose. We will get the little honey bee, and as long as the price of honey is so low, that is the use we will put it to. If Mr. Lamm will put some honey bees out in his orchard he can see what they will do toward assisting him to have a successful orchard—in other words, he will have apples.

I do not say that the honey bee is not a very important element in fertilizing fruit trees, but I hardly think they will avoid failure in years of excessive storms. The very fact of the storms that wash the pollen away will keep the bees in their hives. It is in good weather that the

bees will work and do their work as fertilizing. But in stormy weather the bees will, I think, be prevented from doing that work. So I don't exactly see how they will bring about the crops themselves.

I believe that an over-ruling Power and Commander knows more about this matter than any of us. The little stalk of honey that was placed in the blossom was, as was stated last night, placed there as a reward for the labor performed. Now, because one orchard on one side of a lane had no fruit, and the orchard on the other side had, is not enough, in my opinion, to do away with the bee theory. I would take it that the reason for one orchard bearing fruit and the other bearing none, was on account of the different conditions of the trees; the one not being in a natural condition, and therefore the bees did not visit that orchard and it was not fertilized by them. It is also true that some years we have large crops and some years none at all, or comparatively none. Some years we have no blooms. But we all know that there are 10 blossoms, yes, 100 blossoms more than is necessary, that is, that 99 out of 100 blossoms are not necessary to the production of a good crop of fruit. Nature always makes abundant preparation. If you examine the honey bee and know how many blossoms one honey bee could fertilize in one day's time you would not wonder. In a few hour's time, if the honey bees are distributed over an orchard 100 yards apart, in one evening's time these bees can fertilize all the trees in the orchard, and they will necessarily have to leave off in order to keep the trees from getting too full. This has been thoroughly tested by bee men and has been found to be a fact. We know investigations have gone this far. I have asked why it was that white clover in this country is indiginous and grows all along the country. It is because the bees can reach down into the blossom and extract the sweet. With red clover this is not the case. It has to depend on the bumble bee to extract the honey from it. Why is it that the first crop of red clover has no seed and the white does? I will say again that if you wish to have success as a horticulturist you had better induce some apiarist to put up an apiary close to your orchard.

Mr. Hartzell—The honey bee is not on my place. One of the gentlemen who have spoken on this question said that one orchard had had no fruit and another near by it had fruit; and he also said that there were not enough honey bees in the county to fertilize a forty-acre orchard. I will not say about that, only that it is a fact that the honey bee will go fifteen miles when there is no flower near at hand from which it can extract honey, and that it will work on the nearest flower. The honey bee is an economist. It works to a purpose and aims to accomplish all it can with the expenditure of as little useless labor as

possible. But the honey bee is often prevented in adverse weather from working to advantage. When I say that the honey bee travels fifteen miles to find flowers, from which to get honey, I am not speaking at random. I might be called on to explain my assertion. I know whereof I speak. I will also say that in large numbers they cross sheets of water fifteen miles across. The apiary to which I refer was situated on one shore of a stream fifteen miles wide, and the flowers were on the other shore, fifteen miles away. They were always like a swarm on that body of water. The honey bees are industrious. They will work on your neighbor's field if you have not enough blooms to keep them engaged. So we must think that the honey bee, although he may live on one man's farm, he will work on the farm of another man if he cannot find enough to occupy him at home. Everything in nature shows that there is a God in nature who rules over all and gives to us. He has given us many an insect which is a benefactor which we think is our enemy. I cannot agree with the gentleman who says he does not think that the honey bee has anything to do with the fertilization of fruit trees. I think they are very important factors in that work.

TUESDAY, June 4—8 p. m.

The house was filled to overflowing and the best of attention was paid to the program. Good music was interspersed through the evening exercises and helped to give variety to the program. The papers were good, the discussions sharp, and the meeting a very successful one.

Lawn Making and Decoration.

If my paper on "Lawns" shall be the means of prompting one admirer of the beautiful and good to greater effort to make home more attractive, I shall consider myself well paid for my effort. If I can arouse a similar sentiment in the breasts of a greater number, I shall be better rewarded.

No better proof of advanced civilization, no greater evidence of progress in fine arts can be produced than such careful attention to our home approaches as will make them most attractive. No better investment in a pecuniary sense can be made than a reasonable outlay of time and money in making the exteriors of our homes as attractive

as the interiors. Tastes vary, sentim nts differ as to styles of lawns and their decoration, yet all may be in accordance with such harmonious design as to present a pleasing effect. It may not be just to judge a man's character for industry by the condition of his premises, but we may determine the degree of his appreciation of refinement and his estimate of the value of substantial improvement by the condition of his lawn.

The old adage that "time is money," is not altogether true. Time is more than money, for money can never buy it. The estimate we place on a work that requires time to accomplish it, is in accordance with the amount of time required in its construction. Lawns must grow, trees must be brought to beauty of form by such a system of training and such attention to their requirments as their individual condition demand.

A proper construction of a successful lawn depends upon the beginning of the work. The nature of the material composing the soil, the depth of the soil, its conviences for drainage are the materials on which depend the success of the enterprise. Having found or arranged these requisits, plow or spade deeply and level the surface. Roll the soil firmly and sow evenly with the seed of such grass as is desired. "Fra compressa" or blue-grass is recognized as most dense and persistent when established, and most admired for its color and tenacity. After sowing the seed again roll or press the earth firmly on the surface without harrowing, leaving the surface firm and smooth. I am particular in describing this preparatory part of the work, because I am convinced that many err in leaving the soil so loose as to cause the seed to germinate and perish before sending its roots into the earth.

If a light covering of leaf mold from the woods be added, and an occasional watering be given, the preparatory work may be considered done. The proper time for sowing the seed of most hardy grasses is as early in the spring as it is possible to prepare the soil.

Plans for laying off grounds may be used as suggestive, but it must be remembered that the chief design of every lawn should be comfort and convenience to the occupants of the premises, with such arrangement of its decorations as the owner's tastes may direct. As far as possible work with nature. Plant specimen trees designed for effect, with a view to the proper growth and development of their forms. Plant hedges and border with such low-growing trees or plants as will submit to pruning and density of growth. American Arbor Vitae may be used, where a permanent screen or shelter is desired. Pyrus Japonica or Japan Quince makes a hardy, dense ornamental hedge, producing pretty rose or white-colored flowers in spring, bright,

glossy foliage throughout the summer and golden-colored fruit in the autumn. Plant circular or semi-circular flower beds in portions of the lawn where they may be seen from the walks or roadways. These flower-beds should be composed of such ever-blooming plants as verbenas, phloxes, pansies and brightly colored geraniums. Do not mix roses and annuals in the same bed. I believe we may plant tea roses successfully in many locations in the latitude of Missouri. In such situations as open borders between rows of trees my tea roses have lived the past few winters and flourished, with no protection or covering except the falling leaves of evergreens and maples. Although frozen back within a few inches of the surface, these plants, left with nature's covering, have been better prepared for early blooming, more thrifty in growth and better prepared for the season's work than any potted plants I have tried.

I would not discard such grand old roses as hybrid perpetual Paul Neyron, with its immense rose-colored flowers and iron-clad vigor; the wonderful General Jacqueminot, with its beautiful crimson velvet color so difficult to describe but easy to remember; Lady Emily Peel, bright pink in bud, pure white in bloom. These and a long list of hardy, perpetual blooming sorts, we may have in beauty of bloom and brightness of foliage through the greater part of the summer, and especially in the fall, and never apparently affected by old age.

Plant a few shade trees on the south, east, and west sides of the house. Select young trees with straight trunks and trim the bodies as they grow from year to year, until you have obtained a sufficient height to enable you to have unobstructed view below all branches. These few trees near the dwelling add comfort by cooling the atmosphere in the summer and preventing the passage of high winds and dust.

If the lawn is large enough, plant a few shade-trees of rapid growth, without regard to lines, in different portions of the ground. Trim by successive pruning to a reasonable height in body. Lawn grass flourishes best in partial shade. A better average of moisture is maintained among trees than in open space. A pretty effect is sometimes obtained by massing a few low-growing varieties of evergreens in clusters of three or four.

At the porch or veranda plant one vine of Ampelops Quinique folia or hardy ivy. This will completely shade any ordinary-sized porch in a few years, and remain a permanent summer shade for many years. These thoughts and plans are all suggestive only, on which you can improve.

We are told that there is nothing new under the sun. Yet every day and on every hand we see such wonderful reconstruction of the old material as to give the effect of refreshing novelty. There is, however, nothing really new in all this, for the nearer we approach perfection in plans for attractiveness in home surroundings, so much closer have we copied nature. There are those here this evening who have been familiar with the natural lawns of the great Western prairies. These I call to witness whether in great Eastern cities, or in any town or country, where wealth and skill have done their best, they have ever beheld anything to compare with the virgin lawns of the wild new West in their primitive beauty. Perfect in color of green the early spring covering grew as evenly as smoothest lawn mowing. As the summer's sun grew brighter, beds of gaily colored flowers appeared of such rare beauty of form and color and fragrance, and such harmony of arrangement as to convince us that nature's models are superior to man's most perfect copies. Along the borders of these natural lawns, grew deep, ornamental lines of native trees; their borders attractive in earliest spring with the bloom of the Judas or redbud-tree; contrasting in fine effect with the blossoms of many varieties of the wild plum, relieved by interspersed patches of the early horse chestnut. Deer, buffalo and elk were occupants of these native lawns. The Indian hunter was the owner by right of occupation of all this primal beauty. But utility and progress and ever-growing necessity have destroyed but not effaced from memory all this primitive beauty. Nature's works are our models. Beautiful impressions leave permanent influences for good, which others may copy and improve upon until every one who adds attractions to his home shall be considered a public benefactor.

C. I. ROBARDS, Butler.

After the rendering of a fine piano solo, the President called for Prof. Whitten, who read the following:

Influence of Pollen upon Size, Form, Color and Flavor of Fruits.

Before considering the subject of pollination it is necessary to get clearly in mind the relation and arrangement of the different parts of the flower. The ordinary complete flower is composed of calyx, corolla, stamens and pistils, in the order named. The apple flower is a good

representative. The calyx is the green, outer cup. It is the cover of the unopened bud, and expands as the flower opens into five parts, or sepals. Just within the calyx is the corolla, consisting of five pink petals. This is the most conspicuous and ornamental part of the flower. Just within this corolla are the essential or reproductive organs. They consist of about 20 stamens and a five-parted pistil. The stamens are slender filaments, surmounted each by a little sack containing the pollen. These are the male organs. The pistil is the central, female organ of the flower. It consists of a five-celled ovary, bearing the undeveloped seeds, and five threadlike styles, arising from it, and terminating each in a fleshy surface, called the stigma. Some plants do not produce both stamens and pistils in the same flower. In the Indian corn the pistils are the silk at the ear, while the stamens are born in the tassels at the top of the plant. Our pine trees bear two classes of little cones, or flowers in spring. One kind bears the stamen, and is shed off after the pollen has been produced. The other bears the pistils, and, after being acted upon by the pollen of the male cones, develops into the large cone from which we secure the seed. Other plants like the box elder, soft maple, persimon and cottonwood bear the different sexes upon seperate individuals. This is also the case with many varieties of strawberries. The ornamental corolla is wanting in many flowers, so also may be the calyx. Each species, however, must always produce stamens and pistils either in the same or in different flowers. These, being the reproductive organs of the plant, are as essential to the production of fruit and seeds as are the two sexes essential to reproduction in the animal kingdom.

The existence of sex, in plants, has long been known. Vague hints of it occur even in the writings of Greek and Roman authors. It was not until about two hundred years ago, however, that its existence became clearly defined. Even then, this view was much disputed, and it was not until the collection of proofs of the sexuality of plants, given by Linnæus, in 1735, that the question became a settled one.

When it first became known that pollination in plants was a necessity for the production of seed, very vague ideas prevailed as to how the pollen was carried from the stamens to the pistils. This, at first, excited little more thought than the mere idea that the pollen simply fell on the pistils. When it was considered that in some cases the stamens and pistils are borne on separate plants, a new question arose as to how the pollen was transferred over such great distances. It was found that pistillate plants, growing at a distance from any stamen-bearing plants of the same kind, frequently produced seed. The agency

by which the pollen was transferred in such cases was at first ascribed to the wind. A little later it was suggested that since some flowers contain honey, and are visited by bees, the insects might be of some use in pollination. It was not thought, however, that they affected cross-pollination, the idea being that they simply shook the pollen from the stamens to the pistil, in an individual flower.

The very important part which insects take in the cross-pollination of plants was not much known until about one hundred years ago. At this time Sprengel was led to begin a great number of observations, which showed not only that insects carry pollen from flower to flower, but that the bright colors, scents and singular forms of flowers serve the useful purpose of guiding insects to their secreted honey.

His keen observation are of exceeding interest. He noticed the tiny hair beneath which honey lies hid in a little wild geranium, and found that while these hairs in no way hinder bees from taking the honey, they effectually turned away the rain drops from the nectaries. From this he reached the conclusion that the honey was secreted for the bees, and that the rain was kept out that they might have the nectar pure and unspoiled. Noting the little yellow ring in the throat of the forget-me-not, he conceived the idea that this might guide the insects on their way to the honey. Upon further investigation he found that the colored dots, lines and other figures surrounding or pointing toward the honey actually do serve as honey guides, or path-finders, for the insects. Thus perceiving that the insect is guided to the nectar once it has settled on the flower, he went still farther and reached the wise conclusion that the bright-colored corolla itself is to guide the insect from a distance to the flower. Thus it is that the beauty of our peach, plum and apple blossoms serves not only to gladden the eye, but also to attract these insect pollen-bearers.

Up to this time it was supposed that honey was secreted by flowers simply to furnish a food for insects, and no one even supposed that the insect returned an equivalent service to the flower. Sprengel, however, observed that certain varieties of iris are incapable of being pollinated and producing seed if insects are excluded from them. This led to his further discovery that a great many flowers depend wholly upon insects for transferring the pollen.

In all of Sprengel's work it is perhaps remarkable that he failed to learn the most important lesson which his years of patient study and observation might have taught. While he was well aware of the fact that insects frequently carry pollen from flower to flower, he failed to learn that cross-pollination is the most important result of insect visits. This great truth remained to be first hinted at by Andrew

Knight. After experimenting in self-fertilization and cross-fertilization in the pea and other plants, Knight, in 1799, laid down the law that in no plant does self-fertilization continue for an unlimited number of generations. This theory attracted very little attention until nearly fifty years ago when Darwin came forward with his exhaustive experiments and studies, from which he interpreted the natural law that "no organic being fertilizes itself for a perpetuity of generations, but a cross with another individual is occasionally—perhaps at very long intervals—indispensable." Darwin showed that in all the higher forms of animals the sexes are separate, in order that two different sources of blood, or relationship, may be combined in the off-spring. He also showed what we now so generally admit, that in-breeding diminishes strength and productiveness, while a cross with a different strain increases both.

In his extensive work "Cross and Self-fertilization in the Vegetable Kingdom," Darwin conclusively proves the value of cross-fertilization in plants. Giving years of patient, untiring labor to the work, he carried on a series of experiments in both self and cross-fertilization in morning glories, petunias and other plants for a number of generations. He found that where continued self-fertilization was practiced, the plants diminished in size, vigor and productiveness with each generation, and that a single cross of these seedlings with another strain greatly improved them. He also cross-fertilized a great many flowers, saving the seed and again crossing the seedlings grown from them. These experiments were carried through many generations with different kinds of plants. He found that cross-fertilized flowers produced much larger, heavier and more vigorous seeds, and that the seedlings grown from them were correspondingly stronger and more fruitful. The most important conclusion resulting from Darwin's extensive studies along the line, during which he carefully compared his own observations with those of other investigators, is expressed in one of his own sentences—"Nature thus tells us in the most emphatic manner that she abhors perpetual self-fertilization."

Experiments are ample to prove to us that cross-fertilization between plants of the same species is beneficial. Through laws of adaptation and selection the stronger, cross-fertilized plants would naturally enough crowd out and supplant the weaker self-fertilized ones. It is not surprising, then, to find that most of our flowering plants are actually constructed to bring about this result. Nature having so modified their flowers as to render self-fertilization the exception rather than the rule. In many flowers the pollen and the pistils are not ready for fertilization at the same time, hence such flowers are dependent upon

pollen from an earlier or a later flower. Frequently the pistil is longer than the stamens and reaches above them out of reach of their pollen. In other cases the stamens and pistils are borne on separate plants as is the case in some of our cultivated strawberries. In such cases cross-fertilization must always be the result. Sometimes the pollen of a certain plant is entirely impotent upon the pistils of that plant. Many of our wild plums are of this class. Frequent instances are cited where plum trees producing an abundance of pollen failed to set fruit until a tree of another variety was set among them, when they produced abundantly through the perfect potency of the new supply of pollen.

Certain plants are dependent upon one or more species of insects for the fertilization of its flowers. Our native yuccas being dependent upon a single species of moth to perform this function, is a most remarkable example. A complete account of the life history of this insect and its remarkable habits in securing the fertilization of the yuccas, may be found in the reports of the Missouri Botanical Garden.

For a long time it has been well known that the fig is dependent upon a certain fly for its perfect fertilization, and that when the pollen is carried from flower to flower by the insect, the fruit is much larger and of more delicious flavor than when the flowers are fertilized through any other agency.

Cultivators of strawberries express a preference for certain varieties of pollinators of the various pistillate sorts. This preference is founded upon the fact that the pollen of some staminate varieties is prepotent as compared with that of certain other varieties which flower at the same time. It is a commonly noted fact that most pistillate varieties produce finer fruit than the staminate sorts. One reason given for this is that the pistillate sorts must always be cross-fertilized.

Since cross-fertilization, as thus far discussed, refers primarily to the crossing of plants of the same species, it may not be amiss to mention briefly the subject of hybridization, or crossing of two different species. Without going into a lengthy discussion of this subject, it may be stated that in the vegetable as well as the animal kingdom there are few undoubted hybrids. Experiments in the hybridization of plants has generally proven barren of beneficial results. Where hybrids are not actually sterile, it has been shown to be difficult, in most cases, to fix a type in their off spring.

Finally we may conclude that where cross-fertilization between different varieties is favored, we may expect the most beneficial results. Insects are the active agents through which cross-pollination is best effected. Experiment may yet prove the comparative value of different

varieties as pollinizers of other varieties. A judicious mixing of varieties is preferred to planting solid blocks of a single variety. Keeping honey-bees in the orchard insures better pollination.

Recitation by Little Ethel Robnett of Columbia, entitled "Bro. Brown on the Apple," was a comical recitation, and was well enjoyed by the audience.

All Work and No Play Makes Jack a Dull Boy.

When your worthy Secretary had the kindness to favor me with a request for a paper to read before this meeting with the title, "All work and no play makes Jack a dull boy," I declared it simply an impossibility. The topic was a hackneyed one, and besides, when the letter was read to me, I was endeavoring to recover my patience and reorganize my house after a month's experience with a green girl, who had stopped short, like a case of arrested development, and declaring she didn't have to work and shouldn't. My lady hearers can readily understand the humor I was in, en rapport, as the spiritualists would say, with that theme. All work and no play, indeed, I exclaimed; let us first get some work for these Jacks and Jills—something but a simple desire to vegetate before we agitate ourselves over their play. But the matter recurred to me again and again, until it shaped itself into this unpretentious paper, for as all roads lead to Rome so will all topics lead to our hobbies, and this may lead to mine. But said an ardent follower of your calling, you must make it applicable to horticulturists—to their interests and lives—or it will not prove acceptable. This was a puzzler; how was I to haw, gee and back my subject about so as to hit the horticulturalists. I feel that I am one of you, for with alluring visions of the Ozarks, did I part with the black soil of Illinois, vibrateing with the proximity of a great city life, to bury my golden ducats in the rocky soil of the Ozarks, where lie still dormant the lucious juices of those fine fruits, which we hope some day will materialize and turn back the tide of shining metal to our pockets. As a horticulturist, my sympathies are with you, for if not posted in the latest spraying decoction, my nerves are attuned to the fluctuations of the weather. I note the approach of a cold wave with the gravest apprehensions, while my imagination runs riot with visions of ruined crops and blighted hopes. The black and white flag of the weather bureau

possesses a heretofore unfelt interest for me, while I feel, only wonder, with so many possible mishaps, there is ever a full crop to find its way to the city markets, which usually show an abundance. The motto written all over the Englishman is pluck, and he rarely fails.

But I am not to talk of fruit. Instructive papers have been read, and an enormous stock of experimental station reports, books and bulletins, which I have filed away with due respect in my house, can doubtless be found in all your libraries containing more information than I have ever dreamed of. It is Jack—that boy whose growth and development means more to his father than all the orchards put together, which I shall endeavor to present to you tonight in the line of your own study.

Jack shall be a fruit tree, and whether he is good, bad or indifferent, dwarfed, mentally or morally, encouraging or not, he cannot be pulled up and thrown over the fence. He is yours for a season of years; to make you or to break you; to crown your name with laurels and fame, possibly, or drag it in the dust of shame, and wring your heart with agony. Oh! A nursery indeed, for whose output you are responsible to God and to your country.

I have heard of a penalty in New England attached to the offense of scattering obnoxious weeds broadcast to spoil finely cultivated fields. This, in human phraseology, is called roughing it when little and sowing wild oats later, and small check is put upon it.

Where is the interest felt in Jack that it might naturally manifest itself in discussion, comparison of experiences, and a finely written articles? Must these be relegated entirely to the mothers clubs which have sprung up in so many places? Is it a matter of sex and the masculine mind above or below or beyond these matters of child culture, until it gets to be Dombey & Son? Can't he at least have the breeding and solicitude of a fine-blooded animal?

It is difficult to realize the helpless infant who rules the house, the stumbling boy who taxes our patience, the downy youth who knows it all and ruffles our temper, and the broad-shouldered man who looks calmly in our eyes and proclaims his freedom and individuality, are one and the same. The ego is the same in each stage. The traits are the same, modified and controlled as he has been taught to control them. They are peculiarly his and mark him to the grave, like a ticket stamped "Good for one trip only." A certain life was called a cipher, but when its babe lay in the arms, God's finger had written the numerical value. 'Tis an algebraic equation where we prefix the signs by our own training. Like the game, where we all start at nothing and finish with some at a high score and others in the hole, as the saying

goes. The ciphers are numerous, but the problem is easier if we start with a good valuation.

Froeble, the founder of the kinder-garden, has demonstrated the fact that games, amusements and diversions are powerful educators; they open up the imagination to the pure, healthy, earnest purposes of life, or create a taste and desire for the worst, and as the human tendencies are not well balanced, hence the neccessity of weighing, in every possible way, the lightest side.

You would feel forever disgraced were you caught tying up a peach tree or trying to practice the Kniffen system on an apple tree; but these boys, usually whatever system of training is adopted in a family they are all strung up to the same trellis, regardless of their own natural tendencies. While he might make a fine growth if allowed to stand alone and given proper cultivation, instead, he becomes a miserable failure laced to your stick of a hobby. Of course you are not to blame; you tied him up good and strong; probably you spent considerable money on him, too.

It is not the province of this paper to tell what amusement to give to a boy. If he has dragged behind the plow all day, or wrestled with stones on your place, and you can't think of a refreshing change, probably he can; surely, if he is permitted to consult another boy. Allow him an outing beyond the sight or sound of home. Warner says in being a boy he would gladly do all the work if somebody else would do the chores, and yet I doubt if any boy amounted to much who did not enjoy the advantages of a liberal education in the way of chores. Poor Jack usually fails to appreciate these blessings. That boy who yearns for the opportunity to fish in the country has my sympathy; small comfort to him to know of fine streams many feet underground; would that he might have one good time at the speckled trout of the Northern brooks. Were ever woods so fresh or skies so lovely as when a child I skipped over these fields with a nice little hook and and line secreted in my pocket ready for use? Truly is happiness the sunshine of our child trees and the birthright of every child. The persons jealous of time given to amusements are usually those who, when children, were denied them. They regard it as an evil tendency to be guarded against and punished—this always wanting to play. Granting the necessity of recreation, then, it should be made as good and enjoyable as possible and not furtive and of a questionable nature.

I visited the home of a friend who possessed the most delightful understanding with his boy—an awkward youth of fourteen. They had little chats and laughs together, and in the evening it was with remark-

able cheerfulness that shoes replaced slippers to go on a proposed ice cream lark. It was doubtless an effort and some sacrifice, but the boy was worth more to the father than his own ease. His smile and voice made the boy feel his sympathy. Did you ever consider the commercial value of a smile? Not the society smile, which is simply a slight muscular action of the lips, but the genuine article. It has helped many a person on to success. And a smile will win Jack's heart when a frown will close the door and shove all the bolts.

Children are quick to feel intuitively, perhaps like the angels Swedenborg speaks of when he says: "The angels from the sound of a man's voice know his love. From the articulation of sound his wisdom, and from the sense of his words his science." If we are the law-givers we must try to understand the needs. If too tired at one time try to find a time we can be amiable in. Emerson says: "Laws, but those which men make for themselves, are laughable." This is a very clever speech of Emerson's, and I am glad it was not made by a woman. If I put myself in the place of my child and we see that things are thus and thus; perception is law for him; we are both there, both act; but if I glance over into his plot, and guessing how it is with him ordain this or that, while not carrying him into the thought, he will, never willingly obey me.

Emerson also calls force a practical lie. Certainly 'tis weakening to the character, unless given in homeopathic doses. Through blind obedience he losses the power to exercise his own judgment; has no chance to learn by experience. He is at a standstill in the process of development. The person training him simply rows with one hand and backs water with the other. What progress is there? And time flies. He must some day stand without the prop; then he will quite likely fall.

It is quite generally granted that the position of American children compares very favorably with other nations. Large dry-goods stores employing children are obliged to give them two hours at least for study and recreation. Their restaurant rooms are sometimes used for this purpose. This is done not from generous motives on the part of the proprietors, but to escape the law on child labor. Another method is a systematic course of lying done by the children themselves. I have often asked their ages from mere curiosity, only to learn that the smallest little chaps are all "twelve years old, sure."

We read with interest that when Sir Romelly, of the British parliament, proposed a bill forbidding parish officers binding children as apprentices at a greater distance than forty miles, it was met with spirited opposition from Sirs Peel and Wortley, who stated that though

in the higher ranks to cultivate family affection was a good thing, it was not so among the lower order; better take them away from those who might deprave them; and it was highly injurious to trade to stop binding to manufacturers, as it must raise the price of labor and manufactured goods. Then we note on the next page that Sir Peel was a middle English gentleman, who in his autibiography, has properly a spinning jenny as a frontispiece. Oh, shades of justice, indeed! Must might forever make right? Far more appropriate would a frontispiece of one of these half-starved, over-worked mites of humanity, who toiled that his wealth might swell to millions and given to Hargraves, its original inventor, who died in a work-house, the spinning jenny, or to Arkwright, who improved it. We can judge men better by their amusements than by their work; circumstances may control one but not the other.

In the march of civilization has the goddess of amusements placed her finger upon it, stamping indelibly a nation's history, to be handed down to posterity, perhaps to be forever her disgrace? Can Rome's glory at arms ever wipe away the stains of her amusements? We read them—the fibre of our nineteenth century organism is shocked to the core. What century did not pat its own back for its virtues. We are not quite correct; we have not seized all the virtues and left behind all the crimes. Besides, crimes pay. Was it not Napoleon who said he got five millions from the love of brandy, and what virtue would pay him as much?

I stood one day on the Arch de Triumph in Paris, erected in the honor of Napoleon. It is situated like the hub of a wheel, many streets running to it. I gazed in admiration of the beautiful city, while my mind ran over her turbulent history. I recalled her bloody mobs who swung the dreadful guillotine like a plaything. In the distance water flashed from the exqusite fountain placed where the guillotine once stood, of which some one has poetically said that should its clear waters dash forever it could never wash away the stains of the innocent blood. And this clean, beautiful city stands today the pride of the nineteenth century, embued with the spirit of civilization and culture.

But what is that fine building that towers above all around it? I indicated it to my courier. Oh, that is where they have bull fights! But America is above this. The blood of the Puritan fathers still throbs in our veins. But stop! Is the advent of the lowly emigrant, with his unorthodox notions thinning our blood, lowering our standard of amusements, as well as dragging our politics in the mire? You will probably rarely find a man who has witnessed a prize fight, but the

newspapers—those faithful reflectors of public taste—give the before spot reports and after news with a minuteness of detail worthy a better cause. Rather English, too, isn't it? Did not the Prince of Wales feel honored to shake the hand of John L. Sullivan? But the English you know, ever respected elevating and manly sports! We also learn from the same papers that a great number of Northern gentlemen had business South about the time of the contests. Oh, business! thy mantle is great! We can influence the play of Jack, the boy, but when Jack is a man he is almost past saving grace in this respect.

This recalls the experience of the West Plains Woman's Club in a movement to raise the morals of the juveniles of that place. I am not willing to acknowledge the morals of that town worse than those adjoining, but such as they were we sought to elevate them. I being one of the committee to solicit the assistance of a worthy gentleman in the cause, I shall venture to give his reply by his own story, as it casts a lucid light on the situation.

"I hardly think your plan will work," said he. "It is quite useless to appeal to the fathers; they are on a par with the boys. It is like this story: An irate mother once sought to discipline her boy with the aid of a stout stick. Quite naturally he ran, and finally took refuge under the barn, where she could not go. But she nursed her wrath until the father's return, and insisted he crawl under and bring him out. Understanding well his own family, this he proceeded to do, but when half through the opening a hoarse whisper came through the darkness, 'Say, dad, is that you? Is she after you too?'"

It is needless to say we have abandoned that plan of action. Now, if Jack, the boy, grows dull, do not think that Jack, the man, is any more interesting without amusement and diversion to carry his mind on to something besides business. He must read, study or have some form of mental gymnastics, or there will be nothing in his head but business to talk about. We all enjoy hearing a man well versed and enthusiastic in his calling discuss it sometimes; but we do not care to be always button-holed for that theme.

I recall one instance of childhood that impressed me strongly: A man who was an enthusiastic Jersey stock importer, whose name is forgotten, for we always called him "dam" and "grand dam"—words ever in his mouth. In Chicago now they have conversational classes, taking lessons in conversation—a good thing, doubtless, but you recall the first direction in cooking a rabbit is to first catch your rabbit.

It has been said that the first period of a nation, as an individual, is the period of unconscious strength. Children cry and scream, but

as soon as they can speak and tell their wants and the reason of it, they become more gentle. In adult life culture does for us what speech does for children. Men and women talk vehemently, blunder and quarrel, but with culture things are cleared up a little; they desist from weak vehemence and explain their meaning in detail. If the tongue had not been framed for speech, man would still be a beast in the forest.

What are the red-letter days in the whole calendar for our boys? Most of them would say Fourth of July or Christmas. Who can scent a fire-cracker without visions of juvenile celebrations rising before the mind—burning incense to this country of ours? Yet all this roar and smoke is in vain if it does not each year burn into the boy's heart a fuller sense of patriotism. Must we await a war or actual threatening of danger to feel the thrill of patriotism, which puts a man on his metal to do and give his best to the country—honesty of purpose and honesty of action?

'Tis not the foreign population that is to blame for the muddle affairs are in, but some of our best citizens who have lazily withdrawn from all responsibility and boasted to their shame that they have no part in politics. But the wave of this reform is in its infancy. This generation has started it; the next will guide it. Study it. Teach it to your boys. Read history. Show him how Napoleon, with his vast talent and power, of which no one can read without admiration, but without conscience or principles, left France poorer and feebler than he found it, and the whole contest for freedom to be done over again. Portray this in sharp contrast with our honored Lincoln, who, possessing those qualities Napoleon lacked, rests in our heart in gratitude and love.

Prepare the boy with all in your power to take his place in this reform. England is a magnificent country; she is solid, as they say. Why? An honesty of purpose marks her whole state and municipal government. Their power rests on their national sincerity. They confide in each other; the English believe in the English. On a return trip to America the United States officials meet you out on the ocean and compel each person to solemly affirm their property subject to duty, and then place the lie on the whole transaction by having everything searched when you land. Is this the status of our national confidence? We have the English national song to different words; we have the same national colors arranged differently; we have finer possibilities in our land, but, I grieve to say it, we lack honor in our government.

The dye of this generation is cast, but the boys! the boys! they must save the day! To their hands, whom we train with love and prayer, we must trust the jewel of our country's honor. We must tend the tree with patience, water it with love, spray it with honesty, pour the sunshine of happiness upon it, and God shall give the fruit.

MRS. JOHN T. SNODGRASS, West Plains.

The Dark Side of Fruit Growing.

I hardly think your worthy Secretary realized what a mountain he put upon me when he asked me to write on "The Dark Side of Fruit Growing." Had I been living in any other part of the State than in Oregon county, then it would have been an easier matter to do this; but here at the foot of the mountains, in the Land of the Big Red Apples, such a side of fruit growing has never been dreamed of.

Pephaps we have all been too busy trying to get our little farms improved in such a way that they would pay that we have not stopped to think that there might possibly be a dark side to our business. We all, no doubt, make more or less mistakes, and if by numerating some of mine I can help others keep out of such blunders, then my effort will not be in vain.

Here in this timbered country many make the mistake of cutting trees too high in clearing land; stumps so high that they bother a great deal until they rot away; cut them low. Many are so anxious to get in many acres that they do not prepare the ground thoroughly, many spots are left unbroken, and in many fields I have seen three or four years after having been cleared there is a large amount of wild grass growing in these spots that were not properly broken at the start. After we have our ground ready to set, if we are not careful we will be deceived in buying and planting trees that are too large and too old. In the spring of 1889 I planted apple trees so large that I felt sure that I would get a crop in at least a couple of years, but up to this time I have never seen a single specimen of fruit on many of these trees. Two years later I planted one-year-old trees and today they are much larger and more thirfty than some of the old trees planted in 1889 and are full of fruit.

I made a very serious mistake, in both apple and peach trees, by not looking after them closely in fall and spring for the borers, and I have lost quite a number of trees from this cause.

One of the most distressing sights that I have seen in our calling has been witnessed in the last two years in my peach orchard. Trees

that were perfect beauties in 1893, and the variety making me $400 an acre net from the crop of 1893, may be seen now sick; look as if they had malaria. (Howell county people can tell you all about that part of our troubles.) Leaves cup up, grow pale and commence dropping about the middle of May and by the following spring are ready to be pulled out.

I planted in 1889 fifty apricot trees, and up to this time I have grown some nice looking trees, but have never had a half peck of good specimens. Either the frost kills the blossoms or the curculio gets them all. Plums, ditto. Cherries are doing a little better as a rule, but this year was a hard one on them.

When we talk about raspberries, I used to think that Oregon county was about the only place that they could be grown to perfection, and now I must say that if they are grown anywhere it will be in some other county. To be sure, I still have four acres of them, but I hardly think you can find a fruit-grower that ever will make a success of the business unless he be in deep love with his trees and plants. He must study them and be acquainted with every tree on his place, and as soon as he sees one begin to fail, look carefully for the cause.

Watch, watch, watch, should be the daily motto of every fruit-grower who would be financially successful. We should not only watch our trees to detect the instant they begin to decline, but watch the condition of the soils, be awake, active, ever on the and alert, going steadly forward, so that when the harvest comes we may be ready.

Large opportunities come to the watchful man. Large usefulness and great returns are the result of thoughtful fruit-growers. He who watches thoughtfully and guards carefully his trees daily, hourly, will be ready to meet the issues of each day. Watching does not mean that we are to staud trembling with a fearful looking forward into the future. It means more and something entirely different from this. He who stands in dread of the issues of the next day or week or year will not accomplish much in getting ready to meet those issues when they come. Watch, means a thoughtful, careful and a diligent use of every moment, that there may be a readiness, a life fully prepared for any emergency.

It is well not to know the future in detail, the disappointments of tomorrow, next week, next year. If these were all known to us in detail, would fill our life with such apprehensions that we would not only be most miserable, but would not be able to do the work of the present. And successes, if they were made known, would greatly hinder the

efficiency of our work. There would not be the same effort exerted to force success.

Had you thought of it—that the uncertainty of our business is one of the conditions that greatly blesses it, and is one of the prime factors of success? But if the uncertainty fill us with anxiety and dread, which becomes to us a terror, then we cannot do our best work. It need not necessarly bring dread and anxiety, and ought never to do so. While we know not what a day may bring forth, there is a certainty in the business if intelligently followed.

S. W. GILBERT, Thayer, Mo.

WEDNESDAY, June 5—9 a. m. Subject, "Small Fruits."

Strawberries at Bluffton, Missouri, 1895.

Before going into details on this subject, I will boast a little. Quite recently a report comes to me from Iowa, where one of our R. R. conductors sent a crate of my berries to some friends, who wrote back that such fine strawberries were never seen in those parts. The varieties sent were Parker Earle, Tindrell, Tennessee Prolific and Princess, and here, I may state, that these form, in my opinion, a select list.

The earliest was Michel's Early, by only a few days, but so unproductive, that with me, it is not worth having. All the plants of this variety have already been destroyed.

Columbian—This was to be early as Michel, much larger and productive. It gave me a few nice berries the first season, but is now utterly worthless. This, also, has been destroyed.

Beder Wood—The best early one, and in every way a first-rate berry. Size, color, quality and firmness all satisfactory. It is an excellent polenizer for other early and late varieties, and is in fruit for a whole month. This but few varieties will do.

Tennessee Prolific, Princess, Tindrell, Early (Riehl's No. 6) and Stayman's No. 1 are all that one could wish in this fruit.

Buback No. 5, Cumberland, Tucker, Splendid, Phillips, Seedling, Richmond, America, Rio, Equinox, Cyclone, Mrs. Cleveland and Lovett are all good ones.

Edith, the largest of all I have grown, is a superior one, and a real curiosity.

Marshal has disappointed me by not producing more than a few large, handsome, excellent berries. Must be tried another year.

I could name a score or two of others that promise well, but it is not proper to report on until another season's trial. My intention is to issue a small catalogue before September, in which instructions will be given and a short description.

Just now the weeds and I have a battle, in which, up to this time, the weeds have rather the best of it. But they must be conquered, and a lot of No. 1 plants be ready for fall and spring planting.

To have this noble fruit on our table for near two months is a luxury that is not to be slighted.

Some are asking for plants to set out in July and August—the worst two months during the whole season to set out plants unless on one's own ground, and then it is quite risky.

The growing of layers in pots I have never practiced heretofore, but am tempted to do it this season.

Good, strong plants set out the first part of September will give a fair crop of berries the following summer, and bear another full crop the year after if properly cared for.

One asks me if the plants he got with black roots are good? No; you don't get such plants from me; they were old plants, and by no means the right thing.

A tree agent asked me if I could furnish him with 2-year-old plants; that his customers complained of plants being so small. I told him that that would do with trees, but not with strawberry plants.

It goes to show how much some of these smooth-tongued gentleman know about such matters.

Plums to the Square Feet—In my remarks on that, I had forgotten the number, and intended counting again before sending (the article), but forgot it. Just 39 plums lay on a square foot. Now, as the trees average ten feet square, there would be 3900 taken from one tree.

Wrong Date—When stated that our first dish of strawberries was on the 25th of May, it should have been the 25th of April. I found a few strawberries yet on the 20th of June.

The Burback Plum—Those who have planted this and found it curculio proof had better luck than I. One tree had about a dozen specimens, and every one was stung; only one came to maturity, and that was not quite perfect. Bourback No. 2 is quite as subject to the attacks of the insect. Quackenboss, close by, nearly escaped, while Eldora, but a few rods off, is entirely free.

The Marianna Plum—Men have written to me, thanking me for my caution to not plant this variety extensively, and I am now convinced that my advice was correct. It was sent out to be as large as Wild

Goose, earlier, and curculio proof; was also to be of better quality. Now I have a tree bearing a fine crop, which is commencing to ripen, the Wild Goose fully as far advanced. The fruit is handsome, dark and round, and about two-thirds the size of Wild Goose. The curculio proof is not shown in this case. In quality, it is not quite as good. Here is the fact as regards the fruit, but Elis, the man in Texas who introduced it, has done a wonderful thing for the plum-growers. It is a strong, perfectly healthy grower; will grow from cuttings almost as sure as willows. Is not troubled with the borer, as some plums are, and never suffers. As a stock to work other plums and apricots on, there is nothing equal to it.

Just at this time I have great trouble in keeping down the shoots coming up from the roots of my choice varieties, which were worked on native and French stock.

The Russian Apricots Once More—On close examination I found some fruit on four different varieties, small, but fine in quality. This will give them a few years more time to redeem their reputation.

A New Seedling Raspberry—In a gutter in my orchard I found a seedling raspberry of the Cuthbert type, that will be taken care of. The fruit is as large as the Cuthbert, and of excellent quality, and as the Cuthbert was a failure with me, this shall have a trial.

JUDGE MILLER,
Bluffton, Mo.

Strawberries at Glasgow.

The crop of 1895 is nearly harvested and is below the average in both yield and quality, owing to so much imperfect fruit or "buttons." Where the fruit formed perfect it was fine, as the weather has been very favorable for ripening the crop. I have seen no rust yet, and very few insects.

New plantings, however, suffered during the dry weather in April, and we replanted about 40 per cent and still some missing. The demand has been unusually heavy, and we have not been able to fill all orders. Consequently prices have been good, ranging from $1.50 to $3 per case f. o. b., less boxes and picking, and what we lose in yield is made up in better prices.

We fully expected fruit to set well and be perfect this season, as the weather was warm and dry. Fertilization should have been perfect, as when the plants were mulched they did not get dry enough to suffer.

But, alas! we were very much disappointed, for all varieties were afflicted more or less, and last spring's planting more so than two-year-old beds. So this year we cannot blame cold, wet weather during blooming time for this trouble.

I am inclined to think that a check of growth at any time after the fruit-buds begin to form in the fall until the fruit is fertilized, is liable to cause it. Of course we cannot prevent cool, wet weather during bloom, but we could keep our plants growing during the fall months by irrigating.

A friend in Boonville, Mo., tells me he had the finest, largest and most perfect berries he ever grew. Having only a small plot in his garden and plenty of water handy he gave them several good drenchings last fall and kept them growing. Besides, he gave the ground a good dressing of wood ashes. While the complaint around Boonville, he says was, no berries worth speaking of, with few exceptions his were fine. Again, I have found fall planting invariably more inclined to produce "buttons" than spring plantings; thus indicating that the check they get from transplanting may be to blame. Let us try and solve this problem.

Among the older varieties the race for first place was neck and neck between Bedor Wood, Haverland, Bubach, Jessie, Windsor Chief, Parker Earle, Barton's Eclipse, Gov. Hoard, Shuster's Gem, with Bedor Wood for best early, and Gaudy still holds first place for best late. Van Deman was a failure again, same as last year, and will be dropped from the list. It bloomed profusely, but set no fruit worth speaking of.

Bisel—This new berry, from Illinois, has come to stay—large productive, fine, healthy grower and of fair quality. Of the new ones none disappointed us more than Timbrell, a weak grower, seems to want heavy manuring. We did not get a single perfect berry, but enough buttons to know it is of good quality. We are going to feed it on bone-meal this year and report again next season.

Splendid took the prize for the best new one. Fine grower, good shape and fair quality, moderately firm; nearly every blossom formed a perfect berry. We think it has come to stay.

Belle (Crawford's No. 51) shows up well its long, handsome, firm, large, well flavored berries, and will be planted again. Marshall gave us some fine large berries, but, like all giants, is not productive.

Wooburton is up to average in size, productiveness, etc.

Schnell's No. 6, a dark, rich colored berry, with golden yellow seeds, is a good grower, fairly productive, and, when fully ripe, of excellent quality.

Swindle is not a swindle, but a good late berry of the Glendale type.

Shuckless is undoubtedly a seedling from the Mt. Vernon—so much like it I would as soon have one as the other, as everyone who has grown Mt. Vernon knows how easily it would drop from the cup or calyx when fully ripe; very productive, of good flavor, but color is not bright enough for a market berry.

Beverly, Columbus, Iowa Beauty, Leader and a few more are dropped from the list as worthless. Still I do not condemn them as they may be well worth growing in other localities.

H. SCHNELL, Glasgow.

Treatment of Strawberry Patches after Fruiting.

In the treatment of this subject I shall describe the method we have found to be the most successful. We are often asked, "Why is it you generally have a good crop of fruit?" Our reply is, "Work, and plenty of it." The same answer will apply to the treatment of the strawberry patch—work and everlastingly keeping at it.

As soon as possible after the last picking, before the plants have started their new growth, we go into the patch with the mowing machine or scythe and cut off the vines close to the ground. We then let the patch lay undisturbed for a few days, or until the plants that were mown off are dry enough to burn. Then we touch the match to it and burn it off clean. From the way some people look at us when we tell them of this part of the operation, I am inclined to believe they think we are the biggest liars in Greene county. They have the idea, that like other fires, there is nothing left. The fact of the matter is, it does look rather discouraging—nothing but a blackened piece of ground where once were green vines and luscious red strawberries. But let a nice shower come, and in a few days your plants will begin to grow again. Out of three years experience in burning our patches off. we have had but one small failure. Having a small three-year-old patch, my father thought he would run it another year, and to get all the ashes on the rows, he raked all the straw over on them. Well, he made it a little too hot for them; he got plenty of ashes, but the strawberry plants never showed up.

About a week, or sooner if convenient, after burning off, the patch is ready to be plowed out. This we do by using a one-horse turning plow, throwing the soil toward the middle away from the plants and cutting the rows down to about 14 inches in width. We run but two

furrows between each row, that being all that is necessary. As soon as it is convenient, we go in the patch with our one-horse Planet Jr. cultivator, with medium size shovels on, and level up between the rows, throwing the soil in the furrow left by the turning plow.

From now on till frost there is nothing to do but keep the weeds and grass hoed out, and the space between the rows thoroughly cultivated. The drier it is the more we keep the soil stirred. We are strict believers in clean, thorough cultivation. If "money makes the mare go," then cultivation makes the strawberry grow. Keep the patch worked out almost the same as a young patch.

We have never had a failure of our strawberry crop, and I think it is owing in a large measure to the persistent cultivation given the plants after fruiting. EARL HOPKINS, Springfield.

DISCUSSION—STRAWBERRIES.

Mr. Comley—I think if strawberries are planted on new timber soil, they will ripen sooner; but on old ground, they need manure.

A Member—Is not manure liable to produce grubs?

Mr. Gilbert—I only had two plants in my bed this year that were killed from this cause. I thought it was the ammonia in the manure that did it. I covered the plants from 3 to 4 inches deep with it.

President—If you had plowed under, you would find grubs in plenty. I never used manure until this year before planting. I scatter it on the rows in the fall or winter, and in March plow it under.

Mr. Kirchgraber—In putting on fresh manure I would be afraid weeds would come up in the spring.

Mr. Gilbert—At Thayer I got all I used from the barn, and there was few weed seeds in it.

Mr. Goodman—Subsoiling should be done for all strawberry beds.

Mr. Chapin—It will rain and then the soil will get hard. Whether or not subsoiling will remedy this is the question. But it does not seem to remedy this. It seems that we should have some forage plant that would protect the ground.

Mr. Goodman—Subsoiling will not break the crust, but will help retain the moisture.

Mr. Warren—I have tried subsoiling this year. About 10 or 12 inches. I have had same trouble. I have subsoiled for everything I planted this year. I have raspberries, corn, grapes and other stuff.

Mr. Nelson—I think I have solved this problem. I built an old road south of my house about 35 feet wide. Last year I planted it with sun flowers. After they got to growing, I plowed them up and

threw them on my garden. Now, 3 hours after a rain, you can go in there and the ground works very nicely. That ground was subsoiled not less than 16 inches deep. Everything I have put in I have subsoiled, my nursery, 16 acres of young orchard, and everything except 3 acres of potatoes, I have put in by subsoiling. When I strike a stone I take it out. Some of my ground is worked 18 inches deep. Cow peas is the best thing I know of to prevent ground running together.

Mr. Warren—If you succeed in getting clover started, it is also a good thing. Lots of land in this part of the State has a tendency to run together. If you will set a patch to clover and then after a while turn that clover under it is a great help to the soil. I don't see how a man is going to subsoil new land. It has been said that the stones are on the top, but in subsoiling 12 or 14 inches you will strike lots of stone and some large ones. It is easy to plant an orchard after the ground is in shape. Is it best to plant, first clearing the land of stumps and subsoil, or would you leave the stumps in the ground?

Mr. Gilbert—I have kept ground moist and the results are wonderful, and it seems to me that irrigation and subsoiling are great helps. We plow deep at our house. We put 4 mules on Mr. Hartzell's plow, and we ride that plow deep. I shipped it up to friend Nelson, but he does not use it. It cannot be used in rock, for our ground is all rock.

RASPBERRIES.

Mr. Kirchgraber—I have never tried the Hopkins, and cannot say anything about it. I have seen them grow, however. We have a berry that was found in the woods by a man named Freeman. He propagated it, and it seems to be a success as far as I have tried it, and I have them 7 and 8 years old. I think we will raise a fine crop of berries this year, as these black-caps are free from disease.

President—Have you noticed any disease on the berries?

For the last two years it has been affected like the Hopkins. My patch is in fine shape now.

Mr. Lamm—I do not believe we can raise raspberries on the prairie unless we shade them. That is my experience. I think they grow nicely, but not on prairie soil. Fruit is not all we are after.

President—Have you a deep soil?

No, sir.

President—Why didn't you subsoil?

The plants grow good, but they do not last. The second year they go down. I have some cherries in the orchard that I have shaded, and they are looking lots nicer then those not shaded.

Mr. Kirchgraber—I think it would be a good thing for black-cap berries to mulch them heavily. It wants cool soil, and not shade, and by putting on mulching 4 to 6 inches deep, you would be benefited.

Mr. Lamm—Are you on the prairie?

Mr. Kirchgraber—I think there was timber there before my time.

Mr. Hazeltine—I have some red raspberries home that 3 years ago I put shavings on, and I had a very fine crop of berries. The ground around them seemed mellow and nice.

Mr. Alexander—I would like to hear from someone who has mulched with waste from cane.

The waste was well recommended.

The Blackberry.

There's not much in the name. But how delicious the berry! And while it tickles the palate it has also strong remedial qualities and can be put to many uses. For canning it is the berry, and it stands unequaled for jam. It can be dried, makes an excellent wine and a cordial of well-known medicinal value. The beauties of ebony and black silk are far surpassed by this lustrous berry, with its cluster of shinning black eyes. To see a blackberry patch or field in full bloom—what magnificence in white and green!

A snowfall in May! Myriads of great flakes seem resting on the sea of leaves, the white intensified by its back ground of green. It is a sight worth going miles to see. And when the canes are drooping with great clusters of the black diamonds then is made glad the heart of man—especially the man who owns the patch!

No other berry plant is possessed of so many sterling qualities as is the blackberry, and man does well to emulate them. How one admires its sturdy growth, and the air of independence it seems to possess! Ever on the defensive its weapons are often used with telling effect.

Its persistence or "stickativeness" is well known, and its faithfulness is proven by never-failing crops. Be it fair, meagre or abundant, and though it suffers from neglect and maltreament, it ever strives to hold up its head and bring forth its fruit. Summer's scorching blasts, and winter's icy breath fail to subdue its hardiness. It is a sure money-maker and preminently the lazy man's berry, so far as culture is concerned. True, what I have said does not apply to all blackberries, but it does to the Snyder in our locality. There are numerous varieties of the blackberry, but the Snyder combines more good qualities than

any other. It is perfectly hardy, not subject to rust, not as thorny as other varieties, is a robust grower, very prolific, early and of the best quality. It can be eaten out of hand as soon as it has turned black, for it contains no hard core, like some other varieties.

While the Snyder, on poor soil, produces small berries, on good soil its berries are large enough, and it will bear well on soil which is too rich for other varieties.

Next in value I place the Kittatinny, which is of largest size, a long, somewhat tapering berry. It should remain on the bush several days after turning black to soften the core or heart; it is then of fine quality. On rich soil it does not bear well, growing too rank, but on medium soil it bears well and is quite hardy, though not an iron-clad, like the Snyder. It is also liable to rust on uncongenial soil. Clay seems to suit it best.

Another good berry, equally as hardy as the Snyder, is the Taylor's Prolific. About the size of Snyder, but longer and more tapering in form, of excellent quality, but prolific only on moderate or poor soil. It is of a somewhat sprawling habit, with slender limbs and later than any of the varieties I have tried.

The Early Harvest I place next in value on account of its earliness, being earlier than Snyder. It is, however, lacking in hardiness.

The old Lawton is a large, roundish, oblong berry, a good bearer and of fine quality, but not hardy enough.

Wachusetts is a fine berry and its canes have very few thorns, but it is not prolific.

The Wilson, Jr., and Bromton's Early, the latter an extra early, but small variety and too tender, have been discarded. Stone's Hardy is too small, a slow grower and very thorny.

Now, as to cultivation. Prepare the soil several weeks in advance if possible, and plant either in fall or spring (the former preferred). Distance, 3×7 feet. Open a furrow with a one-horse plow and plant in this so the roots are covered four or five inches. Wet the roots and firm the soil well about them. Keep clean with hoe and cultivator, and trim tips of canes lightly the following winter. They will bear only a light crop the first year, probably 200 gallons per acre. The next summer the new canes or shoots coming up should have four inches of the tips broken off when they are three feet high. As fresh canes keep coming through the blossoming and ripening season, we go over them at least twice a week, so as to have all of a uniform height. This topping is done to force out and increase the laterals or limbs, making the plant more stocky, and therefore less liable to be broken by winds, and increases the yield.

Pruning can be done any time after October. Cut one-fourth off the ends of laterals, but where they lean over into the middle of the rows, they must be cut back more, so as to leave ample room for the horse and cultivator. The dead wood must also be removed. Grape shears are best for pruning. For the past two years we have given our patch but one thorough hoeing, two or three weeks before the crop ripens, and later cut out the largest weeds and vines. The cultivator was run through twice. The weeds and grass cut off in hoeing are put around the base of the plants for a mulch. With all this rather scant cultivation, our plants look as well now as they did three or four years ago. Cut out all suckers between the rows and plants, and do not allow them to spread out into a hedge row.

We give below a statement of the yields and income of our patch. In the spring of 1889 we planted 1½ acres in Snyder, with the following result:

EXPENSE.

Year.	Plants and planting.	Culture.	Pruning.	Rent, picking, marketing.	Total.
1889	$30 00	$20 00	$2 50	$7 50	$60 00
1890		20 00	19 00	42 50	81 50
1891		20 00	19 00	317 82	356 82
1892			19 00	157 74	176 74
1893		15 00	19 00	175 50	209 50
1894		15 00	19 00	125 10	159 10
Totals	30 00	90 00	97 50	826 16	1,043 66

Culture in 1892 was entirely omitted.

INCOME.

Year.	Yield in gallons.	Average price.	Plants sold.	Total receipts.
1890	330	40		$132 00
1891	2,586	27	$5 00	703 22
1892	1,252	30	10 00	385 60
1893	1,400	30	15 00	435 00
1894	980	28	15 00	289 40
Totals.	6,548	29	45 00	1,945 22

It will be seen that the total income is $1,945.22, from which deduct total expense, $1,043.66, leaves a profit of $901.56 for the six years, or a yearly average net income per acre of $100.00. We have kept a record of the crops, but the expense and income is approximated, yet I believe it is nearly correct. I have included everything. As we had

to hire extra horses and wagon during the selling season our expenses were higher than is usual. Price of plants are put at $10.00 per bushel; rent of land at $5.00 per acre; labor at $1.25 per day; picking berries 5c per gallon; for marketing and collecting 5c per gallon, and for boxes and crates used 2c per gallon. As we sold almost exclusively in a home market the boxes and crates were used several times, until broken or unfit. Our crops for this year we estimate at 1200 to 1300 gallons, and the price 27c.

While our profits have been good, competition is stronger now, and prices will be forced down in the near future. I would, therefore, caution beginners in blackberry culture to go slow, and feel their way. I do not think there is much money in shipping blackberries. A home market is best. Many farmers will buy liberally if sold at reasonable prices, although there may be plenty of wild berries.

C. TEUBNER, Lexington.

DISCUSSION—BLACKBERRIES.

Mr. Smith—I would like to ask about the Early Harvest berry. I have put in a lot of those plants, about a thousand, and we had to plow them up. By fall there will not be a plant.

Mr. Warren—I would like to know what will prevent the rust, and if it will spread from one piece of ground to the other?

President—We set out the Early Harvest at Olden, and they rusted so that we had to plow them all up. We have the Snyder, the Taylor and the Brittian. As to this rust question, I do not know what causes it, or do not know what to do with it.

Member—I have had experience with the Early Harvest. All of mine the first year were covered with rust. I cut them down, and now they are loaded with berries.

President—The Early Harvest is a good berry, but I cannot grow it.

Kirchgraber—What is its quality?

President—It is fine. It is small but it is fine.

Howard—Here we can grow some of the finest berrries in the State. Our friend down at Thayer beats us about $1 per crate. If we could get some advice from you or some member how we could keep up with him we would appreciate it.

President—Move down there.

GOOSEBERRIES AND CURRANTS.

Coffin—I would like to ask if you can raise them in this country?

Nelson—We can raise them where I live.

Stanley—They tell me its no use to set out currants. I have got 2 or 3 dozen set out. Whatever you can raise any place, we can raise in the Ozarks.

WEDNESDAY, June 5—2 p. m.

The Peach.

Commercial peach-growing in the Ozarks is a subject in which we are all interested, whether we are growers or only consumers of this delicious fruit. This industry is assuming an importance in the commercial affairs of this county that transcends all other interests. Our apple orchards are among the largest in the world, and our vineyards and small fruit plantations are becoming famous all over the country, but around the peach centers a special interest.

The extensive planting of this fruit has been going on so rapidly during the past few years that the question is sometimes asked what the result will be when all these orchards come to bearing, and whether we will be able to control the insects and the fungus diseases that are so destructive in some sections of our country, and whether we will be able to find a market for all our fruit at remunerative prices. These are important questions to all who are making investments that they expect to realize on 5, 10 or 20 years hence.

In the first place we have the soil and climate to produce the finest peaches of any spot that the sun shines on. To prove this we have only to refer you to the records of this Society, and to the awards made to the Ozark peaches in competition with the world. This fruit is grown all over our country, from the Atlantic to the Pacific, and from the lakes to the gulf, but it is about the center of this vast territory on the slopes of the Ozarks that it reaches its greatest perfection.

Having the soil and climate, our success in the peach business depends upon our skill as horticulturists or our methods of planting, cultivating, pruning, fertilizing, and the packing and shipping of our fruit.

The location of the orchard is important, but not so much so, perhaps, as we were led to believe. As a rule, we are told to put our peach orchard on the very highest land we can find as a protection against late spring frosts, but our experience in the past few years has

convinced us that such a location offers very little protection against those "spring frosts" that come about the middle of January when the thermometer gets down to 10 below zero. In fact, I believe it would be better for them to move down the side of the hill, or even into the valley on such occasions. So I would not be so particular to have my peach orchard on the very top of the hill, especially if it was rocky, but would prefer lower lands without rock and a location that had some lower land adjoining, though the difference in altitude need not be great, just enough to give the air a chance to circulate so the heavy cold air will pass off. A good strong soil, with little or no rock, and with a mean altitude, as compared with the surrounding country, would be my choice of a location for a peach orchard.

Pruning should commence as soon as the trees are planted, or before, by shortening in the roots, cutting the longest ones back one-half. I believe this is an advantage, but from my experience this season I cannot recommend root pruning to the extent our friend Holtzinger would have us practice it. In the spring of '94 I took two trees, one peach and one apple, and trimmed off all the side roots close up to the axis or tap root, and then shortened it to 5 inches. I then sharpened the root end and cut the top back about one-half and planted them in the nursery row by just pushing them into the ground without digging a hole. The peach tree made a growth of 3 feet, and the apple did well, too; both grew more than the average of those planted in the field with all the roots left on. When I dug them up I found such a perfect, smooth, even set of new roots that I ventured to treat half a row across the field in my spring planting in a similar manner. The result of this experiment, at present, is not so encouraging, 20 per cent have failed to make a start, so I am satisfied that peach trees do need some roots. However, I should shorten the roots where they are long or crooked. I had occasion to dig up two rows that had been planted two years, and they showed plainly the evil effects of planting carelessly, and with all the roots left on and crowded together in a small hole. They had grown but very little, especially the roots, having made only a few small fibres.

The top should be pruned after planting by cutting off all side branches and heading back to 3 or $3\frac{1}{2}$ feet. I experimented with one row in my planting last spring by not pruning the tops, and the results were nearly, though not quite, as convincing as the root-pruning experiment. I also went over my planting a few days ago and cut off the sprouts and branches that came out near the ground. I want at least 18 inches of a trunk or body to a peach tree. I don't know that they will make any better trees treated in this way or produce any

better fruit, but I believe they will; anyhow, they look better, and a tree pruned up that way can be examined for borers much easier and quicker than one that branches at the surface of the ground or even under the surface, as you will find some of them if they are not pruned off.

This pruning is usually left until the following spring, but it seems to me it is an advantage to do it about the 1st of June, for then you throw the growth of the tree where you want it. As a rule, those ends that start out near the ground, will be the ones that will make the strongest growth, and when you prune next spring you have some heavy cutting to do or else cut the old stem off and let one of the branches from near the ground make the tree, in which case your tree will lean one way or the other.

The cultivation of the peach orchard should be thorough. The time is coming when we will be forced to adopt better methods of cultivation. Two plowings with the small diamond plow in one year is not sufficient to keep weeds in check or to hold the moisture in the soil through the dry weather of summer. The plowing should be followed by the harrow and the soil made as loose and fine as possible. If we wish to maintain the health and vigor of our orchards we must give more attention to cultivation. The rotary spading harrows used by the Olden Fruit Co. in their orchards are one of the best tools for that purpose, keeping the surface of the soil fine and loose and working up close to the tree.

When it comes to varieties it is difficult to decide what kinds are best. We have a long list of good varieties, all having something to recommend them, but what one shall we plant for profit, for dollars and cents, or how many kinds will we plant and what are they? The early varieties are considered worthless on account of the fruit rot that they are so much subject to, and yet they are among our hardiest varieties, and, in some seasons, they bear well and sell for as much money as any of our late varieties. We have a large number of very fine kinds, but the trouble is they are shy bearers. What we need is a few kinds, enough to cover the season, that are as hardy in the bud as the native seedlings. It does seem to me that they might be produced by some of our experiment stations if it was taken up and followed persistently and systematically by selection and crossing.

The Elberta is, everything considered, our best commercial peach, but it seems to have been damaged more by the winter than many of our other kinds. I believe there is more money to be made in the peach business by planting some ordinary or second-rate variety that is known to be hardy and productive than by growing the fancy kinds.

Susquehanna, Mrs. Brett, Foster and Wheatland are very fine, but their yield is so light. I know of nothing I would rather risk than Bonanza. It is a good deal like the Ben Davis is among the apples. It always has a crop if anything does, and yields heavily. It is a late, white freestone and one that stands handling and shipping. The trees have a tendency to overbear, and unless thinned they are small. But this is an objection that is easily remedied.

In one very important respect we have the advantage over our brother fruit-growers in Delaware, New York and Michigan. I refer now to our immunity from the diseases known as peach yellows and peach rosette. These are two of the most fatal diseases with which the fruit grower has to contend, and while so far as we are aware they have never yet been found inside our borders it is not unlikely that they will at some time make their appearance. The yellows have never yet been reported west of the Mississippi by the department at Washington, but the rosette is known in Kansas, and also in Arkansas, and where they once get established they have never succeeded in stamping them out, and there is no cure for affected trees. The only thing that can be done is to cut the trees down and burn them, and in this way only can they be kept in check. We don't believe in crossing bridges before we get to them, but we who live in this part of the State do want a law placed upon our statute book similar to the ones in force in Pennsylvania and Michigan and other states looking toward the control of these diseases. Under the present condition of things a half dozen fruit-growers in one neighborhood might use all the precautions possible to protect their orchards against diseases and insect enemies, while one neglected his, thereby setting at naught all that had been done for mutual protection and working an injustice upon the community, the county and the whole State.

We trust this subject will be discussed and taken up in our local societies, and that as soon as practicable we may have a statute that may be of service to us in building up and maintaing the reputation of the Ozark peaches until this becomes the most famous peach region in America.

E. L. POLLARD, Olden.

Hardy Peaches.

As we are now on the southern slope of the Ozarks, in a land that is renowned for its fine peaches, and, being one and all directly or indirectly interested in their fruiting, the subject of hardy peaches and how we can produce them might be considered and discussed by the members of this association to advantage.

We hear of the Crosby, the Champion and other hardy peaches, some of them withstanding fifteen and seventeen degrees below zero, and producing good crops the following season. They would be considered iron-clad in North and Central Illinois and other points in the same latitude, but would they be hardy in South Missouri? The past few years have proven that the native seedlings are better adapted to our climate, and will produce fruit oftener than the imported varieties. Why is this?

Is it because they are so hardy and would withstand the low temperature of the North? I think not. It is not a question of how much cold can they endure and be fruitful, but how much heat they can stand without being forced into action during the warm days of early winter. Why are the native seedlings more certain than some of the imported varieties?

I think it is a plain case of adaptation from a natural cause. These seedlings have fruited in this country for a great many years, their seeds have been planted or came up wherever they chanced to fall; the earliest of them are killed by late frosts, the others that come on later survive, and, if other conditions are congenial to their growth, they produce the bearing tree which we call the native seedling. I think it is possible, by careful selection, to produce a peach from this native stock that would be an annual bearer. And here alone are they likely to retain those hardy qualities.

The hardiness of a peach may be increased many degrees, by proper culture, or decreased in the same ratio by neglect. Where trees have had poor cultivation and their growth checked by allowing the weeds to grow during early summer, their fruit buds become dormant, the foliage is mostly shed and the tree is ready for winter. Later on we have warm fall rains and these same trees, in their effort to produce new foliage, start dormant fruit buds, thereby changing their condition and making them very sensitive to cold. These same trees, kept growing by thorough cultivation, would retain their leaves, thereby having foliage enough to cast off or assimilate the late flow of sap, allowing the tree to go into winter quarters in fine condition to withstand ten or twelve degrees below zero.

There may be many choice varieties now in general use which might prove to be annual bearers if given proper care and cultivation. We know that the difference in the apple as to its being affected by heat is very marked. The Jannet and Rome Beauty require a greater amount of heat to start growth than does the Transcendant Crab. There may be a similar difference in the peach, if not so widely marked.

Therefore, if the heat and moisture of late fall is to be as much dreaded as the cold of our winters, it stands us in hand to propagate those varieties of peaches which have the qualities of the Rome Beauty or Jannet—slow to act under any condition.

ROOT ROT.

This so-called disease is a fungus, most prevalent in new land, where there is an abundance of decomposing matter. The young apple tree roots, in coursing their way through the soil, come in close contact with pieces of wood that, in course of time decays, forming a compost that is so rich in certain elements that it is not conducive to their health, owing to its close proximity to the roots, causing dead spots to appear, thus germinating the fungus which spreads slowly from the affected parts.

This fungus is white in appearance, enveloping the roots with a filmy coating, shooting its spores into the apparently healthy bark several inches in advance of the decayed parts. This process is continued until the surface of the ground is reached, thus encircling or girdling all of the roots. This disease never appears in a prairie country, and I think it is seldom found north of Central Missouri; it is also prevalent in certain localities through Southern Illinois. The trees do not show the presence of this malady until it is too late for successful treatment, owing to the surface roots being the last to succumb. Therefore, a preventive rather than a cure is what is wanted.

A. C. SKINNER, West Plains, Mo.

DISCUSSION.

Gilbert—I beleive we should plant on all slopes. On north, south, east and west and on the top of the hill. In 1893 the southern slopes in Oregon county produced more peaches than the northern. In selecting a location go to the top of the hill and all around it.

Skinner—I have got 50 peach trees of fine varietes. They do not bear well. I wrote that little paper that Mr. Goodman read.

President—I have been experimenting in that line. I have some at home and they have borne for 2 or 3 years and some of them are pretty full this year, and in the experimental plot I have a seedling. This year it had as many blooms on as a dozen of the others. I have a few different seedling about the place. Some full and some not. These are from selected stock grown from selected seeds of different kinds.

Hartzell—The best time to prune peach trees is in August. The growth season is still on in August. For Mr. Gilbert's benefit I will say plant on all sides of the hill.

Irish—I would like to know a little more about pruning the top. I understand the time to commence pruning is at the age of about 4 or 5. I pruned some very much father back than others. It is a subject I do not understand.

CHERRIES.

Lamm—The cherry that pays me best is the Early Richmond. I brought some cherries with me. I have an orchard of 500 trees, and I never have any trouble selling the fruit. I do not take less than $1.50 crated. Sometimes I get $2.00 a crate. I think I have the largest orchard in Pettis county, and I wish it were larger than it is. The Richmond are nice fruit. I think the black soil is best for cherries although it will thrive in a variety of soil. I also have 500 plum trees and I will have a good crop. I do not think I have one cherry in the orchard that is stung. I am much encouraged with the prospects.

Member—How close are they set?

Lamm—About 15 feet.

They are too close I do not think we could raise good trees on the prairie. When I went into this business 10 or 12 years ago I knew nothing about it. I saw cherry trees bearing in my neighborhood and so I set them out.

Georgeson—Can cherries be grown from the seeds?

President—The seed of the Early Richmond grows very readily.

Goodman—The Early Richmond will reproduce itself.

APRICOTS.

Murray—I have had experience but have not had the money. The tree agents recommended the Russian.

Hazeltine—The Russian apricots bore you no fruit.

I had lots of blossoms but no fruit.

Gilbert—In the spring of 1889 I set out 50 apricot trees and they have bloomed for several years, but I have never been able to get any ripe fruit.

Stanley—I had some trees and they never amounted to anything.

After paying the shorthand reporter I received this note from him which will explain some of the vacant places in the discussion.

SEC'Y.

Mr. Goodman—I send what I have done. Times are so hard that Mr. C. J. Trowbridge, Willow Springs, has been compelled to let me go,

so I cannot give you the balance of this until I find another position. Just when or where that will be I am unable to say, but I will take the original notes with me and finish it as I get the chance.

Yours truly,

J. E. LITTLE.

WEDNESDAY, June 5—8 p. m.

Fruit Culture in Howell County.

It is not considered as within the proper scope of this paper to trace the course of fruit-growing in Howell county from its beginning, but rather to show what the present stage of its development is, and what its future promises. Fruit growing, as a pursuit, did not begin in Howell county until the Kansas City, Fort Scott & Memphis railroad opened up the region and gave it a market in 1884. Prior to that time the surplus of apples was hauled in wagons to the cotton districts of Northern Arkansas, and there found ready sale at $1 per bushel, or more. Many of the best known sorts were successfully grown, and it has always been claimed that the much decried, but ever popular and profitable Ben Davis, is a far better apple as grown on the southern slope of the Ozarks than anywhere else. Several desirable new varieties were added to the list, and the best new winter apple at the New Orleans Exposition was from Howell county.

Peaches were found to be a profitable and almost certain crop, and, though neglected for want of market, it was amply demonstrated that here is the "home of the peach," as once felicitously expressed by Secretary Goodman. There were, even then, an enthusiastic few in the county, as the records of this Society will doubtless show, who were interested in horticulture, and enough fine fruit was forthcoming to make a notable showing for Howell county in that famous display at New Orleans, from which Missouri brought home the only gold medal offered in the horticultural exhibit, the premiums for the best 200, 100 and 50 varieties, for 26 separate varieties, also (as just stated) for the best new winter apple, and apples from the most ancient trees (80 years old), from Montgomery county. Honor to those members of this Society who had the pluck and perseverance thus to place our State in her merited rank among great fruit producing districts, and special honor to the two men whose zeal for the horticulture and loyalty to their State made the exhibit possible and its success certain—J. C. Evans and L. A. Goodman.

The real development of fruit culture in Howell county may fairly be stated to have begun when the President and Secretary of this Society, who had been long considering the project of establishing a great fruit farm and had investigated many localities, associated with themselves five other well known fruit-growers, namely: Z. S. Regan, John K. Cravens, Frank H. Holsinger, W. G. Gano and G. F. Espenlaub, all members of the Missouri Valley and State Horticultural Societies, and organized the Olden Fruit Company. They selected about 2600 acres of land around Olden station, in the center of Howell county, and completed the purchase March 25, 1884. Thirty days later 18,000 peach and 4000 apple trees had been planted, and five years later, in 1889, the shipments from this farm were 30,000 boxes of peaches and 12,000 crates of berries.

In 1892 one hundred acres of five and six year old Ben Davis trees yielded 3000 barrels of apples, which sold at $3 per barrel at the station, and the total shipments for that year were about 60 car-loads. The crop of 1895 from the 1350 acres now planted, with about 160,000 trees (90,000 being of bearing age) is variously estimated at $100,000 to $150,000 in value. An estimate from a very high source places the apple crop alone at no less that 25,000 barrels. The success of the Olden farm naturally attracted much attention and the fruit-growing movement really became active only about 1889.

Through a systematic effort, involving much labor, a fairly accurate enumeration has been obtained expressly for this paper. Lists were sent to the 32 postoffices in the county and were also distributed in all neighborhoods. The aggregate represents an actual count or careful estimate of 1200 orchards, furnished by upwards of 70 individuals, who have taken an interest in the work. Yet, with all the pains taken, many small orchards comprising thousands of trees have inevitably been overlooked, and, with this explanation of the means employed to obtain the figures following, they are confidently submitted as being under rather than over the actual numbers:

There are now in Howell county 610,000 apple trees and 460,000 peach trees, with 45,000 other fruit trees, a total of 1,115,000 trees. There are 347,000 apple and 248,000 peach now of bearing age, leaving 263,000 apple and 212,000 peach yet to come into bearing. The regular nurseries in the county sold for the planting of 1895, 280,000 apple (225,000 two-year and 55,000 one-year), 95,000 peach, 3500 pear, 5500 plum, 2000 cherry and 1100 other trees, a total of nearly 500,000 trees (besides 80,000 grape). Allowing that some of these trees were shipped out of the county by these nurseries, some trees were probably

shipped into the county by other nurseries, and many orchardists grow all their own trees in the nursery.

Thus we have big figures to show that a very large number of trees have been planted in Howell county this year. Many of these have doubtless escaped enumeration. In the new Koshkonong fruit district, just over the line in Oregon county, there are 28,500 apple and 106,500 peach; also 4000 pears on one farm, nearly all yet to come into bearing. Adding these to the number of trees already given for Howell county, we have 1,250,000 furit trees in this immediate fruit region. It will be observed that the apple largely outnumber the peach (except on the Koshkonong district, where some immense peach plantings have been made). This excess, not so marked in the young trees, is to be accounted for partially by the fact that the old-time orchards are chiefly apples, but mainly because the apple is almost universally regarded as the future great staple product of the county and, even now, a low estimate of this year's crop would reach enormous figures. The statement is ventured without hesitation before this Society that nowhere in the United States, or, probably in the world, do more favorable conditions exist for apple growing than in Howell county, Missouri. Further reference to the conditions does not come within the province of this paper, but, in this connection, it should be mentioned that certain well known varieties have, under these favoring influences, developed new and more valuable characteristics. For example, the Wine Sap, while retaining its old-time good qualities, uniformly reaches greater size here than in any other known locality. And, as mentioned already, our old reliable and irrepressible friend. Ben Davis, is withal a finer (or, must I say, nearer to a fine) apple here than, perhaps, anywhere else in all his broad domain. His supremacy on the southern slope of the Ozarks is yet undisturbed and practically unchallenged. The development of peach culture in Howell county has been remarkable, beginning with the enormous plantings at Olden for several successive years, followed as they were by highly satisfactory results, for candor compels the assertain that for size, color, flavor and shipping qualities, all combined, the Olden peaches, and later those from Pomona and other Howell county fruit farms, have never yet been equalled under the shinning sun, unless it be in our sister county, Oregon.

It is within the past three to five years, however, that the peach planted area has increasd most rapidly, and our figures show that the partial failure of the crop of 1893, and the total failure in 1894, have not perceptibly shaken the belief of careful and experienced growers of this most delicate, as well as delicious fruit, that its perils and

vicissitudes are reduced to their minimum in this favored region. Planting has continued with imitated activity, while the unchecked growth of the trees in the interim has been utilized to improve their shape, renew their strength and better fit them for future fruitfulness. The visitation of the 13-year-old locusts last year caused serious damage, and in many orchards utter destruction of the very young trees, but the injury from this incidental source has been almost wholly repaired already, and it is comforting thought that one of the many enemies of our fruit trees has just entered upon a long term of quiescence.

The Elberta is, by long odds, the leading peach, but this year is not meeting the expectations of its friends, and is bearing very shyly. Much attention has been given to the choice of sorts in planting our commerical peach orchards, in order that they may produce closely succeeding crops from the earilest to the latest varieties, and it is the opinion of leading horticulturists that the actual shipping season for merchantable peaches can, with proper selection, be made longer in Howell county than in any other peach-growing district. The nearness to large distributing markets, permitting the picking of the fruit in the best shipping condition, will be an evident advantage in this direction. The matter of the provisions and preparations for handling the fruit product of the county is sufficiently germain to my subject to warrant me in stating that our fruit-growers appreciate the importance of esiablishing and maintaining the highest possible reputation for Howell county fruits, distinctively, in the great markets of the country, and will, it is contemplated, unite in a county organization for that purpose. The management of the Kansas City, Fort Scott & Memphis R. R. is alert to the importance of placing Howell county fruit in its best condition in all markets, and promises to furnish the fruit cars and fruit trains necessary to that end.

The high standard of excellence set up by this Society for the fruits of our State will never be lowered by Howell county. Coming now to other fruits than apples and peaches, the present actual development of their culture calls for no considerable space in this paper, but it should briefly mention their status and prospects.

Several considerable orchards of pears have been planted, but the fear of the mysterious and deadly blight which has invaded this, in common with all other interior localities, has deterred many from attempting to grow this favorite fruit. In fact, it may be said of this, as of the other fruits not yet planted on a commercial scale, that neither time nor capital have yet been available in Howell county to undertake

such experimental culture of these fruits as will be necessary to settle the all important question of profit. But this will come.

Plums do well, and some prune orchards have been planted by those familiar with prune growing in California and who believe this valuable fruit can be grown as successfully and more cheaply here. This region is well adapted to cherries; they grow here spontaneously and bear abundantly; will undoubtedly become one of our shipping fruits in the near future. Apricots and nectarines are claimed to be hardy and prolific, and many small plantings are being watched with interest with a view to making these fruits a feature in large orchards. Quinces are discussed as one of the future valuable fruits of the district, and several large plantings are in contemplation.

The grape has become an important factor in the development of our future only within the past two years. There are now 175,000 vines within the county, of which not less than 125,000 were planted during the period named, including three vineyards of 20,000 vines each. This remarkable change in favor of the grape is due in no small degree to the investigation, observation and experience of Col. H. D. MacKay, President of the Pomona Fruit Company, also President of the South Missouri Horticultural Association. The astonishing yield, in quantity, obtained from small vineyards on the Pomona farm, the trenchant and well supported arguments advanced by Col. MacKay in support of his vines that this is a grape country, par excellence, and notably, his able paper read before the horticultural institute in this city last winter have all attracted widespread attention.

Hon. Geo. T. Powell, of New York, a horticulturist of national fame, in a series of lectures at West Plains early in 1894, declared unreservely that he had never found in combination so many favoring conditions for profitable grape growing as in Howell county. The plantings have included all the best recommended varieties, both table and wine. Table grapes can be put on the large markets from here at a time before the immense product of the great New York and Ohio districts begin to move, and should therefore command remumerative prices. Wine grapes, it is stated by veteran wine experts of this country and Europe, will thrive as well and produce as fine flavored wines, in due time, as in any of the present wine-growing districts.

Berry culture is practically in its infancy in Howell county, but as to strawberries, raspberries and blackberries, the success of all has been fully demonstrated and the development in growing these fruits promises to be rapid from this time forward. In strawberries, the season has just closed, and though the yield was greatly curtailed by unfavorable weather, the growers are all increasing their acreage

largely. Comment is unnecessary. They know, now, that they can grow strawberries of exceptional flavor, size and firmness, such as will bring good prices when berries from competing localities may reach the same markets soft, out of condition and of poorer quality, and that they can do this at the minimum of cost. Their advantages consist mainly in the well drained and abundantly fertilized soil (phosphatic oxidized) covered completely with the small broken rock which constitutes nature's perfect and gratuitious mulch, protecting both plants and fruit, and bringing them to their best maturity far better than any artificial mulching could do. The prediction is confidently made that within three years Howell county strawberries will be well known and sought after in the best markets. Equally good conditions exist for the raising of other berries profitably; blackberries are now extensively grown at Olden.

Gooseberries are destined to receive some attention from growers of small fruits; the wild gooseberry grows in this region in great profusion and of excellent quality.

Howell county has two horticultural societies—the South Missouri Fruit Growers Association, W. F. Benson, President, which meets at Willow Springs, and the South Missouri Horticultural Association, H. D. MacKay, President (as already stated), at West Plains. Monthly meetings are held, at many of which papers on seasonable topics are read, and at all of which open discussions are indulged in on any subject which a member chooses to bring up. They are a source of valuable information and instruction to the novice, and even to the experienced fruit-grower who finds himself under new conditions. Here, in this new field not yet invaded, or rather not yet occupied in force, by the many adversaries of the horticulturist, all of the most advanced methods of propagation, cultivation and protection may be applied with timely efficacy. It, therefore, behooves these and kindred societies to foster development of Howell county with unceasing and intelligent care, for on their watchfulness against the encroachments of diseases and pests momentous results to this land of great promise may depend.

This paper would not be complete without some information as to the area of fruit land already planted in the country and that which yet awaits development. There are about 240,000 trees of those enumerated which are five miles or more distant from railroad, largely the old orchards. Calculating the remaining 875,000 trees as occupying the belt or strip extending along the railroad five miles on either side through the county, and allowing the usual number of trees per acre, we have only about 10,000 acres in fruit out of a total area of about

300,000 acres. Deducting one-half of the total area named for agriculture and grazing (a fair estimate considering the nature of the soil and surface), and deducting, also, the land now in fruit, we have available about 140,000 acres of as fine fruit land as the sun looks down upon, on the line of a great trunk railroad, and at prices within the reach of every fruit-grower, whatever may be his condition.

Let these further facts be realized in considering the present and future development of fruit-culture in Howell county. It is not only an exceptional fruit country, but it has also a large area of excellent farming land, much of it as smooth as any in the State, and this farming land is interspersed among the best fruit lands. It is admirably adapted to dairying and stock-raising, with long grazing and short feeding. Much work can be done during the mild winters in fields and orchards, and in preparing new land. The soil is stored with elements that will make it productive for years without fertilizers; the climate is healthful and agreeable; schools and churches abound and are thoroughly appreciated; no sectional or political differences prevail. For successful fruit-culture on an extensive scale it is essential to have an abundant, industrious and steady population sufficient to meet all the demands of gathering, packing, etc., at moderate wages.

There must also be such conditions on every hand as will enable the small grower to buy his land and to plant and maintain his orchard while supporting his family; in effect, to fully utilize his own labor as against the capital of his wealthy competitor, with equal facilities of disposing of his product. Where do so many favoring conditions invite the grower, however he may be circumstanced, as in Howell county, Missouri?

CHAS. H. WHEELER, West Plains, Mo.

The Age of Education.

Fruit-growers and friends—We prefer to make this report in writing for this reason, that although the report is upon one single subject and you might think easily made, yet to us, that subject is the subject of all subjects, and embraces a number of important items. Some of these items might be omitted if the report was not committed in writing.

The design of our Society in appointing this committee is that it may collect, classify and arrange such facts and such experiences and weave them together in such a way as to represent the scientific, artistic and practical features of horticulture as we find them in Missouri. This knowledge shall be put into such a shape that it can be grasped.

by the inquiring mind of whatever age. We think this will supply a long-felt and obvious demand.

We presume to say that almost any member of this Society, or any member of our many county societies, could avoid expensive mistakes in horticulture after studying such a hand-book of horticultural knowledge. If this be true of us, how much more will it be true of our children and the inexperienced? Mistakes in fruit-growing are exceedingly expensive. If you plant wrong varieties or plant them in a wrong way, you are at a great disadvantage for years.

While we know that horticultural knowledge is added to and taken from year after year, and no hand-book would be complete in all details and experiences, yet we do know that the most expensive mistakes are made because men are ignorant of well established facts. We believe the State of Missouri recognizes the truth of this assertion, and grants means to extend this knowledge, knowing full well that the time and money of the fruit-grower thus ignorantly and fruitlessly wasted, is lost beyond redemption to the State and individual. So that personally I want to say that my hands and brains were never engage in what I thought was a more noble effort.

Then, again, men in this the dawn of the twentieth century, are relying more and more upon written information for a guide in all the undertakings of life. We all read; we all think; we all study more than ever before about our common occupation, as well as everything else. As this intellectual activity grows upon us and our children, the demand for such knowledge as this committee should be able to furnish, will find a special place in the schools and homes of our people. It surely seems to be worthy undertaking for this Society to try and supply this demand. Who will do it if we do not undertake it? Who possess superior knowledge, or experience, or to whom should the State look for a more willing disposition?

If we have profited by the success and failures of others, why withhold what we should be able to give? The horticultural resources of our State are just beginning to be developed. As far as we know, Missouri is in her infancy in this respect. The generations to come will want a good foundation upon which to build the beautiful orchards of the future. The horticultural art will dot our prairies and woodlands with scenes that will delight not only the eye but the taste of man.

As I behold the superior intellectual advantage of this closing century, and as I see the sunrise of the twentieth century dawning upon us and spreading out such wonderful possibilities before us, I

feel sure that the rising generation will give due consideration to this important industry.

We urge this Society to carry out this educational plan with diligence, for we believe it to be the most important of all her past undertakings. I never have been impressed with a duty which I thought was laden with such far-reaching results. While it is true that your committee make no pretentions to be otherwise than very common toilers in the horticultural vineyard, yet of this we are aware that we have no divinely inspired writers upon this subject.

We also know that long years of experience and many attempts and fruitless efforts to do things contrary to the best plan, have financially ruined many men and discouraged thousands more, and what is perhaps worse than all, have left the resources of the State undeveloped, and its inhabitants in want, and hungry for that which we well might have.

Then we also know that although others who follow us may be wiser and more talented than we, yet they can never be such unless they have first gone over the same road that we have thus far come. So I feel that our position should be sustained; that the Society should hold up our hands; that we should be allowed to do the best we can, and if nothing more is done, we can prepare the way for brighter days for those who may follow us. And this fact should encourage us not a little, because they who follow us will be our children and our children's children.

WHAT HAS BEEN DONE.

One year ago we committed to type the result of a years work. It is embodied in the report of '93. Our second years work is well in progress. We are of necessity proceeding slowly for many reasons, which are well known to the Society and to the committee. In the first place the work is new to us all. We have to find out where our friends are, and who can help us along special lines of investigation. Our field is large. Our forces are scattered. It takes time to enlist the energies of men in any subject, and especially do we find that our friends who are possessed of the required knowledge we desire, must convey to us what we would know by correspondence. If we could talk to them we could make more rapid progress. But greatness is always of small growth, and we feel safe in saying that the good influences that will result from the systematic pursuit of the work, and the presentation of a hand book of horticultural knowledge to the people of this State will never be called small by those who are capable to comprehend it. Finally to make our work felt in all its grandeur, it must go before the whole people of the State for their approval. Knowledge to be appreciated and efficient must run along

in the natural channels of education, so that we have to prepare our work in such a way that it can be appreciated and comprehended by minds who are seeking in the world of thought for special food adapted for their own wants.

The knowledge we shall have to collect and arrange will have to take its place along side of all other classes of information. If a bright mind is to choose between horticulture and surgery, he will do it not at the age of 40 but at the age of 20. He must have the two subjects side by side to compare and digest. He will study the one when he is studying the other.

In those years when the mind grasps quickly, when the retention serves best, when the individual nature is seeking that which is adapted to its longings—in other words, when the boy is unconsciously perhaps settling down into a calling or occupation for life, then is the time when this knowledge should be within his reach. It should be attractive; it should be comprehensive; it should be worthy in every particular of the great, grand, beautiful subject of which it treats.

Oh, these worthy, time-honored occupations of man; what angel of destiny has consigned them to a second or third place in the estimation of man? Ask yourself, please, what is the nature of man, or the times in which we live that our youth spurn these, the noblest callings of life, and seek others that are certainly less worthy? I feel that by the exaltation and development of these common occupations, the earth will be made fit for the newer, higher civilization we would so much rejoice to see—that civilization when the better nature of man shall rule supreme.

I know this Society is doing much to bring about favorable results. I know its members covet the influences that lift up and elevate the individual.

Upon this knowledge is built our hope that our educational work will be warmly supported. We want it to help men to be more practical, and useful, and honorable. It will take perseverance. It will take courage and unfaltering trust in the hope that we shall at last get hold of the better natures of men and bring them up into a higher plain of intellectual and moral activity. If this can never be done I want to quit. If we, as a committee are on the wrong road, tell us now.

But if we are proceeding intelligently, if we have a worthy object in view, if we are trying to step a little higher in the world of thought and action, then as chairman of this committee, I ask you to hold up our hands, that we may have our efforts crowned at last with success.

G. B. LAMM, Sedalia.

Fruits of the Ozarks, and How to Grow them Successfully.

What are the fruits of the Ozark? First, above all other ranks the ever to be called for, never to be forgotten, the best of all fruits—the apple; second, the peach that grows to greater perfection, higher colored, richer and finer flavored than can be grown anywhere; third, the grape which seems to be at home in every nook and corner of the mountains, and of better quality than anywhere in the west; fourth, the blackberry; fifth, the raspberry; sixth, the strawberry; seventh, the pear; eighth, the native plum; ninth, the foreign plum; tenth, the cherry.

To take each of these up and discuss them as they should be, would be no light task, and I shall attempt only a part of this work before you. One great advantage this southern country has over and above all others, is that it is all covered with wood growth; never have been broken by the plow; is rich in tree and fruit-producing qualities; well drained by the best of underground drainage; is high and rolling with a rich porous subsoil; is neither too hot or too cold; is as healthy as any of our land; has good railroads and quick transportation; the best of markets in the country; good schools and churches, and the best class of people of the land settling and clearing and planting this south country.

This discussion of the matter in particular has been well presented on the grape by Col. McKay, on the berries by S. W. Gilbert, and will be given you on the apple by A. Nelson, so that I take it, your intention was that I should appeal to something in general as to modes and manners and not in particular to any one class or variety of fruit.

Some of the principles underlying the successful culture of all plants may be of use to us in this subject of orcharding. Our virgin soils, as they appear to us today all over this southern country, are just right for the production of tree-fruits. It then behooves us to take up this work and do it correctly in growing our trees, pruning them, planting them and care and cultivation of them for the future profitable orchard.

FIRST, THE TREES NEED TO BE WELL GROWN

From good, sound seed, free from disease of all kinds. The plants should be grown from good, healthy plants or bushes and given the best opportunity possible for the development of root growth. A good,

sound, healthy root will make a good, sound healthy top if it is well cared for in the propagating beds, or cutting bed, or nursery. It should not be the aim to get the largest growth possible in either our trees, plants or vines, especially if it has to be done either by manures or special fertilizers. A good medium, hardy, healthy growth is much the best for all kinds of transplanting, and I never select the largest of two-year-old trees for planting and very seldom the largest of other plants or vines unless I know how they have been managed in the nursery or propagating beds. Good, medium-sized, healthy plants and trees are usually the most successful.

SECOND, THE PREPARATION OF THE GROUND,

Especially for small fruit should be well, very well, done unless they are to be planted on strictly new land, where it is almost impossible to prepare it just as we would like. On this land the plowing should be done deeply and well. On this strictly new land, where the soil is full of roots, we have the best of subsoiling already done for the trees and plants. As the trees grow and the roots and stumps decay, we find that the tree roots are following the old decayed roots down deep into the ground and feeding on this decayed matter to its great advantage. I have to answer a question here that I have had to answer many times: "If it will pay to take out the stumps?" By no manner of means; the stumps and roots are the best feeders to the trees as long as they last, and the roots help to keep the soil loose and easy for the roots to penetrate. If it were not for the stumps so continously sprouting, they would be of more value than that much fertilizer.

THIRD, THEN THE PLANTING

Should be done well, well done. This can only be done in much of this hard land by digging good large holes, so that the tree shall have enough fresh soil to get a good start the first year. A large hole is no disadvantage in this south country, but rather an advantage, for there is no danger of the hole holding water like it will in many other parts of the country. Well planted, but not planted too deeply, and the soil well packed about the roots, is the correct way whether the plant be a strawberry, raspberry, grapevine or apple tree.

FOURTH, THE PRUNING

At the time of planting; all plants and vines, and trees, need more or less pruning at the time of transplanting. Care should be exercised in this that it be not done too severely and the nature of the tree or plant must be taken into consideration. The strawberry needs only its

outer and older leaves taken off; the raspberry and blackberry need the old cane cut off to about six inches in length; the grape needs only four or five buds to make its best growth; the peach and Wild Goose plums should be cut back severely; the apple and pear only moderately, and the cherry and foreign plums very slightly indeed. In fact, remember this and it will be a good guide: That the harder the wood, the less it should be cut; all trees should be pruned with a special leader, center branch, and the other branches at right angles to the main branch.

FIFTH, THE CULTIVATION,

Which should be done in a very systematic manner. If you have to plant anything in the orchard, plant corn, and as soon as the trees begin to bear, then stop the cropping, unless you put something back on the land again to feed the trees, such as cow-peas, clover, ashes or manure. Clover I always fear to recommend for nearly everyone is apt to leave it on the ground too long.

At least one good plowing should be given the orchard each year and then cultivation during the summer with the single plow, disc harrow and double shovel. Our small fruits and vineyards need the best of cultivation during the whole of the summer to get the best growth and sure results. The fact that the principle of cultivation is just as necessary to the plants and trees in the ground as feed and care is to our animals, or as cultivation is to the corn crop. As you would expect no corn crop without good care, just so look at your orchards and "go and do likewise."

SIXTH, AFTER CARE,

Will depend entirely upon the plant or vine or tree. A good rule to follow is not to cut off anything unless you can give a reason for it. The strawberry may have all its runners kept off or not, just as you plan to keep your bed; the raspberry and blackberry need topping off at the height of 2 to 3 feet and the superfluous shoots taken off; the grape needs only those vines let grow for fruiting and for shade of its crop of fruit. The peach and Wild Goose plum and Keiffer pear need to be cut back each year more or less severely according to their variety and growth.

The apple and pear need very little cutting, only to keep it in shape, while the cherry and damson plum need no cutting at all. Better always cut too little than too much, and remember while the trees and plants are young that you cannot get good root growth unless you get good leaf growth, and you cannot get good leaf growth if you are continually pruning or pinching during the whole summer. The

leaves must be abundant on the tree if you expect a healthy tree or good growth. Many an orchard has been pruned so badly or so persistently that it has not enough leaf surface to give good life and vigor to the tree, and the trees have been stunted. Let us always use common sense and moderation in all these matters and we shall be on the safe side.

SEVENTH, THE FEEDING OF THE TREES

And vines is a very important, a very interesting and a very valuable question for us to consider. They must be fed, we all admit that, but just how to do it the best, the easiest and the cheapest is a question that we cannot yet answer. Ashes, lime, bone meal, dried blood, nitrate of soda and salt are all good and powerful feeders like corn and wheat are for our cattle.

Just how much to use, and when to use, and how to use, are questions we cannot answer positively. We are testing this matter all over the country, and in Europe quite extensively at this time.

EIGHTH, THE FIGHTING OUR FUNGUS DISEASES

And our insect foes are two very important matters that must be stuided well if we expect to have good fruit. I believe that facts have been established that the Bourdeaux mixture will destroy the mildew and scab and rot, and that the Paris green or London purple will destroy insect life, and the only question for us to settle is when to use it, how to apply it, the number of applications to give, the strength of the mixture, the pump and nozzle to use, and the cost of it all.

As a result I must say that each one must experiment and test for himself, and know how to mix the ingredients and then how to apply them. It is quite a problem to get the mixture just right, and apply it in just the right manner and at the right time. If it is thus done we may be sure of success.

The following is the best formula:

BORDEAUX MIXTURE.

Four lbs. sulphate copper in 50 gals. water, 4 lbs. lime, 1 lb. soap.

Paris Green—Add 2 ozs. for apple or 1 oz. for peach to the above mixture.

London purple—The same if you use it instead of Paris green.

The Bordeaux mixture should be used first before the buds start in the spring. The second application should be made with the Paris green added and made just as the bloom drops, and the third about ten days later.

A NEWLY DISCOVERED INSECTICIDE.

It is announced that Mr. S. C. Moulton, of the Massachusetts Gypsy Moth Commission, has made a new and important discovery in insecticides. The compound used is arsenate of lead, which is prepared by dissolving eleven ounces of acetate of lead and four ounces of arsenate of soda in 150 gallons of water. These substances dissolve quickly and the arsenate form of lead, which is a fine white powder, much lighter than Paris green, and while fully as effective in destroying insect life, has a number of marked advantages over Paris green. If the mixture happens to be stronger than is necessary, even to the extent of three or four times the necesssary strength, it does not injure the foilage upon which it is spread. This is an important point in favor of the new insecticide, for not infrequently in the use of Paris green for the potato beetle and the codling moth larvæ, the poison has burned the foliage and caused as much injury, perhaps, as the insect pest would have done. Prof. Fernald, of the Hatch Experiment Station in Massachusetts, in reporting on the new insecticide, says that it is better under all circumstances and for all insects than Paris green. Besides the advantages just referred to it can also be seen on the leaves, so that one can tell what has and what has not been sprayed. Furthermore, being lighter than Paris green, it does not settle so quickly, and as a result it can be distributed over the foliage more evenly. Arsenate of lead can be used, if necessary, in the proportion of twenty-five pounds to 150 gallons of water, without injuring the foliage, although no such strength is required to destroy insect life. Prof. Fernald advises the addition of two quarts of glucose or molasses to each 150 gallons of water, in order that the insecticide may adhere to the leaves. Experiments show that it will adhere to the leaves for a long time, even after quite a heavy rain. The cost of the material is quite low. At wholesale rate arsenate of soda costs 8 cents per pound, and acetate of lead 14 cents a pound. It should not be forgotten in using these applications that they are very poisonous, and must be handled with care.

NINTH, PICKING, PACKING AND MARKETING.

While all the other points I have mentioned are important, this last one is none the less so, for if it is not well done the whole of the best profit is gone, and our work is not a success. I have seen good, fine fruit so handled, and packed and marketed that it did not bring as much as other fruit not so well grown or so large and handsome, just because they were better handled. These times are calling for

special, even, regular, systematic, honest packing, and those who meet these requirements are the ones who will make the money out of their fruits and the others will not. Beginning with the strawberry, it pays to have the berries run even in the boxes; it pays to have them well picked; it pays to have clean boxes; it pays to handle them carefully, and it pays to have one variety in a crate. The same points are urged in regard to the raspberry, the blackberry, the grape, the plum and the cherry. With the peach, the pear and the apple it pays best to make three grades: Fancy, No. 1 and No. 2. All fancy fruit should be able to go on the fruit-stands. All No. 1 should be strictly No. 1 all through the packages. Fruits that run even in size are the ones that always bring the most money.

It is astonishing how soon one will make a reputation for good packing if he is honest in his endeavor, and has any large quantity of fruit to handle, and it is equally surprising how soon people will shun a "brand" if they have been fooled a few times. Good, honest packing in good clean, full size packages, will always pay the fruit-grower.

THE WORLD OUR MARKET.

In the discussion of this topic, the "Fruits of the Ozarks," we may be sure, that if we but grow the fruits of the Ozarks, we will make a market for the best fruits that grow on top of the earth, and this market will not be a short-lived one, but one that will grow and grow, and increase in volume like the beautiful spring brook which rushes onward to the full river and it to the larger, until all the world knows of the majestic river and its name, and power and its capacity. I shall expect to see this southern land occupy just such a high position with its apples, and peaches, and pears, and grapes, as Oregon with its prunes, as Florida with its oranges, as California with its raisins, as the Newtown pippin has in New York, as the Rhode Island Greening does in Michigan, or as the Spitzenberg in New England. Onward and upward will be our motto, and success is assured.—L. A. Goodman, in Farmer and Fruitman.

THURSDAY, June 6—9 a. m.

Secretary's Report of the Fruit Crop, June 18, 1895.

Since our meeting last winter we have had many things to encourage us in our work as fruit-growers and developers of our lands as well as beautifiers of them. Some strange things have happened;

the winter has been a mild and pleasant one, and yet some of the coldest weather that we ever have lasted for a day or two at different seasons.

The winter has been the dryest, and the spring, in sympathy, has kept up the record. The early budding of our trees, the extreme warm weather of March, the numerous cold spells, with frost attending, and the continuous cool weather with the smallest amount of rain for April and May have not hindered our fruits from fully developing.

The extreme dry weather of 1894 injured, and the past winter injured still more, our raspberry and strawberry crop. This drouth affected more or less all our fruits which may be seen in dropping of the fruit in some places this summer. But no serious injury has thus far occurred and the prospects are the best the State has ever had.

Our apple crop promises to be one of the best that the State has ever produced. From the Iowa line to the Arkansas border; and from the Mississippi river to the Kansas State line, the report comes continually that wherever the orchard was not too full last year, and wherever the trees have been taken care of; the crop will be good. What this means to Missouri, one can hardly appreciate until he sees the millions of money it will bring to the State.

In some instances the hail has done damage, in other instances there has been some injury by late frosts, but the injury is local only, and the damage not severe. The south part of the State will make a wonderful showing this year if nothing intervenes, and I look for a great extension of our orchards during the next few years.

Cultivation and care show conclusively that they will pay, in the growth of the tree, the health of the leaves, the vigor of the bloom, the size of the fruit, and in the money return the crop will bring.

Already buyers are seeking to locate our largest apple orchards, and making bids for them. The crop will be light in the East, and prospects are good for fair prices.

The peach crop will be quite a general one, but strange to say that along the line of Neosho, Carthage and nearly or quite to Springfield, the crop will be a very light one, while as far north as St. Joseph it will be a full one. In some few locations the trees were slightly injured, but where they were cut back properly, they have shown a wonderful vigor and growth. Peaches will be abundant, however, in the State, and the prospect is fair for good prices.

The pear crop will be an average one, excepting locations where some damage by frost occurred.

The plum. Wild goose varieties promise a good crop over most of the State in spite of the large crop of last year. They are being

marked for their doom by the curculio, and if not jarred or sprayed will likely be very wormy. The European varieties, as has ever been their record, will make a poor showing. The Japanese varieties, where not killed by early frost, show that they can produce more plums to the square foot than any other; yet it is doubtful if they are profitable market varieties.

The cherry, Morello varieties, are as full again as it is possible for the trees to hold in most all our fruit districts. In spite of the very large crop last year we will again have a good crop of fine cherries. Dry weather is affecting their ripening somewhat.

The grape has been injured in many northern counties, but in most of the State the crop will be an average one. The grape crop of the East has been cut off very badly by frosts, and we may safely count on fair prices for our crop.

The blackberry, where hardy varieties were planted, never looked better, and give promise of a grand good crop indeed.

The raspberry will not be more than half crop.

The strawberry did not average more than one-half crop, except in some special locations.

Taking all in all, we will have good fruit crop, and if money was not so scare, could count on good prices, but as it is we can only expect fair to good prices.

THE SOCIETY'S WORK.

This is gradually growing. Interest is increasing. More locations are developing. More thorough work is being accomplished and people are studying and watching and experimenting, finding out more and more the requisites necessary to success, and striving more earnestly to follow them. The Society and the local societies, and the horticultural papers are all agents in this work, and are working with a will which is showing good results all over the State. The influence and teaching of our Society has done much for the fruit interests of the State, and been the means of locating many a fruit-grower in our midst. Intelligent and earnest following will surely bring success to horticultural effort in spite of the drawbacks which seem to surround us. Discouragement and failure comes to every business of life, but to those who persevere and faithfully work, success surely comes at last. Ours is no exception to any other business of life, and one has only to look about him to see failure in every vocation that man follows.

Marketing—If there be any subject that this Society is interested in more than another, next to planting it is in the proper picking, packing and marketing of our fruits. Good measure, perfect fruit, well

handled, clean packages, uniform size, named varieties, clean specimens, honest packing and the packers guarantee behind it, is what the Society wishes to inculcate into the minds of every fruit-grower. Ship no trash; pack no culls. Keep all inferior fruit off the market and your fruit will pay.

The work done at Jefferson City, while not what we had hoped it to be, yet we will have to be content with. We had expected to see our appropriation increased so that we might have more money to use in the display of our fruits at different locations. From the expenditure of moneys in many directions it would seem that the Legislature would be justified in giving to the Society 3, 4 or 5 thousand per year and print at least five thousand copies of our report. But our printing will be as usual, 3500 copies, and $2500 per year for Society use. We tried in every way possible to get a thousand dollars for our entomologist's work, but were doomed to failure. Some money put to use in this way would be worth thousands to our people.

Our Agricultural College separation failed to pass the Senate after passing the House. Much interest was manifested, and our Vice-President, Murray, deserves our thanks and our admiration for the faithful work he performed in the cause. If there ever was a just cause of separation and removal, there is certainly reason for this action if the State ever expects to have an Agricultural College worthy the name.

As before stated to you many times, it is the only way to make our Agricultural College a success, and I feel sure that it would be to the best interests of the University also. The State Society entered into this movement alone, and have had the brunt of the work to do, but we have done it with the best of feeling and good wishes; have no ill-will against any of the University people, and will now wait another two years to see what shall be accomplished at the College. This matter is not settled yet, and if the continual prejudice is persisted in, then there will be a stronger effort made at the next meeting of our Legislature for separation.

If our boys and girls will not attend the College under its present management and surrounded by its present influence, then it is time for them to say so, and it is due time for our Representatives to hear and heed the call. A separation would mean that the $50,000 income of the College would in two years establish a College rivaling that of Iowa, Illinois, Kansas or Michigan.

THE EXPERIMENT STATION.

Our interest as fruit-growers centers in the knowledge and information we can get that will most correctly answer our questions and give us facts and help us make a success of our fruit interests. The future work of the Station depends upon the money that is given it, and the line of work outlined and followed. We should be glad to see some of the experiments stated that were suggested at the meeting at Trenton. If some four substations could be organized to test fruits and report to the center station at Columbia, then we would see a great improvement in their experiments.

Whilst it would not be possible for the substations to carry on any scientific experiments, yet they would be of untold value in testing varieties, using the different forms of fungicides and insecticides, different modes of culture and pruning, testing new tools and plans of picking, packing and marketing. This can never be done unless the Boards of Regents will set aside a certain sum of money for this department to experiment with and give horticulture its due position at the Station. The results obtained do not justify the stingy outlay thus far.

OUR REPORT.

This has been in the hands of the State Printer since January 10, and is just being finished. I expected to have them here for distribution, but they are not quite ready. This delay has been caused by the two sessions of the Legislature, and it does seem too bad that it should be so long delayed, when it might have been ready in a month after the copy was furnished. The report I feel justified in saying will be equal to any the Society has sent out, and embraces a list of "Trees and Shrubs" of Missouri, prepared by B. F. Bush, Botanist, probably the most complete or only complete list ever printed in our State.

The "Report" is made up of our own experiences, observations, discussions and papers; and I am sure that every one of them is practical and of great value to the fruit-grower. While I can but feel proud of our "Report," yet they are yours, and their value depends upon your intelligence, your knowledge, your experience and your presenting them.

THE ST. LOUIS EXPOSITION.

Our display last year at St. Louis, in connection with the World's Fair display, was surely a move in the right direction, and although a very hard year to make a display, was yet one of the best we ever made. You will see some photographs of the display on the walls, and

can but admit that it was a good one. This display cost the Society less than $100, whilst the one made a few years ago at the same place cost over $800. This was made possible because the St. Louis Exposition paid the expenses of the display itself, and in doing so did more than any other association ever did, and performed all it promised to the letter. This display has been the means of drawing the attention of people more and still more to our orchard lands, and it behooves us this year above all others to make an extra effort to make a grand display at the same place that shall eclipse all others. Our State Society has the reputation of doing more of this work than any other in the land, and we do it because we think it the best means of advertising. We shall take charge of the coming display, and hope to have the assistance of 40 counties of the State.

LETTER FROM MR. GAIENNIE.

Mr. L. A. GOODMAN, Secretary, etc.:

DEAR SIR—I received the notice of the semi-annual meeting of the State Horticultural Society, to be held at Willow Springs, June 4, 5 and 6, and nothing would give me greater pleasure than to attend, and I will do all that I possibly can do, if my business engagements permit, to be there anyhow on the 5th or 6th. Should I, however, not be able to leave the city, I beg to express to the Society my thanks and appreciation of the work they did at the St. Louis Exposition of 1894, and hope their exhibit at the Exposition of 1895 will be even more successful than the one in 1894, which, in my opinion, has been of great benefit to the St. Louis Exposition, and, I believe, to your Society.

With the assurance of my great respect, I am, yours truly,

FRANK GAIENNIE, General Manager.

OUR COUNTY SOCIETIES.

Though many are flagging, those that live are doing good work and keeping up their interest and their studies. Discouragements will come, of course; can you tell me any business or occupation that does not have them? Our merchants have a hard time to keep their debts paid. Hotel keepers never passed through a more severe trial. Professional men have to do double the work for half the pay. Mechanics have been working on the shortest time ever known. Railroads cannot pay the interest on their bonds. Capitalists have lost 25 per cent in the value of their estates. Land owners see their properties slip away without help, and farmers and fruit-growers never saw such close times before; and yet they are as well, if not better off, than many thousands of our fellow-men. During this time of general depression, disruption, despair and destruction, we must expect to have some of it.

Our county societies can help to a better work, a more advanced standard and a determination to succeed if they will but pull together and encourage each other. County societies can do much to advance the interests of their counties. Let us determine to do it.

AN ENTOMOLOGIST AND BOTANIST.

Some years ago the Society selected as its entomologist, Miss Mary E. Murtfeldt, and expected that in a year or two we would be able to secure an appropriation for her, but thus far have failed. For the work that she has done for the Society she has received no recompense, except now and then a little donation. It would be well if we could pay her something for her valuable assistance this year. Willingly she gives information to anyone who ask of her, and her opinion is the ultimatum when an insect is sent to her for identification. If you find any insect that you want to identify, send it to her and she will name it. This will be of much value to you and you should avail yourself of this opportunity.

Mr. B. F. Bush, botanist, of Independence, is authority on the botany of our plants and wishes to have members know that he is ever ready to name plants, weeds, vines or trees for any member of this Society if they will but send him samples to name. He has furnished the Society a list of trees of Missouri that is of great value, and I would suggest that he be elected an honorary member and chosen as our botanist.

THE FRUIT INTERESTS OF THE STATE.

The fruit interests have grown and multiplied to such an extent all over the State that it is hard to say where the fruit interests are not important. Millions of trees have been planted on every kind and quality of land from the Loess formation along the Missouri river to the Ozark region, and down even to the gumbo of our praries and river bottoms. Orchards of hundreds of acres and thousands of trees; orchard on mounthin top, on hillside, in the valley, on the prairie, in the river valley; orchards of thousands of trees of one single variety; orchards with forty varieties; orchards well-planted and well cared for, and others planted and left to the care of the grubs, the weeds and the borers; orchards planted by well-posted men, by novices, by the merchant, the lawyer, the doctor, by those who think all they have to do is to plant and then reap; by those who are ignorant of the first principles of tree growth and tree fruiting, and orchards planted by those who know how to care for them and have the pluck and vim to make, and will make a success of them.

This indiscriminate planting will surely result in very many disappointents to the loss of much money and the wasting of both means and energy. Many of these will have no good word for the fruit interests of the State, but on the other hand abuse and sometimes cursing. It is well, perhaps, that such should fail and seek other avoca-

tions, for if success could follow such careless and unbusiness-like methods the fruit business would be of no profit at all.

The fruit of the State will this year bring more money than ever known in our history. The failure in many parts of the country by the frosts will give Missouri such an advantage as to prices for her vast product that ten millions of dollars will fail to cover its value. Thirty thousand people are now growing fruits or are directly interested in the cause of horticulture in this State, and this means 150,000 persons dependent upon it for their support. This means the employment of 150,000 women, girls and boys in the gathering, marketing and handling of our berry, peach, apple and other fruit crops.

When will the fruit grower learn to take the same business-like view of the orchard and berry plantations that other men take of theirs? Giving it the same care and attention, work and study, watching and waiting, push and vim, persistence and enthusiasm? Failures will come. Hail and snow, frost and heat, rain and drouth, sunshine and cloud, insect and rusts, sickness and death, and yet we are astonished when they come to us and are angry. We expect such things to happen, and men think that we will be the sufferers. We are sure that death is abroad and know that all things will die, yet wonder that it should happen to us. Too many think that all men will die, but that they themselves are immortal; they know that disaster will come to men, but do not expect it to themselves.

And now, friends, let us be in earnest. Let not little things disappoint or discourage us, but with the best knowledge that we can obtain let us do our best, assured that success will crown our efforts.

This little city and its surrounding hills will blossom as the roses. Orchards and vines and small fruits will dot the hills and valleys about here so beautifully that a man visiting this country in five years will wonder why he did not own one of these beautiful homes. To this end let us work and to this end we will be sure to succeed. Watch and wait and work.

L. A. GOODMAN, Sec'y.

REPORT OF COMMITTEE ON SECRETARY'S REPORT.

We, the committee appointed to examine and audit the Secretary's report, beg to recommend that an appropriation be made Miss Murtfeldt, our entomologist, of one hundred dollars. While we do not consider this full payment for her most valuable services, we hope she will accept it as an expression of our feeling and good intentions, and we further hope our treasury will be so replenished that this may be handsomely increased in the near future. We also recommend the expenditure of sufficient money to make our Horticultural display at St. Louis second to none in the land, as we feel and know that Missouri can make such a display.

We further recommend that the Secrerary's report be approved and accepted as a whole

JOHN T. SNODGRASS,
S. I HASELTINE,
A. AMBROSE.

The report of the committee was adopted, and the Secretary instructed to make the necessary arrangements to carry on the fruit show at St. Louis this fall.

REPORT OF A. NELSON, TREASURER, June 4-6, 1895.

1895.			
	RECEIPTS.		
Jan. 8..	Warrant from State Auditor		$624 96
May 6..	Warrant from State Auditor		561 52
Jan. 1..	Balance from settlement report of 1894		161 83
	Total		1,348 31
	EXPENSES.		
Jan. 8..	A. Nelson, expenses to Willow Springs	$11 58	
8..	D. A. Robnett, expenses to Dixon, Ill	26 05	
	Warrant No. 286		37 63
Jan. 25..	Express, 55c, $3 85, $3.15, $3 15	10 70	
25..	P. O. bill	22 00	
25..	Salary for Secretary for January	66 66	
	Warrant No. 287		99 36
Jan. 25..	J. C. Evans, expenses to Jefferson City and hotel	11 55	
25..	L. A. Goodman, expenses to Jefferson City and hotel	11 55	
	Warrant No. 288		23 10
Feb. 5..	H. Schnell, expenses of Institute at Marceline	6 15	
5..	J. W. Turner, " " "	4 60	
5..	L. A. Goodman, " " "	12 20	
5..	J. C. Evans, " " "	10 20	
	Warrant No. 289		33 15
Feb. 18..	G. B. Lamm, expenses as committee on Horticultural education	3 35	
18..	G. W. Gilbert, expenses at Institute	7 00	
	Warrant No 290		10 35
Feb. 20..	G. B. Lamm, balance on expense account	8 65	
20..	J. C. Evans, attendance Cole Co. Hort. Society	14 55	
20..	A. Nelson, " " "	23 00	
	Warrant No. 291		46 20
Feb. 26..	Express, 75c, $1, $1.15	2 90	
26..	L. A. Goodman, expenses to Neosho	11 80	
26.	Salary of Secretary for February	66 66	
	Warrant No. 292		81 36
Feb. 26.	Hudson & K. 6M. letter-heads	25 15	
26..	1750 envelopes, $5.75, express, $1 80	7 55	
	Warrant No. 293		32 70
Mar. 16..	P. O. bill, S. S. Booth. Warrant No. 294		32 16
16..	L. A. Goodman, expenses to Jefferson City	18 55	
16..	L. A. Goodman, Freight on reports	2 15	
16..	L. A. Goodman, expenses to Carthage	10 20	
	Warrant No. 295		30 90
Mar. 26..	Salary of Secretary for March, $66 66, express, $1.50. Warrant No. 296		68 16
26.	A. Nelson, expenses to Jefferson City	24 50	
26..	G. B. Lamm, expenses Hort. education	10 80	
	Warrant No. 297		35 30
Mar. 16..	J. C. Evans, expenses to Oregon Co	20 60	
16..	J. C. Evans, expenses to Jefferson City	10 55	
	Warrant No. 298		31 15
April 25..	Salary of Secretary for April	66 66	
25..	Expenses to Jefferson City, $14.55; express, $1.20	15 75	
	Warrant No. 299		82 41

REPORT OF TREASURER—Continued.

April 30..	Mrs. S. S. Booth P.O. bill. Warrant No. 300		30 85
May 15..	Hudson & K., cuts for report (4)	26 00	
15..	Prints of above cuts for report (3500 each)	20 00	
	Warrant No. 301		46 00
May 25..	Salary of Secretary for May	55 66	
25..	Express, 30c, 70c, 90c; programme of meeting, $11.50	13 30	
	Total		800 78
	Balance in hands of Treasurer		547 53
			$1,348 31

A. NELSON, Treasurer.

We, the committee appointed to audit the Treasurer's accounts, have examined all bills and warrants and find same correct, showing balance in Treasurer's hands of five hundred and forty-seven and 53-100 ($547.53) dollars.

JOHN T. SNODGRASS.
N. F. MURRAY.
S. W. GILBERT.

The following letters were read and discussed:

MORRIS, ILL., August 16, 1892

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—I see in O. J. Farmer a notice of publication by your State Horticultural Society of its 37th annual report. If sent outside of your State would very much like you to send me a copy. There are several families here—now renters—who are desirous of locating in Missouri, and would like information in regard to the most desirable part of your State where good land can be yet secured before prices get, as they are here, "out of sight."

Will you kindly inform me what county, if any, there are in your State, that combine good soil, pure water, suited to general farming and fruit raising, where no malaria or serious objection to health obtains, and where land has not yet reached a price beyond ordinary means of securing it. I know of several excellent counties in your State, but the land now too high-priced for our means.

Jasper county has been highly recommended, both for fruit and grain, but I fear two things; these are, that it is too close to the dry belt and hot winds and also in a cyclone route. If I am mistaken will you kindly correct me.

There is another county—Miller—where lands are quoted very low in price, yet extravagant claims are made as to its productions. Why is this? Is there no prairie in Miller county?

You will understand we are entirely ignorant in regard to a great portion of your State, and would be pleased to go and look at any part of the State you would recommend.

An early answer would much oblige Yours truly,

W. J. FOLEY.

Answer—We have forty counties where you can get good, cheap lands and a good home among good people.

JEFFERSON CITY, MO., Oct. 19, 1894.

L. A. GOODMAN, Westport Mo.:

DEAR SIR—At our last meeting held in Jefferson City, October 11, we elected the following officers for the years 1894-95: J. W. Edwards, president; Charles Staats, first vice-president; J. A. Hunter, second vice-president; Fred Buehrle, Treasurer; A. J. Davis, secretary. Dates were arranged for the Society's meeting for Jefferson City as follows: Second Monday in November, 1894; second Mondays in February, May, August and November, 1895. Have tried the virtue of the two methods of caring for newly planted fruit trees, namely: mulching and oft-repeated cultivation. I think the past summer has been about as good for that purpose as one could wish; will give the members of our Society the benefit of what little I learned at our winter meeting at Trenton if I can be able to attend. Could find no apples in our county this fall that I considered fit to exhibit.

Our local Society extends a cordial invitation to you to attend our meeting when convenient for you to do so. Yours truly, A. J. DAVIS.

EMBARRASS, WIS.

L. A. GOODMAN, Westport, Mo.:

DEAR SIR—Your name is mentioned in The Orange Judd Farmer, Aug. 4, 1894, as Secretary of the Fruit-growers' Association.

I have recently sold my business here, and being quite out of health and unable to endure the winters here, I intend going to the Ozark country, around Rogers and Springdale, Ark., to buy me a home, and to benefit my health. I want to engage in the business of raising fruit, and I thought you might be kind enough to give me the benefit of your greater knowledge and experience in this business. Will you kindly inform me if the apples raised in this section are hard and of good quality? Is this country too remote from St. Louis and Kansas City to raise berries, grapes and small fruits profitably? The towns are located on the direct line of the Atchison, Topeka & Santa Fe R. R., about one day's journey. Can you give me any information about this country as regards quality of fruit, soil, climate, water, etc.?

I am fifty years of age, and this change, I contemplate, is to make a home for my family and myself in my old age.

You will pardon the presumption that induces me to prefer this inquiry, but the change is for me an important one, and if you will kindly answer, and give me the benefit of your advice, it will be greatly and sincerely appreciated. I enclose stamps for reply.

A. C. SALMER.

HURON, SOUTH DAKOTA, August 14, 1894.

HON. L. A. GOODMAN, Secretary State Horticultural Society, Westport, Mo.:

DEAR SIR—Will you do me the kindness to send me the latest report containing the proceedings of your Society, if issued in volume, or such information as you can that will give this and additional information, as I am trying to get posted on your State with a view to locating in it. An early reply will be appreciated. Yours truly,

MARION COOK.

QUESTIONS AND ANSWERS.

Is lack of proper fertilization one cause of a short crop?

Yes; often it is.

Is not the wooly aphis induced by some chemical condition of the soil which might be changed by the addition of a suitable fertilizer?

No.

J. G. Cox, Odessa, Mo., wants to know about the Robinson apple, Glade Beauty apple and the Winter Banana apple.

Nelson reports the Robinson Pippin as a valuable apple, but no one seems to be posted on either of the others.

WEST PLAINS, MO., May 13, 1895.

MR. SECRETARY—We are making preparations to attend the meeting at Willow Springs 4, 5 and 6. I expect a good turn-out.

Querry—Are honey bees injurious to horticulturists? If so, why?

To be answered at meeting. Respectfully,

R. G. SMITH.

The universal opinion is that they are very beneficial.

SECRETARY.

At what height should apple trees be headed in a windy location?

Eighteen inches.

Should young trees, one or two years planted, headed above three feet, and badly headed besides, be replaced by new ones?

If they are not sound trees, yes. If some are good and healthy, leave them.

Can new limbs be encouraged to grow on the trunk?

No; not after the top is formed.

Can limbs of overloaded trees be successfully supported to prevent breaking?

No tree should have such a load as to need proping.

Can forks in bearing trees be prevented from splitting by wiring them together?

Better bolt them.

When do Abundance and Burbank plums ripen in North Missouri?

August.

Will one quart of salt thrown around the trunk of a tree injure it?

No; but will benefit it.

Have you fruited the Babbett raspberry—can you tell us anything about it?

Murray has it and finds it good.

How or where can we get good rubbers (such as we used to get) for fruit jars?

At the wholesale houses in Kansas City.

Please tell us about growing artichokes for hog feed in winter in this Ozark country.

Plant and cultivate like potatoes. They will yield 200 bushels per acre and hogs will dig them.

How can we farmers, with small amount of cash, keep our apples over winter?

Make cellars in the sides of these hills.

What is the most practical way to down the black jack sprouts, looking at it from the standpoint of the man of average means?

Cut them in July or August. Cut your trees at that time and they will not sprout so badly.

What is the best style of plow to use in farming new ground, after having been broken one way thoroughly with a bull-tongue plow?

Use the chilled plow.

What worthy variety of peaches produce true to name from seed?

The Smock family will come as near as any unless it be the Indian peach.

Receipt for Borers: One quart coal oil, one pint turpentine, one pound sulphur, one gallon soft soap; make into emulsion by gentle heat and add 25 gallons of water; wash trees. D. L. Davison, M. D.

What kind of storage for apples would this Association recommend to small growers?

Cellers in these hillsides.

Is the strawberry rust and blight the same thing?

No.

Has spraying proven an entire remedy?

Not entirely; but is the best preventive measure.

What time to cut Alfalfa and manner of curing and storing?

Cut three or four times a year and store like red clover.

What distance apart would you advise setting grapes in this section?

Eight by eight feet.

How and what is a sure way to propagate roses, especially Hybrid Perpetuals?

Layer them.

Is fertilization necessary for the development of apples, pears, etc?

Yes; certainly.

Are the imperfect strawberries (buttons) in some sections this season, caused by the draught, cold, insects, or imperfect fertilization?

By one or all these.

What black cap raspberry is most preferable for a market berry?

Hopkins and Kansas.

We mulched all kinds of berries with cane bagasse in Nebraska and also here, and is the best of all mulches as no weeds are ever in it.—Mrs. Moyer.

Will crimson clover do well in south Missouri?

Red clover is better.

If so, would it not be an ideal crop to supply humus for our soil?

The cow-pea is best in an orchard of all fertilizers.

EXCELSIOR SPRINGS, MO., Aug. 18, 1895.

MR. L. A. GOODMAN, Westport, Mo.:

DEAR SIR—I received the 37th Annual Report of the Missouri State Horticultural Society, and accept many thanks for same. In looking over some Agricultural paper that I have, last fall I came across the following: if a tree is infected with borers, find the animal, and if you cannot get at him very well, just put a parlor match with the sulphur end next to him that plugs his hole, and he goes where the woodbine twineth.

Put 3 or 4 good handfulls of powdered coperas around the body and roots of grape vines, and it will prevent the rotting of the grapes, the first of June, and again on first of July. I have tried both with entire satisfaction. The borers are dead where we used the sulphur match, and my grapes rotted less this year than by spraying, and I think the flavor is improved.

Yours,

JNO. W. HENRIE.

Would like to plant about 50 each of cherries and pears this fall. What varieties would you recommend? Would like to have the cherries half and half, sweet and sour.

Twenty-five E. Richmond 25 English Morello.

Mr. Goodman—There seem to be some varieties of Wild Goose plum that don't fertilize themselves; and there are other kinds which do fertilize themselves.

Mr. President—I want to make an impression in regard to my remark about a man cultivating his orchard until it is large enough to bear and then letting it alone. I want that fact well understood. He must not, if he wishes to make a success of his orchard, bring it up to bearing age and then quit taking care of it. But he must keep on cultivating it as long as he expects to make anything out of it. There are too many persons who are trying to raise an orchard who treat it that way. But that is a great mistake.

Mr. Tippin—On this point I think perhaps another point will be well to advance. I believe we have as great an evil in the practice of cultivating the orchards for a number of years and then not cultivating them for a long time, and then turning in and cultivating them too much. Mr. Haseltine has used a plan referred to by Mr. Lamm. In 1880 he planted an orchard and did not cultivate it except by mulching for five years after he planted it. It was in grass. When the trees got big enough he had crops. I think he got $1500, or 3000 bushels two years ago. The next year he had a fine crop, and last year only half a crop. Last year he gave it fine tillage, repeating it week after week, and the result is he has produced an overgrowth of foliage and has no fruit at all. I agree with you, Mr. President, in regard to keeping up the cultivation. I believe it should be commenced with the beginning of the orchard and kept up as long as the orchard is continued. It is like feeding a child and expecting it to become a man—you must begin feeding it at first and keep it up.

Mr. Murray—I thank the gentlemen for their compliments to my paper. I am willing to concede a little to the other side. I will say I was describing an orchard of different formation from his. It is on bluffs and hills. I will say for the orchard I was describing that it is the orchard I have on my home place in North Missouri, and it is at the end of 20 years from the time it was planted. It averaged $40 net per acre per year. I cultivated it and the more the trees grew the more I cultivated it; I mulched it and gave it barn-yard manure, wood ashes, which latter I hauled for several miles distant. The people all laughed at me and said I was foolish. Finally I came to the same conclusion that my friends did. The trees were so thrifty and doing so well I thought I would quit cultivating them. They did still do well, and the first year after that they bore a good crop; came near bearing themselves to death. I went to cultivating them and got a fine crop for two years, amounting to $200 per acre. Those trees at five years

old had apples everywhere from a peck to five bushels. I measured the apples from the best tree and it was exactly five bushels. I never had a failure on the orchard for 15 years; I had light crops and heavy crops, but never a failure. I am not boasting of my orchard. There are others I know of that are as successful. I know one 12 miles from St. Joseph where a man planted 80 trees per acre on six acres. They are mostly Ben Davis. After he had had it planted 18 years he told me he had received a little over $1200 for the sales. I know we have an old fashioned orchard, apples that are old fashioned, that never paid for the ground they grew on and never will. I have two Baldwin's 20 years old. One never has borne a bushel of apples, and the other, perhaps, has borne two barrels all told.

We have the last year been going through the school of experience, we have had all kinds of discouragements and backsets, and failures; but men in North Missouri who have followed along with the tide and kept up with the leading varieties to plant and have planted those choice kinds on their farms on the bluffs and hills, especially near streams where it was well drained, where they have planted good varieties, there has never been a complete failure for ten years—or twenty years, I will say—though the crops have varied considerably from time to time. So now when we are having such peculiar weather, and have failures once or twice, we must be willing to bear it without complaint. These are times of adversity, but they will not last always. We must buoy up and bear it for the present. It will come around all right in the end. I agree with the President in his idea of the necessity for the continuous and persistent care of the trees from the time they are planted, clear up to the time they are given up. I think that is the only way to have them produce the best results. I don't consider that I gave my crops the opportunity he did, but I got good crops. I hoed around them, and raked them and cultivated them. It will pay a man to spend something on his orchard, even if it costs a good deal, to obtain the best results. But with the right kind of treatment we can successfully cultivate an orchard at very little expense. There are many other things that I might say, but I don't want to take up the time of others. I will say in regard to pruning that I would rather have no pruning at all than too much. A little is good, and very necessary; but too much is very injurious.

Mr. Hartzell—I will ask Mr. Lamm if he plowed the ground first before planting his orchard. I am in favor of plowing the ground before planting the trees, as well as of cultivating it after they are planted. If we would have a successful growth of an orchard, whether we cut them down or let them grow old, we must be careful in regard to the

KOSHKONONG, MO., June 13, 1895.

MR. L. A. GOODMAN:

DEAR SIR—We have in our last springsetting of peach trees a great many seedlings. Will you kindly tell me which to do—bud them from their neighboring trees this summer, or wait till fall and replace with other trees?

Yours truly,

CALVER BROS.

Replace them.

ST. LOUIS, June 3, 1895.

L. A. GOODMAN, Sec'y, Willow Springs, Mo.:

DEAR SIR—The price ofthe tree wrappers is $3 per 1000 in small lots $2 50; in lots of 5000; $2.25 in lots of 15,000 and up. These are net cash prices. We cut this material from waste, hence the low price. They are quickly put on, with a short piece of broom wire put through two holes near the center with an awl, so as to hold wire in place, a great number can be put on in an hour. Above prices are f.o.b here in St. Louis. We neglected to send you prices.

Yours truly,

CARONDELET BASKET & BOX CO.

Invitations were presented for the winter meeting as follows:

NEOSHO, MO., May 11, 1895.

L A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—I brought up the matter of sending a delegation to Willow Springs to try and secure the next meeting of the Missouri State Horticultural Society here, before the Neosho Club at its last meeting, and a delegation was apppointed and the matter is well under way. We have already secured the court-house to hold the meeting in, and have also secured low rates from the hotels for the delegates. The delegation will be on hand at Willow Springs.

Yours truly,

J. M. PURDY.

NEOSHO, MO., June 3, 1895.

To the State Horticultural Society of Misssouri:

GENTLEMEN—The city of Neosho, by order of its Board of Aldermen, extend to you a cordial invitation to hold your next December, 1895, meeting in our city, and extend to you the hospitality of the city.

Yours respectfully,

N. A. MORFORD, City Clerk.

NEOSHO, MO., June 3, 1895.

To the Missouri State Horticultural Society:

At a regular meeting of the Neosho Business Mens' Club, held here 15th ult., a resolution inviting the State Horticultural Society to hold its winter convention in Neosho in December of this year, was unanimously adopted, and I was instructed to tender said invitation to you in convention assembled at Willow Springs, and to assure you that the fruit-growers, the citizens and business men of this community would use every effort to make the visit of the delegates to the convention a very pleasant, agreeable and, I trust, a profitable one.

The Neosho business men earnestly hope that your Executive Committee will see their way to appointing this city as the meeting place of your next convention.

Yours faithfully,

JAS. MCEWING,

Secretary Neosho Club.

MARCELINE, MO., May 29, 1895.

HON. L. A. GOODMAN, Westport Mo.:

YOUR HONOR—Owing to the press of our business, I cannot attend your meeting at Willow Springs, as would much desire to do; and, living as we are, in a part of the State where horticulture is just budding in anything of an interest, and a little encouragement at an early date would be the means of building a permanent horticultural business in this

vicinity. Therefore, by request of a number of our best citizens of the city and country, I give and extend a cordial invitation to the State Horticultural Society to hold their next annual meeting at Marceline, Mo., and on behalf of the good people of this place I feel safe in saying that all things requisite and adequate to make an interesting meeting will be done with the greatest of willingness and pleasure. Hoping this request may meet with favor, wishing you a pleasant and interesting time at your present meeting, I am with due respect,

Yours truly,

S. H. LINTON.

MOBERLY, MO., March 23, 1895

MR. L. A. GOODMAN:

DEAR SIR—Yours received. In regard to the change, I am confident it will suit our people fully as well, if not better, in December. You will please give me all the information and instruction you may have, so we can get ready in due time. I will see all the fruit men I can and talk it up.

Respectfully yours,

J. P SINNOCK.

THURSDAY, June 6—2 p. m.

What We Learn by Failures.

This is the topic given me by our worthy Secretary. A full answer would call for columns of both narrative and of facts. One cause of failure and perhaps the greatest is that many are too stingy to pay a dollar for membership in our State Horticultural Society, by which they would get needed light and knowledge, as developed in the life-long experience in fruit-culture of those who both, by success and failure, know how to avoid expensive mistakes and how to accomplish the best results; men whose lives are spent more in the interests of others than themselves.

If I had an enemy that wanted to grow fruit and had no experience and I wanted to keep him poor, I would advise him to work every moment, to never read a horticultural page, and to buy all the new varieties of trees and plants the glib-tongued tree agent offered him.

We pay enormous prices for new and untested varieties of fruit, which in a few years prove to be failures, and then cry "fruit-growing is a failure." But are we not ourselves to blame? Are we not the men who pay the tree agents big salaries and traveling expenses? Look at their pictures which will make your mouth water if you think of planting fruit trees or vines. But if you wish to succeed go to the nearest reliable nursery and buy your trees and plants.

If we aim to succeed we must devote not less than one-fourth of our working hours to eye and brain work looking around on soil like ours and ask fruit-growers who are honest for advice. One key to success is to learn that an acre in orchard or berries with a selection

of varieties adapted to our soil and climate, will bring more profit than ten acres with an ignorant, hasty selection and culture.

My failures are too numerous to mention, but I will quote a few. I planted too many varieties of trees, vines and plants. More than twenty years ago I planted more than sixty varieties. I set five yellow Belleflowers and they proved a failure. I planted also Baldwin, Greening, Northern Spy and many others. I planted also too many sweet apples for market; they proved profitable for hogs, though, as one acre of sweet apples is worth ten of corn. It would have been worth thousands of dollars to me had I planted for every 1000 trees 500 Ben Davis, 200 Jonathan, 100 Winkler, 100 Little Red Romanite, 75 Wine Sap, 25 summer and autumn varieties, such as Red June, Red Astrachan, Early Harvest, Sweet June, Maiden's Blush, etc., etc.

Were my land limestone I would plant Grimes' Golden in place of Jonathan. Willow Twig is a profitable apple on some soils. With me it blights more than all the other varieties combined. This shows how necessary it is to discover what to plant on our own soil.

Of blackbearies I tested over thirty varieties. For profit the Early Harvest leads, followed by the Kittatinny, Synder and Taylor's Prolific. Two hundred miles north Snyder and Taylor would take the place of the Early Harvest.

Of raspberries I tested twenty varieties. The red sorts failed to pay me. The black-cap varieties paid when planted on rich land, and were well cultivated. Souhegan or Taylor is the first to ripen, Gregg the latest. Hopkins is one of the best, so is Ohio; but the Kansas with me is as the Ben Davis apple.

Of strawberries I have tested over one hundred varieties, and met with many failures, buying many new varieties and paying enormous prices. I watered them and I fed them much as one would a $100-calf, and then they did not prove half as good as the old standard sorts. I have reduced my main planting to five varieties, namely: Robinson, Bubach, Windsor Chief, Warfield, and Michel's Early. The first four are very large, the Michel is the earliest to ripen. and one of the best fertilizers for the three pistillates.

I made mistakes in planting apple trees over two years old and peach, pear and plum over one year old; also in topping or heading low. I now aim in trimming to avoid forks and to grow a center branch for a leader.

Plowing deep and close to trees is injurious; shallow culture often repeated is beneficial. I have watched and taken notes of the signs of the moon, but have never been able to discover any difference, but have seen a big difference in favor of good care and culture.

Currants fail with me on a sandy soil and in a southern exposure, but succeed on a moist, clay soil. Do not set strawberries on ridges, nor hill them up. Give them level culture. Much is gained by proper fertilizing.

The sprouts that appear on the trunk and branches of fruit trees should be cut off as soon as seen, unless they are desired to take the place of older limbs that are to be cut out; they only serve to weaken the tree. Do not trim the cherry tree unless it is absolutely necessary. If too thick some of the branches will die out and thus thin themselves. Cherries are injured more by pruning than any other tree. Plum and pear trees also need but little trimming, whilst peach trees need more than any tree that I know of.

It is a great mistake nowadays not to study fruit-culture and to gather up all the experience of fruit-growers to enable us to avoid mistakes by taking advantage thereof. The consumption of fruit is annually on the increase, and it is only by studying his work the producer can keep pace with the demand, but in doing so he can make his farm and home the dearest spot on earth both to himself and to every member of his family.

JACOB FAITH.

Geology in Horticulture.

Geology and horticulture come together not merely upon scientific grounds, not merely as a theory "found in the books," but the relationship is of a thorough practical nature—so practical that every tiller of the ground must answer such questions as these: What is soil? What are the constituent elements of plants and trees? What nourishment do these require? Do all demand the same nourishment?

Nor does it require a scientific training in the books to answer these questions, but close attention, patient experiment and careful transcript of results.

Prof. LeComte, the great American geologist, says: "All soils (with the exception of the thin stratum of vegetable mould, which covers the ground in certain localities) are formed from the disintegration of rocks; often it is difficult to trace every stage of gradation between perfect rock and perfect soil. The general effect of atmospheric agencies is the disintegration of rocks and the formation of soil. The atmosphere is composed of nitrogen and oxygen with a small quanity of watery vapor and carbonic acid. There are but few rocks which are not gradually disintegrated under the constant chemical action of the atmosphere. Chemical analysis always shows an evident relation between the soil and the subjacent or country rock, except in

cases in which the soil has been brought from a considerable distance. The depth to which soil will thus accumulate depends partly on the nature of the rock and the rapidity of decomposition, partly on the slope of the ground, and partly on the climate. The process of rock disintegration may be explained in a general way: Almost all rocks are composed partly of solid materials and partly of materials which are slowly dissolved by atmospheric water. Granite gneiss and volcanic rocks are composed of quartz, feldspar and mica. Quartz is unchangeable; mica is very slowly affected; feldspar is then the decomposable element. Pure limestone may be regarded as composed of granules of carbonate of lime, cohering by a cement of the same. Sandstone consists of grains of sand cemented together by carbonate of lime or peroxide of iron; where the latter prevails we have a fine building stone; where the former we have a sandy soil. Slate rocks disintegrate into a pure clay soil because the cementing material is carbonate of lime. The disintegration is caused by the action of the atmosphere and frost."

This being the composition of different rocks we raise the interesting question, how best preserve the soil? How restore "worn out lands?" What kind of soil is best adapted to trees, plants or vegetables? This drives us to the question: How feed our trees, plants or vegetables? In other words, what is the best fertilizer? Can the soil be best maintained or improved by artificial fertilization or by adding the original constituent elements? Can we add these? Is there any affinity between the soil and the tree? Is the wood of the tree composed of the same elements as the soil? Do we find the same elements in the fruit?

If we dare answer in the affirmative, then the fertilizer becomes a matter of vast importance, because we eat the elements of the fertilizer. Ought that to be clean or refuse from the stable? Why is it that artificial fertilizers were not used until within the last two hundred years? Why was animal refuse ever used as a fertilizer? This question will be answered further on.

"We find" says Hensel, a celebrated German horticulturist, "that all plants, as also all animal bodies (for these are built up from vegetable substances), after combustion, leave behind ashes which always consist of the same substances, although the proportions of admixture vary with the different kinds of plants. We always find in the ashes, potash, soda, lime, magnesia, iron and manganese, combined with carbonic, phosphoric, sulphuric, muriatic, fluoric and silicic acids. These ashy constituents give their form and connections to the bodies of plants and animals according to the manner indicated above. Now, in-

asmuch as plants spring from the soil, it is manifest that the enumerated earthy or ashy constituents must be furnished by the soil. And as in the soil, these substances are present in combination with silica and alumina, the origin of the soil thence becomes manifest. It has arisen from the disintegrated primary rocks, all of which contain more or less potash, soda, lime, magnesia, manganese and iron, besides phosphoric and sulphuric acids; also chlorine, fluorine, silica and alumina. Now as all the enumerated earthy materials, with the exception of silica and alumina, enter into the crops that are taken away from the field, it is clear that they must be replaced. If we desire normal and healthy crops, and that men and animal living on them should find in them all that is necessary for their bodily sustenance, it will not suffice to merely restore the potassa, phosphoric acid and nitrogen; other things are imperatively demanded."

It is very evident that there is more at stake in the manner in which we treat the soil than is generally conceded. The physician diagnoses the case and decides what the system needs; he does not try to hold it up with a stimulant. Where the soil has been almost exhausted of the elements that nourish plants through the cultivation of years "the original natural strength cannot be restored to it by means of medicines and single chemicals, but this can only be effected by supplying new soil out of which nothing has grown and the strength of which is therefore intact."

Potash, soda, lime and magnesia are called bases; one-fifth of the amount of these, silicic acid; one-twentieth, chlorine; one-sixth, phosphoric acid; but sulphuric acid only one-fourth of the weight of the phosphoric acid. Granite rock is the full complement of this combination.

How do we fertilize our plants and trees? Chlorine is constantly administered through liquid manure. Chlorine is not found in wheat, rye, barley, oats, millet, apples, pears, plums or gooseberries, nor in the wood of any trees. Why should we ever administer chlorine? Why stimulate the soil for a time, but give nothing to the plant? But a more serious question arises—the effect of fertilizer on the fruit gathered. Hensel contends that stable manure produces grain that has no firmness, in grinding would smear the stones; barley which the brewers would reject. If it be true that "animal bodies have no consistency without earth," then man or beasts have no business eating anything forced with stable manure. This becomes a demonstration when we consider that ammonia takes the places of the fixed alkalies, potassa, soda, lime and magnesia.

Hensel says again: "Nitrogenous foods are supposed to be strength-givers. This is a theoretic error, full of fatal consequences for agriculture. We have never had as many cattle plagues as we have had since artificial fertilizers and 'strong' foods have been in vogue.

One proposition is sure, there are no earths in stable manure. It stimulates the soil; makes semi-hotbeds; produces quick growth; of itself, could produce no strength; the earths have been absorbed by the animal; produces ammonia, which has the same effect on the plant that alcohol has on man. Why is there a demand for "well-rotted manure?" Because the ammonia has escaped and the refuse mixed with the soil makes it light and pleasant to cultivate.

Here is the whole theory: make new soil; do not doctor it. Give to the ground real soil containing the ingredients the plant or tree needs. To do this, give it the pulverized rock suitable to that locality. The practical point to settle is, how far fertilizing with stone meal pays. What yield it affords. Would it be better to break the lime rock of these regions than to gather them off the ground? Why are strangers amazed at the fertility of our rocky ground. We used to wonder why the first 10 or 12 rows of corn in a field lying along the turnpike in Kentucky were much better than the remainder of the field. They were fertilized with stone meal.

"Almost every field contains stones which have only been acted upon in part by the dissolving moisture of the soil, and which, therefore, show a more or less rounded form. These stones, as they injure the plow or spade, are usually removed to the sides of the field, and there heaped up and sold at a cheap rate for the highway. The farmer who acts thus sells his birthright." Hensel 102-3. The theory specially applied to fruit trees is found in Hensel 108-9.

A letter to the Pomological Society of Germany says: "For the last two years I have been making various experiments with stone meal manure, and indeed with different kinds. From my experience with it I have come to the firm conviction that we need no other manure at all but this.

"I should like to send you a picture of some of our standard trees and some of our half standards, so, with your own eyes you would be convinced of the excellent effect of this wonderful fertilizer. The apples hang twice as thick as in other years, and their flavor can hardly be recognized; their aroma is really refreshing."

With this this testimony from geology and from those who have tested the whole theory by actual experiment, I present the following for consideration:

1. Does the kind of fertilizer affect the fruit?

2. Are there any elements in the fruit not drawn from the soil or atmosphere?

3. Does the fertilizer ever produce disease of the tree or plant?

4. Why do our trees need spraying and forest trees do not?

5. In Japan the gardens are fertilized with human as well as animal refuse. Americans cannot eat the vegetables. Why? On the other hand, the fruit trees of Japan are not cultivated and the fruit is good. The answer is the fertilizer.

6. Would it not be wise in all our farmers and horticulturists to spend the time and labor used in removing the stones in breaking and pulverizing them?

What we need for health of plant or tree is original, clean soil.

H. B. BOUDE, Springfield.

OTTAWA, KANSAS, February 25, 1895.

Mr. L. A. GOODMAN, Westport, Mo.:

DEAR SIR—Referring to the discussion on the subject of "Wooly Aphis" at the State Horticultural meeting at Fort Scott, my notes, taken at the time, report you as saying one pint of coal oil to one gallon of water will kill it. Now I have some trees that are more or less infested that are stored in my packing-house, and some that are heeled in that it is intended to use in my spring trade. Last fall I dipped them in a solution of concentrated lye and water, but it was not entirely effective, and while I do not believe in ordinary cases trees not too badly infested are the worse for it, yet I am anxious to send them out free of such pests if possible, and so I write you to learn if my notes are correct, and if so, to ask how to prepare it, and what grade of oil is best, and is it proper to get a quantity and mix it in the proportions above named, and if not, in what proportions and what process would be best; also, as coal oil is much lighter than water, will it not rise to the top so I lose the mixture? Is there any danger to the tree in the use of this mixture?

Any information you can give will be thankfully received. Yours truly,

A. WILLIS.

Answer—While the oil will not mix, yet "dipping" the trees in the oil and water will surely kill the aphis. Use hot water if you prefer. Or you can make the regular kerosene emulsion and use it.

The Plum Curculio.

I will give your readers my experience in jarring for the plum curculio the past two years. Last year I began as soon as the bloom dropped, keeping it up for three weeks, and could not find a curculio, yet all the while I saw they were stinging the plums. Having never seen one of the little wretches, I was wholly in the dark. In vain I searched all of my horticultural reports to find a cut of them, and asked several fruit men about them, but none of them could give me any light on the subject, so as a last resort I hunted up an agricultural report of 1861, in which I found the object of my search, a plain

cut of the curculio, with an accompanying description. I then went to work with renewed courage and at one time caught fifty-seven; I think I must have caught all of 500, though I did not count them. Result: from the five trees jarred I got less than a dozen sound plums.

This year I began as before, as soon as the bloom dropped, and jarred five five-year-old and two three-year-old trees, keeping strict account of all I jarred; they numbered 162. Allowing half of them to be females and each female capable of laying 600 eggs—which I am sure I have read—I have destroyed 48,600 of the next year's crop, and not more than five per cent of my plums are stung. I do not think there were more than 48,600 plums on my trees, so you see if I had not jarred they would all have been stung this year. The trees were so loaded that I had to thin them, and in doing so took pains to get all of the stung ones and burn them.

I see Judge Samuel Miller says he will have a good crop of plums and his trees were neither jarred nor sprayed, and that to save the trees he would be compelled to thin the fruit. Now, if he or anyone else who has to thin, will gather all of the wormy ones and burn them, they will have less to contend with next year.

J. H. MARION, Callaway county, Mo.

An Apple That Pays.

In 1887 we bought a small farm in Ste. Genevieve county, Mo., a county that lies along the Mississippi river, in the southeastern portion of the State.

On that farm there were about 85 fruit trees, ten of them peach trees, and the others apple trees of several varieties. Some Maiden Blush, Rambo, Early Harvest, Red June and Red Astrakan, and one or two other kinds.

The farm contained 40 acres, and the man we bought it of could not make a living off of it and pay the interest on some outstanding notes. He was devoting its 30 acres of tillable land to wheat and corn. He paid no attention to the apples, other than to eat a few, dry a few, and let his hogs have the balance.

When we got the place he had 11 acres in wheat, which crop sold for about $60, gross. The fruit season was past for that year. The next year we paid our attention to the fruit. There were about 25 Maiden Blush apple trees, six or eight each of Early Harvest and Red Junes, a like number of Rambos. We boxed and shipped the Harvest and Junes to St. Louis, and sold them for forty cents per third bushel

box. A few Red Astrakans. The Maiden Blush sold in the same market at $3.50 a barrel. The best seller and the best bearer was the Maiden Blush. Our gross sales of that year from those few trees was over $150.

Since then we have worked and watched those trees, and planted and cultivated other trees and vines on the place; and year after year we have marketed the Maiden Blush in St. Louis at from $3.75 to $3.60 per barrel, usually between July 25 and August 15. This variety of apples ripens in that locality in just the right time—between the harvest apples and the fall apples, and they always sell for top prices.

The Maiden Blush makes a beautiful, large, full tree, and is a prolific bearer. The apples are of a pale yellow or cream, with the tell-tale blush or red on one side—usually the side toward the midday sun when ripe.

It is a great sauce and pie apple, and cooks beautifully. Is also good baked and makes delicious preserves or jelly.

H. B. GEER, Nashville, Tenn.

Fruits as a Food.

The term fruit in botanical language signifies the seed with its surrounding structures in progress to or arrived at maturity. In a popular and dietetic sense it has a more limited signification, and refers in a general way only to such products when used in the manner of a dessert or food. Botanically wheat, peas, beans, etc., constitute fruits, but popularly the term is restricted to articles like apples, pears, plums, grapes, berries, etc.

Fruits consist of two parts: the seed and what is technically called the pericarp. The latter comprises that which surrounds the seed, and is composed of the epicarp—the external integument, or skin; the endocarp, or putanum—the inner coat or shell; and the sarcocarp, or mesocarp—the intermediate part, which generally posseses a more or less fleshy consistence. It is this portion of the fruit which form the edible part.

Fruit is formed from modifications of the leaf, and in the early stages the fruit is green and exhibits much the same chemical composition as the leaf. It is only as the fruit advances that the special characteristics become developed. At first, like other green parts of the plant, it absorbs and decomposes the carbonic acid of the atmosphere under the influence of light—liberating oxygen and assimilating the carbon. As it approaches maturity it loses its green color, be-

comes brown, yellow or red, and no longer acts on the air like the leaves, but, on the contrary, absorbs oxygen and gives out carbonic acid. As this process advances, some of the proximate principles contained in the unripe fruit—particularly the vegetable acids and tannin—in part disappear, apparently by oxidation, and then it becomes less sour and astringent. At the same time the starch undergoes transformation into sugar and the insoluble pectose into pectin and other soluble substances of allied composition and having more or less of a gelatinous character. The fruit in this way arrives at a stage of perfection for eating. Unless these changes are arrested by the surrounding temperature, oxidation still advances and the sugar and remaining acid become destroyed, giving rise to the loss of flavor which occurs after the full ripened state has been attained, and deterioration sets in.

The agreeable taste of fruits partly depends on the aroma and partly on the existence of a due relation between the acid, sugar, gum, pectin, etc., and likewise the amount of water and the soluble and insoluble constituents. Lucious fruits, like the peach, greengage and mulberry, which seem to melt in the mouth, contain a very large proportion of soluble substances. A due proportion of gum, pectin and other gelatinous substances serves to mask the taste of the free acid, if present in a somewhat large porportion as compared with the sugar. Such is the case with the peach, apricot and greengage, which contain but a small amount of sugar as compared with free acid and a large proportion of gum and pectous substances. The sour taste of certain berry fruits, as the current and gooseberry, arises from the presence of a considerable quantity of free acid, with only a small amount of gum and pectin to disguise it.

By cultivation the proportion of sugar may be increased in fruits, as is instanced by the difference existing between the wild and cultivated strawberry and raspberry.

Fruit forms an agreeable and refreshing kind of food, and, eaten in moderate quantity, exerts a forcible influence as an article of diet. Its proportion of nitrogenous matter is too low and of water too high to allow it to possess much nutritive value. It is chiefly of service—looking at the actual material afforded—for the carbohydrates, vegetable acids and salts it contains. It enjoys in a high degree the power of counteracting the unhealthy state found to be induced by too close restriction to dried and salted provisions. The lemon and lime are especially useful and largely used on account of their anti-scorbutic efficacy.

While advantageous when consumed in moderate quantity, fruit, on the other hand, proves injurious if eaten in excess. Of a highly

succulent nature, and containing free acids and principles prone to undergo change, it is apt, when eaten out of due proportion to other food, to act as a disturbing element, and excite derangement of the alimentary canal. This is particularly likely to occur if eaten either in the unripe or overripe state ; in the former case, from the quantity of acid present ; in the latter, from its strong tendency to ferment and decompose within the digestive tract.

The prevalence of stomach and bowel disorders, noticed during the height of the fruit season, affords proof of the inconveniences that the too free use of fruit may give rise to. The effect of fruit will increase the activity of the excretions of the kidneys. The alkaline vegetable salts which it contains become decomposed in the system and converted into carbonate of the alkali, which passes off with the excretions of the kidneys. By virtue of this result, fruit is advantageous in gout and other disorders where the excretions of the kidneys show a tendency to throw down deposits of lithic acid.

In speaking of fruit as a food, we will confine ourselves to the apple, and what we have to say in regard to the apple as food will apply in a large sense to the peach, pear and small fruits, as well as berries. They all contain essentially the same elements, only in different proportions. The composition of apple :

SOLUBLE MATTER IN ONE HUNDRED PARTS.

Sugar	7.58
Free acid (reduced to equivalent in malic acid)	1.04
Albuminous substances	.22
Pectous substances	2.72
Ash	.44

INSOLUBLE MATTER.

Seeds	.38
Skins	1.42
Pectose	1.16
Ash from insoluble matter	.03
Water	85.01

Apples eaten immediately before bed-time promotes the health generally. Its dietetical as well as alimentary substance is of high order. It contains more phosphoric acid in an easily digestible combination than any other vegetable product; consequently it is a good brain food, and builds up the nervous system; excites the functions of the liver ; promotes a sound and quiet sleep; disinfects the mouth ; agglutinates the surplus acids of the stomach; paralyzes hemorrhoidal

disturbances; helps to prevent calculous concretion; assists in digestion.

Apple in its raw state is more pleasing to the eye and agreeable to the palate. We all know, for example, the influence exerted by the appearance presented by food; how, if pleasing to the eye, it becomes tempting to the palate, and, if revolting to the sight, the stomach may turn against it.

However, cooking has a beneficial effect; it lessens cohesion and alters the texture in such a manner as to render it more easy of mastication and subsequent reduction to a fluid state; also, the alterations it produces of a physical and chemical nature are of great importance as well as the destruction of parasites or their germs, where such may exist.

In conclusion I would advise eating fruit in moderation—either raw or cooked. It should not be stuffed down in quantities when the stomach is already full. It is healthful, and when taken in moderation and at proper times is often as good as medicine. Fruit was man's first God-given food, and while under the curse, fruits often fail, and man is forced to make use of inferior articles of food and eat his bread in the sweat of his brow.

Physiology teaches us that pure air, as it passes in and out of the lungs, purifies the blood; likewise if we inhale impure air the blood becomes poisoned and thereby causes disease—both mental and physical and, otherwise shortens our days. We believe diet also largely affects our health as well as character.

You raise a boy on hog and hominy for several succeeding generations and the hog becomes a part of his nature; his blood becomes sluggish and his nature craves strong drink; and strong drink destroys soul and body and threatens the destruction of society and our civil governments. But raise children on good wholesome food with plenty of fruit mixed in, and we believe and know they will have better blood, better lungs, better stomachs, better complexions, brighter eyes, better brains—yes, their whole physical and moral natures will be lifted up to a higher plane, and they will come nearer to the perfection which their Maker intended they should be. DR. HENSLEY, Springfield.

Grape Culture.

From close observations and study I have concluded that the region lying between 36° and 40° north latitude, from the Atlantic to the Pacific (occasionally modified by the isothermal line) is one of the best for grape culture.

North of this region or earth-belt is the home of the Labruska, and south of it is the home of the Rotundifolia or Volpinia, while South and Southwest Missouri and Northern Arkansas produce the best Æstivalis. The southern portion of Missouri and the northern portion of Arkansas, known as the Ozark range, seems by nature best adapted to grape growing. It is situated in the favored climatic belt between 36° and 40° north latitude. The northern Æstivalis, of which the Cynthiana, Herbemont and Norton's Virginia are types, flourish within this latitudinal belt, but not further north. The Labrusca species belongs north of the Æstivalis, but will flourish south as far as the Ozark range, but not further south. The Cordifolia or Ripara will succeed in the southern portion of the Labrusca belt and the northern part of the Æstivalis belt, but wholly fails in the extreme south or extreme north. It grows well and produces abundantly at about 37° and 38° north latitude, which brings it within the limits of the Ozark range.

While much has been written, yet little is known of the capability of the State of Missouri for grape culture, as the region best adapted to grape growth within her borders has never been devoted to that industry. I refer to the southern slope of the Ozark range.

We will now consider the soil and location best suited to grape culture within the region best adapted to its growth—that is, between 36 and 40 degrees north latitude.

Grape growing is possible under a wider range of conditions and soil than any other thing cultivated by man, but grapes will not thrive in undrained soil; stagnant water is death to successful grape-growing—running water not so much so. Soil is an important factor in the growing of grapes. The soil of the great grape-growing and wine-producing districts of France is a mixture of light clay, silica, disintegrated rock and oxide of iron. This character of soil enables the vine to draw from the earth those chemical elements that give a certain peculiar flavor to the grapes and qualities to the wines of France, especially in the Bordeaux districts.

From all the information attainable I can see but little, if any, difference between the soil of the grape regions of France and the Ozarks. If there is any, that difference is in favor of the Ozark regions of Missouri and Northern Arkansas. Here we have what is known as the stony lands, composed of fragmentary or disintegrated rock, more or less rotton shale, red clay and large quantities of oxide of iron.

Many wonder how grapes grow and obtain flavor on such rocky ground. The reason is that in such earth the soil retains the sun's heat longer during the night, thereby preventing sudden climatic changes. Small particles of these rocks are being slowly dissolved by

the action of frost and moisture, and carried into the earth by rain, forming food for the vine; hence these rocks act not only as a mulch, but as a perpetual fertilizer.

Vineyards should not be planted in a low, damp, flat situation. They should have free circulation of air, as it avoids excessive humidity, which in warm seasons, or even days, develops fungous diseases. They generally succeed best on high, dry, sloping, naturally well-drained grounds; but there should not be too much exposure to sweeping cold winds. Careful tests have been made which prove that there is a difference of ten degrees in favor of wind protection at the same altitude. In northern states, where the winters are severe and long and the summers short, the growth must be rapid to produce maturity. There the southern slope and exposure is best, but in this region an eastern, northern or northeastern is preferred. It should be remembered that the grape requires a daily warm temperature of 55 degrees during the months of May and June, and for the maturing months of July, August and September an average of not less than 65 degrees of temperature, or there can be no success. Where the temperature for the growing period averages 65 or 70 degrees and that of the maturing periods 75 or 80, fruit of the most excellent kinds can be produced.

As it is expected that a vineyard is to occupy the land during one life time at least, much care should be taken in selecting climate, soil and location, and there should be a most thorough preparation of the ground before planting.

H. D. McKAY, Olden.

ENOCH, MO., June 4.

Mr. L. A GOODMAN:

I would have liked very much to have come to the summer meeting, but we are in the midst of spraying for the bag worms, a few of which I enclose. Perhaps you have never seen them. They are a dreadful pest. These leaves are from sprayed trees, and you will see some dead worms. There are yet some alive. It is difficult to kill them all at one spraying. Wetting every leaf thoroughly is the key-note to success in this business. We have about 35 or 40 per cent of an apple crop, but they are fine and fair. I have only found seven wormy ones so far. I don't know how much this is due to spraying.

W. H BENEDICT.

PREMIUMS AWARDED.

Strawberries—

Wayne O'Donald, Springfield, Mo., 2 boxes, Gandy	75
Mrs. A. Nelson, Lebanon, Mo., 1 box, Warfield	50
1 box, Gandy	40
1 box, Cumberland	40
C. B. Saunders, Columbia, Mo., 1 box Capt. Yale	65
Mrs. Kropp, Mt. Grove, Mo., 1 box, Cumberland	35
W. C. Bartley, Willow Springs, 1 box, mixed	35
M. N. Bonwell, Willow Springs, 1 box	25

Raspberries—

Joseph Kirchgraber, Springfield, Mo., 1 box, Bonanza $1 00
C. S. Willis, Willow Springs, 1 box 75
J. C. Evans, black 50

Gooseberries—

A. Nelson, Lebanon, 2 boxes 1 25
J. C. Evans, black 50

Currants—

A. Nelson, Lebanon, 1 box 75

Cherries—

A. Nelson, Lebanon, 1 box 75
J. C. Evans 1 50

Mulberries—

H. P. Dawes, Willow Springs, 1 small dish, white 75
1 large dish, black 50

Apples—

Conrad Hartzell 5 00

SUPPLEMENTARY REPORT ON FRUITS.

Your committee on fruits on exhibition before this Society at this, the June meeting of 1895, would, in addition to the premiums already awarded, award a premium of $5 to Mr. Conrad Hartzell for the most excellent display of apples he has placed before us, which he has kept by a method that he has discovered.

We would further say, that we have tasted several of these apples, and that their quality is in keeping with their appearance.

L. I. Haseltine,
A. H Gilkerson,
Committee.

Honey—

E. C. Warren, Willow Springs, 6 boxes honey 75

We, the committee on awards on fruits, have made awards as given on foregoing pages.

L. I. Hazeltine,
A. H. Gilkeson,
Committee.

PREMIUMS AWARDED FOR FLOWERS.

Mrs. H. T. King, Willow Springs 75
Mrs. S. M. Secongost, Boonville $1 25
B. C. Stanley, Willow Springs 1 50
H. P. Dawes, Willow Springs 1 50
Mrs. Withoup, Willow Springs 1 00

H. C. Irish,
Mrs. A. Nelson.

Plum and Cherry.

Having been assigned the part of writing a paper on "Plum and Cherry Culture" for this Society, I will try, in my feeble way, to give the Society the benefit of what little I know in regard to this fruit and its culture. Just why I have been selected to write a paper on this important fruit when there are older members here that know more about it I cannot tell. In setting an orchard for either family or commercial use, I would set a plum orchard 15×15 feet each way, first

having soil well prepared. I would prefer to have trees taken up and heeled in close to where I want to set in the fall, then I can set as early in spring as the soil will do to work. In setting, would prefer to set two inches deeper than they were in nursery, firmly packing earth around roots and fibers. The firmer the earth is packed around the roots the better success you will have with your trees living. Now we come to the cultivation. If your soil is rich, which it should be, you can cultivate for three years; if it is poor, you can cultivate for six or seven years. If your soil is rich, plum trees will grow very fast and will get so large that you cannot cultivate after three years. You can cultivate with potatoes and such vegetables until your trees are too large and then sow down to clover. As to varieties, every man should use his own judgment as to whether he wants them for home or commercial use. If it were possible I would advise those setting an orchard to set them as close to their chicken run as they can get them, for I think they will have much better success when so planted.

Now, as to cherries; I would set them 16×20 feet or 20×20, if I had plenty of room. I have set them closer, but find they do not do so well as when set farther apart. I would set in better soil if I had it than I do the plum, for the cherry makes a very slow growth. In setting, would use the same care as in setting the plum. I would cultivate the ground to small fruits and vegetables for four or five years, keeping the ground well manured so as to promote as rapid a growth as possible. The better condition you keep your soil in, the better will be your fruit when your trees come into bearing. You cannot expect to have fine trees and fine fruit if you do not put something back on the soil for your trees to live on. Just as well say that a man can work day after day on half rations. You will meet with nurserymen and fruit agents who will tell you that you have just the soil for the plum and cherry, when they know that you are throwing your money and time away to plant in such soil. You may plant trees on poor soil and if you have not got manure enough to give your trees to keep them growing, you will never have an orchard that is any account. I will venture to assert that there are more orchards lost by planting in poor soil and giving them nothing to live on than from all other causes combined.

Now, as to varieties; I would plant, if for home use, early and late varieties, but if I were planting a commercial orchard in this climate I would plant but one variety and that would be early. In cultivating the first three or four years I would be very careful to keep the trees well pruned, giving them good shape and leaving them thin enough in the branches to give them plenty of air and sunshine.

We have now come to a time when, if we have taken good care of our trees, they have commenced to bear, and the question is what shall we do to save our fruit from the multitude of insects that prey upon them? and in reply would say spray, and do not forget to spray. For cherry and plum I would use London purple, first, when the trees are in full bloom. Second, when the petals have fallen; and after that, every two weeks, unless we have hard rains, then spray as soon as the rain is over and the leaves have become dry. In that way I think we can have good fruit that we will not be ashamed to put on any market, and command the highest price, and fruit we will be glad for our neighbor to come in and inspect and help us to eat.

M. M. DAUGHERTY, Jefferson City.

MISSOURI AT THE ST. LOUIS EXPOSITION, 1895.

WINTER MEETING AT NEOSHO.

THIRTY-EIGHTH ANNUAL MEETING

Held at Neosho, Newton County, Mo., December 3, 4, 5, 1895.

The 38th annual meeting of the State Society convened at Neosho on December 3, at 8 p. m. The court-house, the place of meeting, was filled to its utmost by the delegates and the local representation.

One of our most successful and enthusiastic meetings of our Society was held during the three days' session. Representatives from Illinois, Kansas, Nebraska and Arkansas were there and all took active part in the work of the Society and the discussions.

One of the finest displays the Society ever made was shown in a large building opposite the court-house. This consisted of about 1200 plates of apples, not common apples, but such ones as it delights the heart of an horticulturist to see, without a speck or flaw in them. They were the finest specimens of all the standard varieties of apples that one could ask for, and the tables were the admiration of every person who saw them.

Representatives were there from "Colman's Rural World" of St. Louis, "The Southwest" of Springfield, Mo., "The Journal of Agriculture" of St. Louis, "The Prairie Farmer" of Chicago, "The Horticulturist" of Lawrence, Kas.

The meeting displayed the enthusiasm of the Missouri fruit-growers, and the whole tendency of the papers and discussions was to a better care of the orchards, better handling, packing and marketing, and the necessity of many more places for storage and keeping our apples.

A desire to know of all the good things that were said and done can only be satisfied wholly by those who were there to see, know and hear, but this desire can be satisfied in part by a thorough perusal of this report.

The following reports from "The Southwest" and "Colman's Rural World" will give an outline of the meeting that will induce you to look further into the papers and discussions.

L. A. GOODMAN, Sec'y.

Report From "The Southwest" of Springfield.

The 38th annual meeting of the Missouri State Horticultural Society was held at Neosho, December 3, 4 and 5. President Evans and Secretary Goodman were promptly on the ground and so was Treasurer Nelson. The first session was held Tuesday evening. Miss Patterson gave a piano solo. Invocation by Rev. C. C. Wood. A double quartette sang "Descending Light."

Owing to the sickness of Mayor Sherman, the address of welcome was made by Dr. Wood, and most eloquent and learned was his impromptu speech. He said a man owes more to mother earth than to all the other elements. A man is an ingrate indeed if he forgets to consider her offerings. Horticulture is the most enobling of the arts. Since Almighty God made man the tiller of the soil, agriculture is first in importance. There are unmistakable indications that man is returning to the work he was first appointed to do. The speaker referring to this latitude said: "The highest civilizations have been under a vertical sun. The populations that lived along the Mediteranean sea more than eighteen centuries ago were far advanced in civilization. The Vandals hurled themselves against the people of the Mediteranean sea because they wanted to enjoy the climate. Never has a Webster, a Milton or a great captain come from the frozen regions of the north. I look forward for grander results than we have seen in the development of the race. More and more will men live upon vegetables and fruit. Bring man into a more southern climate and he will lay aside the food of the prize-fighter and the tiger for natural food. Possibly, there is no part of the earth so favored as this locality to which we welcome you tonight. Our soil will produce anything from a petrified man to a—national question—as genial as any upon which the sun shines—a rich soil, and the climate of Southern Italy—a sky as blue as that which hung over the land of Alcibiades. I welcome you in the name of the mayor, in the name of our colleges and schools, and in the name of the fair ladies who will do their best to break your hearts."

The eloquent college president was loudly applauded.

Miss Ames sang beautifully a solo, "When the Heart is Young."

President Evans' address appears on another page.

Mrs. E. S. Curtice read a well written and humorous paper, in which she recorded her experience in cultivating flowers and vegetables.

Mrs. G. E. Dugan, of Sedalia, furnished a paper on the cultivation of flowers, which was read by Miss Goodman.

After another selection of music, Mr. A. Nelson, of Lebanon, read his paper on "New Missouri." He thought the subject was larger than he could cover; if it was Laclede county he might be equal to the task, but the subject was 114 times larger. He referred to the time when the people, some of them, did not want settlers to come or railroads built, as they would destroy their cattle ranges. That was old Missouri. When he went to Lebanon and planted an orchard some thought he was foolish, but no one thinks so now. The men who once disliked to see Northern men come into the State were now eager to welcome all new comers.

He said the question had been asked: "How cheap can apples be grown?" At 15 cents per bushel he had seen one acre bring in a revenue of $180. They were sold this season. He condemned the practice of some men who buy nursery stock of men they have never known, paying extravagant prices. Buy of home nursery men. Some allow cattle to run over the young orchards in which corn is planted. The twigs are eaten off and the trees are badly injured. He also referred, in the course of his remarks, to the importance of being particular in packing fruit; a hat full of rotten apples would injure the whole barrel. Mr. Nelson declares the market cannot be glutted with fancy fruit. Missouri's apple crop this season amounts from $12,000,000 to $15,000,000. In old Missouri the business in summer was selling railroad ties—in the winter, hunting rabbits.

Mr. Nelson referred to the opinion that many once had of the people of this State. At the World's Fair, where he gave considerable time to the Missouri exhibit of fruit, one day several ladies cautiously approached. Finally one of the elderly ladies dared to ask him: "Are you really from Missouri?" She supposed every Missourian wore a slouch hat and carried a gun and a knife. He reasoned with the lady, who was a resident of his old state, and convinced her that there was a New Missouri. That good woman's son is now an enthusiastic citizen of South Missouri. Mr. Nelson closed with a word picture of S. W. Gilbert's model Flint Hill Fruit farm, at Thayer, on one side of the road, and of a farm on the other side where cattle were bronsing on the young apple tree branches, representing the new and the old.

J. M. Purdy, of Neosho, read a practical paper on "How to Take Care of Our Apples," giving directions how to build storage houses with little cost. He favored digging into a side hill or making a cellar, walling it with stone. The only cash outlay would be to the roof, ceiling and doors.

Frank Hammon's paper on "Planting an Orchard" drew out an extended discussion.

N. F. Murray approved the paper, especially the using of the lister. Work should also be done with precision and care, as suggested, not with a "lick and a promise." If we would do the work as thoroughly as Californians have done we should beat them.

Geo. T. Tippin inquired the proper depth of planting. Mr. Hammon said to set the tree so as to have it the same depth as it grew in the nursery. He plowed two feet; of course, it would settle some. Mr. Tippin said he asked the question for the benefit of new planters. Mr. Hammon was correct. He instanced cases where some lost two years' growth by planting too deep.

Col. Evans said the most important point in the paper was the deep plowing. Subsoiling is of vast importance. Mr. Murray advised suitable drainage in addition to subsoiling. J. B. Durand said an orchard should not be planted where under-drainage is necessary. There is plenty of land in Missouri for commercial orchards that needs no drainage. Of course if a man wants a family orchard and his ground needs a drainage, it should be properly prepared.

W. A. Gardner does not believe in root rot. Secretary Goodman said the wooly aphis does much damage in South Missouri, and there is a fungus growth on live roots. He endorsed subsoiling, and said the bad effects of deep planting can never be overcome. Kerosene emulsion would kill wooly aphis. The best medicine for all these trees is thorough cultivation.

W. A. Gardiner declared there was no sign of fungus killing trees—it was not found below the root rot. Mr. Murray did not deny the existence of fungus disease, but the injury resulted from other diseases.

Alvin Dixon stated that the Benton County Horticultural Society appointed a committee to investigate the cause of the death of trees. Some said the wooly aphis had caused the destruction, others said it had not. Prof. Whitten inquired as to the character of the land where the aphis was found, and he said the fungus does attack live trees.

Mr. Hammon, of Amoret, gave results of deep planting. When in California his company sold a lot of prune trees to a new planter who was certain his foreman understood just how to set them out. The trees were planted eight inches too deep and they died from root rot. The buyer complained and wanted the trees replaced, but the nursery company told him the trouble was in the planting. The next lot was set out by the nurserymen at the proper depth and the trees did finely. Fungus only attacks unhealthy trees.

Major Holsinger made the point that a nurseryman is often blamed for what he is not guilty of. He does not believe that the aphis ever killed a tree. In many cases where trees died it was from poor soil, not from aphis.

Mr. Tippin said the wooly aphis had come to stay. The aphis and fungus diseases are not always together. Much depends upon the season. The aphis will come—it is not planted. Take good care of the trees, make as few bruises as possible, cultivate thoroughly, especially near the surface. A tree is like the body. If a man is healthy he can withstand disease—so with a tree if well cared for, in rich land; the aphis will not prey upon it. The same is true as to the borer.

Mr. Murry said there was wooly aphis in West Virginia 30 years ago. He was happy to know that there is none in North Missouri. He had not lost a tree in 27 years from that enemy.

It was asked if spraying would affect the roots. Prof. Whitten replied that only that portion of the tree that the spraying comes in contact with will be affected.

The root louse and wolly aphis, said Mr. Wild, are not the same. He would like to know how to get rid of the aphis. In what way should we cultivate. Coal oil, he thinks, is the surest remedy,but it is hard to apply and soon evaporates. Dip stock in coal oil and allow it to remain a few days so the oil will penetrate. Cultivation should be early and thorough but left off when the trees had made their growth. Mr. Gardner said there was an impresion that the aphis was a fungus disease; it is an insect.—The Southwest, Springfield Mo.

Report from "Colman's Rural World."

The Thirty-eighth annual meeting of the State Horticultural Society was held at Neosho, Newton county, Missouri, last week, as per the programme heretofore published. President J. C. Evans occupied the chair, and all the officers were present with the sole exception of the Second Vice-President. Considerably more than one hundred of the practical horticulturists of the State were present, and the active people of the city and county made considerable of an audience every evening. The programme was an eminently practical one, and the discussions which followed brought out considerable valuable information, which, when transcribed by the stenographer and published, will be thoroughly appreciated by all commercial orchardists and ambitious horticulturists.

In the absence of the Mayor of the city, Dr. C. C. Woods made the address of welcome, and did it with considerable point and marked abililty; making everybody feel at home and at their ease. President Evans replied in a more than usually lengthy and pertinent address, felicitating both the Society and the fruit-growers of the State generally on the progress made and the magnificent crops produced this year. His address will be found elsewhere in full. We commend its earnest perusal to our readers generally. Mr. Nelson read an address on "New Missouri." Mrs. Geo. E. Dugan, of Sedalia—"May Myrtle," the well-known correspondent of the Rural World—was unable to be present to read her paper," The Flower Garden, What to Use and Why," and it was read by Miss Goodman with much grace and finish.

Frank Hammon, of Amoret, Mo., opened the proceedings on Wednesday, after the usual preliminary exercises, with an exhaustive and very practical paper on "Preparing the Ground and Planting an Orchard." It met with a deservedly warm reception, and was of more than ordinary thoroughness and ability. "How to take Care of Our Apples" was another excellent paper by J. M. Purdy, of Neosho, who evidently has noted the signs of the times, watched the markets and realized the fact that there are good times to sell and good ways of keeping fruit whilst holding it for the hasty ones to get rid of their stuff before he wants to market his own. These papers were thoroughly discussed and brought out many good points as to subsoiling, drainage, the depth to plant, and the thought that no orchard should be planted on soil that would hold water. Mr. Gardener, of Howell county, read a paper on orcharding 15,000 apple and peach trees, equally divided. Here again we had the man who knew what he had done, could do, and how to do it; and impressed the listener with the thought that too much care cannot be devoted to the preparation of such papers from the fact that they are widely reproduced by the press and read and followed by hundreds of thousands. The paper was thoroughly and instructively discussed by Messrs. Evans, Goodman, Dr. Bailey, of New Mexico, Gano, Gardner and others, and drifted into the question of the best varieties for commercial orchards. Here, there, was an expression of confidence yet in the Ben Davis and its very general planting, especially on some soils, in which it evidently did better than others; and yet it was not difficult to discover an undercurrent of thought, if not of apprehension, that the Ben Davis was as an apple unworthy, and that sooner or later an improvement would be found that would set its showy qualities aside and afford both color and quality as well.

The other apples mentioned in that connection were the Ingram, York Imperial, Gano, Clayton, Willow Twig, Jonathan and one or two others.

In the afternoon Mr. Goodman read a paper on spraying and made special reference to the oyster shell bark louse and the extent of its distribution over the State. Prof. Whitten (Professor of Horticulture in the State University of Missouri, and who, with Prof. H. J. Waters, Dean of the Agricultural College, was in considerable request for information all through the meeting), said that kerosene emulsion was a sure cure when made strong and used thoroughly. The discussion of fungus and insect pests was continued at considerable length and elicited much valuable practical information calculated to impress all with the fact that in thorough spraying the fruit-grower had discovered a remedy of great value, but that it must be thoroughly done and well followed up.

Again taking up the programme, fruits in general had an inning, and pears, peaches, plums, cherries and quinces were discussed. Mr. Gardener thought of more extensive planting of pears. Mr. Tippin read a paper on pear culture, and in it showed considerable experience and good sound judgment. Would plant mainly of fall and winter varieties. Cultivate early in the season and plant to pumpkins, pease or such like crops. Spray freely, fully, and often, before and after blossoming. The standard varieties are longer lived than the dwarf and more acceptable.

CARNAHAN'S TREE-WASH AND INSECT DESTROYER.

The President next announced that Mr. John Wiswell, of Columbus, Kan., the sole manufacturer of Carnahan's Tree-Wash and Insect Destroyer was present, and that the convention would like to hear from him. Mr. Wiswell then addressed the convention on this famous bore worm remedy, showing how it would destroy the bore worm and aphis and prevent the tree from future attacks, also prevent the plum from the sting of the curculio and protect the tree from rabbits. That it is a fine fertilizer, greatly increasing the output of the fruit and making it of a much finer quality. His talk was listened to with marked attention and was very interesting. Most of the members present arranged for a trial order of the wash.

This remedy is now being used by some of the largest and most successful orchard men in the country. The Huber Milling Co., of Seneca, Mo., are using it on their entire orchard of 1500 acres. Mr.

Henry Scholten, of Springfield, Mo., is the general agent for Southwest Missouri, and many more parties of note are adopting it. The life experiments of Mr. Carnahan have resulted in giving to the fruit-growing world a remedy the value of which cannot be estimated.

The wash is applied with a common brush to the body of the tree The mode of application being simple and inexpensive. We should be pleased to give a much more detailed account of this remedy for the benefit of our readers, but space will not permit. We advise all of our readers to give it a trial.

Mr. Gilbert, of Thayer, read a paper on the peach, and in doing so very forcibly advocated the necessity of co-operation among growers and shippers in the distribution of peaches and small fruits; and the discussion resulting therefrom elicited much that fruit-growers generally ought to have heard and laid to heart. It was very generally conceded that co-operation was of the greatest importance if we are to find the market needing our fruits, control the railroads in the matter of charges, and ship only where our products are imperfectly supplied. The discussion of this was most thorough and practical, and opened the eyes of many to the fact that hundreds of towns and cities were unsupplied and others flooded to profusion. We shall expect to refer to this and to other matters of like importance later on.

The discussion on the various fruits named was continued at considerable length, but as we hope to give the same in full in future issues, will not take the space now.

Mr. Wild, of Sarcoxie, read a paper on plums, dwelling considerably on the Japanese. The opinion having been expressed that in Southwest Missouri the Damson could not be raised, that the foliage fell and the fruit rotted, Mr. Gano could see no reason for it. Mr. Tippin, however, said they would not hold their fruit in Green county.

On Wednesday evening clover and cow-peas as fertilizers for the orchard was discussed. Mrs. Clarence Robinson read a carefully prepared paper on "The Ideal," which was warmly received. Miss Alberta Murray gave a recitation, "Darius and the Apples," acquitting herself admirably and evidencing considerable elocutionary ability. She was warmly received and most heartily applauded.

Prof. Whitten delivered an address on "Fungus Growths," displaying a thorough knowledge of his subject and a rare ability in making himself thoroughly understood.

The Queston Box being examined, was found to contain some knotty problems. Does it pay to evaporate apples, and is it best to bleach them? Another to the similar effect, will it pay to bleach? And yet another: Has anyone made any money at evaporation this

year? These were discussed somewhat at random and pretty much altogether. Mr. Durand said it costs 2 cents to evaporate; that he is holding four cars for a favorable offer. Has been offered 5 1-4 cents, but is indisposed to sell. Thinks it pays to bleach, for the reason that the fruit brings double that of the unbleached. He uses a kiln. The general sentiment of the meeting evidently favored the idea that there was very little money in evaporating, and even then only to the man who is so located as to get all the fruit he can use, and is well fixed to run from the first to the last of the season, and is in a measure able to hold for a market and command a profitable price.

The best season to plant fruit trees was another question. Answer: Stone fruit in the spring, others in the fall. In this connection much was said as to how to prepare the ground so as to insure drainage; the depth to plant trees; how to avoid sagging or bending over, etc. The general sentiment seemed to be to plant about the same depth as in the nursery. Many instances were enumerated where trees had been planted too deep, and whole orchards failed to grow in consequence. The roots should have ample room, the earth be well packed in about and around them, and if, by the rains of winter and spring, the newly-made soil sunk below the crown, it should be replenished to that point.

What is the best apple to plant in an orchard of Ben Davis trees to so fertilize them as to give a higher color and better quality? Answer: It cannot be done. The Ben Davis of itself does better in some soils than in others, and this is the point to look after.

On Thursday morning "reports of local societies" was the first order of business, and several reported. Here, this writer wishes to say, is a weak point in the State organization. Every local society ought to feel its bounden duty to itself, its locality, its orchardists and fruit-growers generally, to prepare in the best and most thorough manner a report of its own doings during the year, the condition of its own orchards, vineyards and berry fields; the success or failure of the efforts of its members and the cause or causes thereof, and generally give such information as subordinate foremen are expected to give to a general manager of a great enterprise. There are a great many of these local societies in the State, and if each were to report once a year in this way to the parent society and a whole day given to their discussion, the time would be spent to excellent advantage, a more comprehensive view of the State situation be obtained, the several counties would profit by the advertising it would give them, and the Society's annual report give to us at home, and especially to men at a distance seeking homes and new locations, a much better idea of the

industry of the State and of the State itself. We respectfully submit this thought to the Executive Committee and urge its adoption on the President and Secretary. As it was, but few reports were made, and these in the main verbal, inconsequential and for all practical purposes worthless.

A letter was read by the Secretary from Absolom McCreary, of Glasgow, Mo., to the effect that the Ben Davis apple originated in Howard county, Mo. (was known as the New York Pippin), and not in Kentucky, as has been claimed. Good, again, for Missouri.

Conrad Hartzell sent word to the Society that he was willing to give his secret for preserving fruit in its natural condition to the members of the State Horticultural Society on condition of its secrecy, in order that they might fully and thoroughly test its merits and testify thereto to the world. One member suggested that by submerging apples under water at low temperature had been found efficacious. Another member said that an aged and experienced fruit-grower had discovered in his practice, that spraying the trees thoroughly before, during and after blossoming with pure water had been as efficacious in keeping off the bugs and insects as with the kerosene emulsion. In this connection it was urged that in spraying the nozzle must be very fine, no matter what the material used; that it must be a spray and not a rain. The one will rest on the leaves, the other run off and do little or no good. The water spray found but few that would risk its practice.

The reports of the Secretary, Treasurer and the Finance Committee were presented, accepted and adopted. The election of officers followed. All the old officers were unanimously re-elected.

Invitations were received for holding the June meeting of the Society from Jefferson City, West Plains, Lake Side Park at Cartersville, and at Pertle Springs; and from Springfield and Columbia for the annual meeting in December. The question of locating these meetings was referred to the Executive Committee. The West Plains people were particularly earnest in their efforts to secure the summer meeting and it would not surprise us to see it held there. The horticulturists of that enterprising little burg would stir themselves to the utmost and give the Society a rousing good meeting.

A paper on the life and work of Prof. Charles V. Riley, late Chief Entomologist of the United States Department of Agriculture, written by his life-long friend and assistant, Miss Mary E. Murtfeldt, of Kirkwood, was admirably read by Miss Goodman. Few who have written of Prof. Riley's life and worth have done it more intelligently or with

so much loving affection as Miss Murtfeldt, and her paper will stand on the records as one of the best.

Mr. Tippin, of Greene county, read a paper, "By their fruits ye shall know them." Mr. Lamm on "Local Society's exhibits." The latter brought Mr. Goodman to his feet to speak of the remarkable exhibit made by the enterprising people of Pettis county, Mo., at Sedalia. Mr. Atwood, editor of the "Southwest," Springfield, Mo., read a paper on "Transportation." Mr. Gardner led the discussion and insisted that the men engaged in farm industries should combine and co-operate much as other industries do, which brought Mr. Rice forward with an exhaustive practical and business-like address on the question of co-operation among fruit-shippers. He had very little faith evidently in the all-pull-one-way faculty of farmers of any kind, and felt that every man would suspect every other of being for himself first and other members afterward. This question of co-operation, however, is one that must have more thought than it has yet secured, and we see no reason why it is not both practical and feasible.

G. B. Lamm moved that the Committee on Education be made one of the standing committees. Prof. H. J. Waters made an admirable and telling address on the work of the Agricultural College, and fully convinced his audience that he was heart and soul in the work, and that, if it did not prove a success, it would not be his fault. Miss Emma Lindsay, of Springfield, read a very interesting paper on "Land Ownership." Mr. Goodman read a paper by G. W. Hopkins on "Growing Small Fruits."

FRUIT SHOW AT NEOSHO.

One of the most interesting features of the State Horticultural Society's annual meeting was the great show of fruits made by members present and county societies contiguous to the place of meeting. It was estimated that there were not less than a thousand plates of the handsomest apples ever exhibited at a State meeting. A separate room on the square had been secured for it and hundreds of the citizens flocked to and admired it. Mr. Goodman had carefully saved and shipped much of the best from that exhibited at the St. Louis Exposition, which added immeasurably to the attractiveness of the display and the fine quality of fruits shown. There were also fine exhibits from Thayer, West Plains, Springfield, Parkville, Lebanon, Sarcoxie, Bentonville, Ark., and other places.

An interesting display was made by James H. Bailey, of Mesilla, New Mexico, consisting of apples, Japanese persimmons, raisins, grains,

etc. Mr. John Harlan, of Sarcoxie, had an exhibition of 176 Ben Davis apples which filled a barrel. The Newton county display made a fine showing alongside of the others. The largest apples on exhibition were from Newton county and of the Gloria Mundi variety grown by J. H. Carmichael in Benton township. Exhibits were made by F. H. Comer, 16 varieties; Samuel Reynolds, 6 varieties; S. M. Powell, 3 varieties; Wm. Kruse, 5 varieties; John Jaeger, 11 varieties of apples, wines, vinegar, etc.; F. H. Speakman, 3 varieties; J. H. Carmichael, 12 varieties; F. W. Wyatt, 4 varieties; C. H. Smith, 4 varieties; John Roschi, 2 varieties. An orange tree 17 years old, having borne 15 crops and now bearing 45 oranges, was on exhibition from Mrs. Charles Lewis, of Neosho. Dr. Yates had on display a red pepper plant full of the "hot fruit."

The meeting was a very pleasant and profitable one, and will long be remembered by those in attendance as marking an advance in the magnitude of our operations as a fruit-growing State, and as establishing the fact that Missouri is, in the matter of commercial orchards, to lead the country.

TUESDAY, December 3—7:30 p. m.

President Evans called the meeting to order, and the program opened with a piano solo. The opening prayer was offered by Rev. Dr. C. C. Woods. After a song by the double quartette of the city, Dr. Wood, in the absense of the mayor, delivered an address of welcome to the Society.

Welcome Address—Dr. C. C. Woods.

MR. PRESIDENT, LADIES AND GENTLEMEN: I desire in the name of the mayor and citizens of Neosho, whom he so worthily represents and leads in the upward march of progress, to welcome you sir, and those over whom you preside, the fair ladies and sturdy men who honor us with their presence. On his behalf and for the people of Neosho, I desire to extend to you a most hearty, most cordial and most sincere welcome. I assure you sir, that aside from my own unfitness to fill this honorable and responsible position, there is none other that could give me greater pleasure.

I appreciate fully the fact that you represent one of the highest and largest interests of humanity, and I am sure that there is not one in this intelligent audience who will deny that man owes more to the

Mother Earth than he does to all the other elements combined. In this state of nature, as man is fettered by the forces of gravitation to the bosom of the earth, he feels in that warm bosom his largest comfort and his chief sustenance, and he is ingrate indeed if ever for one moment he fails to remember the loyalty and the profound regard with which he should ever consider her.

Agricultural and horticultural has always claimed the largest share of my attention, from the fact that we live by and from the bounty of the Mother Earth. As our chief sustenance springs from her own generous impulses, so also do those luxuries which she has been accustomed to offer for the gratification of more æsthetic tastes and more refined and cultivated desires. So long as a man recognizes the need and the propriety of loyalty and deference to the Mother Earth, and so long as he holds in profound veneration the arts of the peace, so long will society flourish and humanity may hope to achieve the very largest and best results. It is at once the most innocent, the most pure, the most ennobling and the most useful of the arts and sciences. From the very morning of time, when man in his purity was created to be a tiller of the soil, and since when he went forth banished from his primal home and his divine estate, it was still as a tiller of the soil; I repeat, it is not only first in point of time, but it is likewise first in point of importance. I see about me upon every side, as I observe the progress of the world, unmistakable evidence that man in these latter days is more and more awakening to the necessity of returning to first principles and giving more careful attention to the simpler and yet grander and more satisfying occupations, which bring him more closely to the bosom of nature.

I am very well satisfied of the fact that man is to find his largest measure of enjoyment, he is to find his chief happiness and his largest development, and the world is to realize its golden age only when our farming interests are magnified and multiplied, and when the Hegira from the farm to the city shall cease and there shall be reflex tide, emptying out of our cities their surplus population, and shall send them out to the country to grow wise and strong, that they may make glad the wilderness and cause the desert to blossom as the rose. I am very sure that that day will come. Men are growing wiser and better with the onward march of time. Grim visaged war must sooner or later smooth its wrinkled front, and man, instead of going forth to battle with his fellow-men, or capering to the lascivious music of the waltz, must go into the fields and guide the plow-share, and in the very divinest art of peace, he must keep step with the moving columns of the Grand Army of Progress, which God has called and ordained to

redeem the world, by showing to humanity that which is most innocent, purest and best.

There is no branch of agriculture in which I take more interest of necessity, there is none in which man ought to be more interested, from the very highest of considerations, than that very branch which you represent. The dwellers of the hardy North must more and more eschew a vegetable diet, and we find in all ages of the world, as we have departed from the polar regions, as we have found our way to where the genial sun shines, and the earth gives back its splendor, just in this proportion do we find the bounty of Mother Earth more and more magnified and multiplied, and life to have reached its very highest possibility.

The largest and best civilizations of the world have always been under a tropical sun. The civilization of the olden days concentrated itself around the Mediterranean Sea. All the pulsations of life in Central Africa extended to the shores of the Mediterranean and everything that belonged to brain or brawn expressed itself in its highest endeavor upon the shores of that sea. On its eastern and northern boundary the Goths and Vandals hurled themselves upon the dwellers upon its shores in the endeavor to reach the civilization which was then in its divinest expression there, and where everything offered advantages which the cold and frozen regions in which they had starved and fought like wild beasts had not given them. They hurled themselves upon the gentle sons of the south, not with a fiendish disposition to destroy, but because they saw them in possession of a clime and soil which they recognized as being next to the very garden of God, and so, sir, I return to say, that man has gained his very highest ideas, he has achieved the very divinest results under a tropical sun.

History repeats itself, and I do not expect in the years to come that there will ever be evidenced near the polar circle, anything belonging to a higher nature, which is calulated to distinguish humanity. Never has a Milton, a Shakespere, a Webster, a Columbus, a Ceasar or an Alexander, never has a man distinguished among his fellow men by intellect, never has a man capable of leading the armies of humanity come out of the frozen north. We rejoice in our glorious America, in this United States, situated sufficiently near the tropics to obtain their general warmth, and yet separated from all that tends to enervate. For this reason our country has produced fairer daughters and braver sons than the world has ever known, and I look before me for yet grander results than any which we rejoice at the present time. But, sir, the thought which led me astray was this ; that precisely in proportion as the arts of war decay and the arts of peace flourish, precisely

in proportion as man is brought nearer to nature and God, in that measure will man be more and more inclined to a vegetable diet. I do not for a moment doubt that man was created omniverous, the structure of his being, the shaping of his teeth and the entire conformation of his body, all indicate this. He was made to be, if peradventure fate so ordained, a carnivorous creature, yet, that this is not a necessity we have abundant evidence. As man goes further and further into frozen lands, he more and more feeds upon an animal diet, but bring him down to a southern land, under genial skies, where the sun forever shines, and the grass is always green, and where the tree of life stands on the bank of the fair river yielding her fruit every month, and more and more will he feed upon that pabulum which God permitted him to take in the morning of time. And so, sir, this brings me, no doubt you will hope, to the very last thought, and that is that we are situated sufficiently far from the inhospitable north, and sufficiently near to the equator to rejoice in all that is best in either climate, and possibly, sir, there is no part of the habitable earth, certainly not in which we, as citizens of the United States rejoice, that is better calculated to develop the fruit-culture, than this locality to which we extend to you so hearty, so cordial, so sincere a welcome tonight.

I am here, sir, not in a spirit of boasting, it would not become me to go beyond the limitations of the truth. I am here, not as a land agent or real estate man, who may sometimes be suspected of mendacity. We have very few real estate men here, and they are all strict members of the church. I am not here to represent any landed corporation or syndicate. I am here simply as a minister of the gospel, and a citizen of Neosho, all of whom are bound to speak the truth, to say that we have the very grandest locality with which God ever favored humanity. Our soil will produce anything, absolutely anything, from a petrified man* to a national question. But in the first case if we undertake to do it, not for our own use and benefit, but for our less fortunate neighbors. The truth is we do not like petrified men, or women either. We want them wide awake and full of life. Our soil is itself as genial as any upon which the sun shines. Even these sterile hills around us, scattered over so thickly with stones of so suitable a size as that you would think that God intended them especially for an Hibernian picnic—even these sterile hillsides will produce the grape, and, in fact, all manner of fruit in such plenty and of such quality, that you, sir, with all your wisdom and wealth of knowledge of horticulture, will be amazed. We have land especially adapted to grain-growing in our magnificent valleys, and we have just as rich, just as generous soil as the great plain of Sharon, which has

borne wondrous harvests for 3000 years. We have here, sir, a climate as genial as that of Southern Italy, a sky as blue as that which hung over Greece in the days of Alcibiades. We have here, sir, unlimited opportunity for honest industry to achieve independence. We are very glad, indeed, to be favored with so large and representative body of ladies and gentlemen, and we doubt not that you, coming from less favored localities, and seeing the exceeding beauty of this Canaan's land here, we doubt not that some of you, at least, will conclude to marry and settle down among us.

In conclusion (and I really beg pardon that I have been so prolix), but I represent the mayor, and he is somewhat garrulous, and this gentleman here, Mr. Alexander, who is a sort of sub-mayor, has promised to endorse everything that I have said. I repeat it therefore, in the name of his honor, the mayor, whose absence I greatly deplore, and which I only excuse, because of the fact that he may possibly have gone off to secure one of the National conventions to meet at Neosho, and it does not matter to me which one, I vote both ways. I only excuse his absence, because I know that he is living, fighting, and I hope praying for Neosho tonight. In his name I welcome you to our fair city, in the name of the citizens of Neosho, who gladly recognize the stranger within our gates, and feel for him (not for his pocket-book) all the sympathy that is meet they should. In the name of our community I welcome this convention to Neosho. In the name of educational interests—one of the most magnificent and complete public schools in the State of Missouri, and a college of some promise and dignity, I welcome you in the name, last but not least, of the ladies of Neosho, who will do all they can to break your hearts—in their name, sir, I welcome you to Neosho.

* This is a local allusion, and refers to a petrified man of the "Cardiff Giant" species, which created much wonder and amazement among the worthy townspeople.

President Evans' Response.

In behalf of the Missouri State Horticultural Society, I thank you for the most cordial welcome you have extended to them. Your good people invited our Society to hold this, the Thirty-eighth annual meeting in your beautiful and prosperous city, and we have come, trusting and expecting that they will assist us in making the meeting one of the best in the history of the Society; and already we see indications that point to such a result.

We came to help you to promote and develop the horticultural interests of your section of the great orchard region of the world. If

we have come partly for our pleasure, let us strive together that it may be for your good as well as your pleasure. Let us build on that foundation that has been by nature so well laid, until your section shall have attained to that prominence it so justly merits, until your hills and your valleys shall blossom as the rose, and in due season bear fruit in abundance until horticulture shall be your leading industry, and your means of transportation be taxed to their utmost capacity to bear your products to the markets of the world. Your section is possessed of all the elements and surrounding conditions to render all this possible, and it is only necessary for your people to avail themselves of the many advantages so lavishly spread out before them by nature, and with the proper energy, industry and good judgment reach such results. It is the purpose of the State Horticultural Society to aid and assist, not only the people of your section, but those of all sections within the borders of the State, and as much as may be, those beyond our borders, to the end that Missouri shall be placed first instead of fourth in the production of horticultural products.

With the help and co-operation of the people and the proper encouragement from our Legislature, this is all possible. Every man and every woman in the State who makes any pretentions to horticulture, or who owns and lives on an acre of land, should become a member of this Society and receive the benefits of its work, and assist in benefitting others by their knowledge and experience. Our Legislature should by all means increase the appropriation to the Society to $5000 a year instead of $2500, as it now is. Such a change would insure a much more rapid development of the horticultural interests of the State, and in time the State would reap the benefit of increased revenue. Who can look into the future and tell what the possibilities of the great State of Missouri will bring within the next generation? Long ago the question was asked, where will be the future orchards of the world? That question was answered then just as the actual facts and figures are demonstrating today. Missouri and her border states, Northwestern Arkansas, Eastern Kansas, Southern Iowa, Western Kentucky and the entire portion of your own great State. Nature has so endowed this section, the very center of the United States with all the elements that go to make up a rich country, and especially a fruit country, soil, climate, altitude, rain and sunshine, that it is justly entitled to be called the garden spot of the United States. Here may be grown any and all of the known fruits (except the tropical), and all the staple food products that enter into commerce or go to make food for the human race, besides much raw material for the manufacturer.

Of the 114 counties in the State, fully 100 of them are well adapted to horticultural pursuits. Some few have already become famous, but many of them, perhaps as well suited, have not made a start. Much of the lands in many parts of the State once considered only fit for grazing purposes, are now being developed into orchards, and are proving superior for the purpose to our best agricultural sections. Millions of acres of such lands are yet idle in many parts of the State. The bluff lands along the Missouri river and all its tributaries in the north central part of the State comprising a part of the great Loess formation. All of the east part, along the Mississippi river, the vast Red lands or Ozark region, comprising nearly one-third of the State, on the south side, all are yet comparatively undeveloped, and all are the very best fruit lands, and are only waiting the coming of thousands of people who are eking a scanty living on rented land in older states and countries paying more per acre per annum in rents than these lands would cost to buy them outright.

Where away back in the beginning of the present century the white man came to settle the territory of Missouri, and only a few years back the best agricultural sections were selected and there the family orchard was planted and it was not until commercial orchards began to be planted that it first came to be known that these lands, first considered worthless, were so well adapted to fruit-growing. Even at the present rate of development it will require at least fifty years to convert a respectable majority of the lands into orchards. Some of you may ask, as we know many have already asked the question, what will be done with all the fruit then? The answer is: We have the world for a market, and the population of the world is increasing more rapidly than our orchards are; besides, there is a large part of the world where fruits cannot be grown, and in most cases these parts are the most densely populated. There are large sections of the United States, either densely populated or becoming so, where fruits are very little grown. Owing to the varied climates, soil, etc., of our great fruit region we do not get a full crop of fruit all over the country each year. As a rule we find failures and successes here and there all over the country; and this is perhaps a wise provision of nature, to give trees and plants a rest and prevent any over-production, which we need not fear in the present generation.

The means of transportation have been so improved that we can send our fruits to markets that awhile ago we had not thought of ever reaching. The time is coming, and it is not far in the future, when train loads of fruits will leave our orchards to go to the seaboard, there to be loaded into cold storage vessels and taken to the various

markets of foreign countries; and the consumer will get a barrel of nice apples for about $3, thus bringing them within reach of the masses and creating a demand for large quantities. Then the apple will no longer be considered a luxury, but will be classed as one of the staple food products, and be found on the table of the common people three times a day. When this shall have come, and when the population of the earth has increased as it will, then the question may be asked: Where are the fruits to come from to supply the people of the world? It will be answered then just as we answer it now: The orchards of the world are in the great Mississippi valley of America. Then let us, we who are now occupying the stage of action, and these younger people who are ready to step on, resolve to do our part for the advancement of the work of the State Horticultural Society, so that when we shall step down and others take our places, it may be said that we have done our part in bringing our great State up to that high rank in horticulture. That these things will come is my sincere belief and earnest desire.

After the vocal solo by Miss Ames, Pres. Evans called for a paper on Horticulture by Mrs. Curtice.

What I Know About Horticulture.

When I received an invitation to read a paper before this Society I was quite surprised. Conscious of my ignorance of horticulture, I supposed others were also aware of my lack of knowledge, as it seems to me it must be evident to the most carless observer. Still, as no less a personage than Horace Greely, in his articles entitled "What I Know About Farming" was willing to confess his shortcomings, perhaps it will not be improper for me to follow so illustrious an example.

When I have a home of my own, I said in my confidential moments, I will have fruit and flowers. My strawberries shall equal Mrs. Ramsour's, my grapes rival Mrs. Zimmerman's, my pansies shall make those of Mrs. Wolfenden to hang their heads, and my roses put Mrs. Vickery's to blush. I will eat peaches and pears from my own trees—I and my children and my children's children.

Living as I do, so near the public school, where the atmosphere is permeated with learning, where music floats down upon the breeze, and where, at times, the air vibrates with the laughter of merry children, one would think that flowers would bloom their brightest and fruit-trees gladly yield their finest fruit. But, alas! Things are not what they seem and disappointment is the common lot of—woman.

At first I patronized home industries. I bought strawberry plants of Mrs. Ramsour, and J. B. Price not only sold me fruit trees, but set them out in my own yard. For awhile they flourished finely, but the washerwoman, with her big kettle, in a fit of abstraction, forgot her fire. The flames crept stealthily along from one leaf to another, catching a dry twig here and a bit of brush there, till they reached my Flemish Beauty, wrapping it in a fatal embrace, and it went up in a chariot of fire. Then the hydrant sprung a leak and dripped, dripped continually down around the roots of my brave Bartlett till it went down to death, drowned, poor thing! My peaches did bear one year, nearly half a bushel. Now they are not even an ornament to the landscape, for last winter's below zero weather froze the sap in their veins and five of the eight are dead, fit only for firewood and not so cheap as coal. The hot sun dried up my strawberries, the rain washed the gravel down upon them, the chickens scratched them up by their roots, and the hoe did not cultivate them. In six months not one was left to tell the tale.

Then, seduced by the glowing representations of J. Lewis Childs and dazzled by the vivid pictures in his magazine, I ordered several dollars' worth of trees from Floral Park—pears, plums, cherries, yes; and even currants, with a couple of dozen roses warranted to bloom the first year. He had made arrangements with the express companies for cheap rates, so he said. As I paid about half as much for express as I did for the trees I wondered what full charges would have been.

I hired a man to plant them out. He brought rich dirt to put around their roots; he dug holes broad and deep; he straightened out the little fibres as he placed the trees in proper position, and firmed the ground with his feet. Everything was done according to the books. And they grew. But the next spring a Nebraska blizzard came down from the North and froze nearly every green thing. There are two of those trees left—a Japan plum and a Vermont Beauty pear; but I shall never eat of their fruit; not that I expect to depart this life suddenly, but I am sure they will. Do you remember that unfortunate person in Lalla Rookh, of whom Tom Moore sings so pathetically—

> "Who never loved a dear gazelle
> To glad her with its soft bright eye;
> But when it came to know her well
> And love her, it was sure to die."

So do my trees. The roses I planted and petted with my own fair hands, as the novelists say. I brought fertilizers by the bucketful from behind my neighbor's barn to put around their roots; I watered and watched them and waited for the blossoms. It was the same old

story. My American Beauty belied her name; she was neither American nor Beauty, for she died in a day. Mary Washington climbed an inch or two, then her leaves turned yellow and she followed her sister to the tomb. Meteor did give one blossom, the crimson petals opened in a burst of splendor, then it vanished like its namesake. Perle de Jardin was my pride; its rich, dark leaves gladdened my heart and I looked forward eagerly to the yellow blooms. But some careless children running through the yard stepped upon it and broke it off even with the ground. In vain to water it with my tears, that was the end. And so on through the whole list; nothing remains of them all but a few sweet remembrances!

I have bought pansy plants by the dozens; I have sowed the seed and transplanted my own plants; I have put them out on the north side of the house and on every other side; I have covered them with brush to keep out the chickens, and surrounded them with stones to keep in the dirt. But the winds have blown them, the rains have beaten them, the chickens have scratched them, and the largest pansy I ever had was an inch across.

My grape vines, I have ten of them; they have been planted eight years. I have pruned them myself. I have hired a man to prune them. I have let them grow at their own sweet will. But the result has been the same. On those ten vines there have been five bunches of grapes —a half bunch apiece.

This is the conclusion to which I have come: Let those raise fruit who will and can—I shall buy mine. My flowers I will beg of my neighbors or go without. I shall devote my spare time to the culture of oaks. The veriest idiot can grow them and the crop of acorns is always sure. LOUISE CAPRON CURTICE.

The Flower Garden—What to Use and Buy.

It is quite evident that this must be a pure practical paper, no opportunity for anything ideal to creep in, with the above title looking coldly and critically down on one. Therefore, I will proceed to state briefly what I use, and why, as regards my own flower garden.

Before beginning, however, let me say that I permit even my flowers to have their own respective individuality, and heed their preferences whenever such a thing is possible.

I never follow the fashion in floriculture.

My flower garden proper is located in the northwest corner of the lawn, fronting on the main street.

This selection is not the best for all classes of plants, as it is difficult to find any one particular spot exactly suited to all varieties of flowers. I usually let mine straggle at will over the place, using only just enough discipline to prevent one class from encroaching on another, to the detriment of either, or both, for I find the vegetable world is like the human in that the strong is inclined to crowd the weak and to usurp their rights.

I use shrubs, such as the lilac Althea, spirea, hydrangea, wigelia and other varieties, because they bloom early, have graceful foliage, and help to make beautiful a large lawn.

I plant many roses, always in clusters, groups or hedges, because roses are very neighborly and sociable, in their own class, always getting along comfortably together if they are fed well with plenty of rich food and given all the water they require, which is a great deal. I use many of the hybrid perpetuals, because they are more than half hardy and almost as prolific of bloom, and as sweet scented as the tender teas. I always plant tea-roses in groups, for it is just as easy to protect twenty thus planted as one bush standing alone, and they do better for me when planted in clusters than singly.

I use bulbs freely, both indoors and out, my favorite being hard to define.

I plant callas, cannas, caladiums, tulips, jonquils, narcissus, freesias, tritilea-uniflora, lilies, lily of the valley, crocus, ixas, sparixas, snow drops, hyacinths and others, including the Spanish iris, and ornithogalum.

I always plant a mixed collection of bulbs and bulblets, using the taller ones in regular gradation toward the center of the beds, and tucking in the bulblets in the least conspicuous and most effective places.

I find that by mixing the bulbs a succession of bloom may be had and the beds kept beautiful until the middle of May. Crocus and snow drops, tulips, grape hyacinth, sparixias and many others will begin to blossom as soon as the frost permits them to put their bright faces out of the ground.

The lily family is of aristrocratic lineage and refuse to dwell among plebeian plants however rich and beautiful these may be.

They will grow in clusters, many sorts of the same family together, and do well, but when you crowd in other things among them they will resent such intrusion to the death, as I have found out to my sorrow after many experiments.

The lily of the valley requires a place to itself, and when established in its home must not be often disturbed. Nothing disgusts and

discourages these bulblets like frequent removals. I have had a change of location cause the death of a fine collection, although considerations for removal all seemed favorable, and they were taken, as I thought, to a better place. I plant all lilies in clusters, in large well-prepared beds, where they may remain for many years undisturbed.

I use cannas plentifully, because they are so easy to grow, are very ornamental and prolific in blooming.

I use vines a great deal, both in the flower garden and about the house. Climbing roses, cinnamon vine, ampelopsis, clematis, passion vine, woodbine and honeysuckle, because vines express so much of grace and beauty to me, and because a place without them looks naked and uncomfortable. I use quantities of sweet peas and pansies every year. Why? Is it necessary to ask such a question? It is because they are so clean, sweet, fresh and beautiful, and because they decorate the rooms so prettily. No floral center piece ever placed on my table gives me one-half the delight that I can get out of a flat dish hidden beneath feathery ferns, through which the smiling faces of many pansies are showing cheerily.

I use sweet peas because they may be cut by the half-bushel and are so fragrant and exquisite in their coloring. During their season I keep every vase and bowl in the house filled with them, then send the surplus to my friends.

I always used nastertiums in my flower garden, because I love their brilliant blossoms, clean foliage and pungent, spicy odor. When the roses are resting and the sweet peas are gone, when the hot summer wind has discouraged the pansies; when, indeed, nearly every other flower has performed its duty, fulfilled its mission and is resting on laurels won, these cheerful, democratic nastertiums are at their best. It takes a great deal of snubbing and positive ill-treatment to discourage a nastertium. Nothing but Jack Frost is ever able to hurt mine, and they must know how much I love them, for they always bloom for me, so riotously, no other word can express their overflow of exquisite brilliancy in my garden.

I always use the China asters, not the quilled variety, but the plain, old-fashioned sort. They are not fragrant, but are of easy culture, have such rare colors and are so feathery, so branching, so rife with bloom that a garden which excludes them shows poor taste.

For decorative purposes I use them freely in tall vases, each vase containing one splendid branch—a bouquet in itself—and am always careful not to mix inharmonious colors.

I use the white, the pink, the purple and the lavender only, both in sweet peas and asters. I use zinnias in hedges in the vegetable garden, or to divide the vegetables from a corner where I may desire to put a few flowers. Zinnias are coarse in foliage, liable to attacks of mildew, but when the hot autumn days come and everything begins to look dry, dusty and miserable, the scarlet and white, the cream and gold of the zinnia hedge is a thing to rest the eye and make the heart glad.

As to the geraniums, verbenas, carnations and half a dozen other kinds of flowers that I grow and admire, it will not be necessary for me to go into detail as to the why of their cultivation.

To sum up the whole matter in a few words, I use the flowers I most love and cultivate them because I do love them.

Flowers and friendship are analagous in one respect, to get the best results from either, we must give affection and assiduous care, which means cultivation.

MRS. GEO. E. DUGAN.

Music—Double quartette.

Paper by A. Nelson, Treasurer.

The following committees were appointed :

Fruits.

J. B. Wild, F. Holsinger, W. G. Gano.

Flowers.

Prof. H. C. Irish, Miss Emma Lindsey, Mrs. A. H. Vicery.

Finance.

J. T. Snodgrass, M. Butterfield, A. H. Gilkerson.

Obituary.

G. A. Atwood, W. A. Gardner, Lee D. Bell.

Final Resolutions.

J. Ames, S. W. Gilbert, G B. Lamm.

WEDNESDAY, Dec. 4—9 a. m.

The session was opened with prayer by Rev. Johnson.

The first paper was by Mr. Hammon.

Preparing the Ground and Planting an Orchard.

The following list of articles should be provided before begining operatious, so no delay may be necessary:

A large, strong lister plow with ironed beam to stand a pull of six horses, and a four-horse double-tree.

A good subsoil plow.

One thousand wooden pins, one-half inch in diameter and 12 inches long.

Four posts for corners of tract.

Fourteen flags—poles 12 feet long, sharpened at lower end, with a piece of clean white cloth nailed to the top.

Two iron pins, same as used with check-rower.

A planting wire with three-inch iron rings attached to each end (use No. 12 wire); length of wire including rings, 300 feet. Pieces of wire should be twisted around and soldered firmly to the planting wire every 30 feet, making ten 30-foot spaces.

Four planting boards four feet long, four inches wide and one-half inch thick. Bore one-inch holes in board three inches from each end and saw a notch from center of board exactly midway between the holes.

Two tubs, made by sawing an oil barrel in two.

The preparation of the ground comes first (presuming that it has been selected with care and good judgment). All trees and brush and old hedges should be thoroughly grubbed out and burned; any abrupt banks or very uneven surfaces should be leveled down so there may be no delay in working teams over them, and any obstructions removed which may interfere with throwing all the ground to be planted into a body. (I am taking for granted that the ground has been under cultivation). We all agree that the land should be plowed deeply and well harrowed and pulverized.

We will suppose that we have a 40-acre block to plant and that we will plant the trees 30 feet apart each way and on the square. We will now get the exact corners of the block, which will be 1,300 feet apart, and drive stakes. The northeast corner we will take as a starting point, or initial corner. Measure west from it and plant a flag 15 feet in exact line to northwest corner stake, and also south 15 feet and likewise plant a flag on direct line to southeast corner stake. Go to each of the other corners and locate flags in the same way 15 feet each way on the line from corner stakes.

Let us, to aid in description, number our flags, beginning with the first one west of initial, or northeast corner, which we call No. 1. The next one west 1290 feet is No. 2, it being 15 feet east of northwest corner. South of northwest corner 15 feet is No. 3. Next one south is No. 4 and so on around to the one located 15 feet south of initial corner, which is No. 8. We now have the outside lines of the tract, and by standing at the initial corner and sighting south from flag No. 1 to flag No. 6 and from flag No. 8 west to flag No. 3, we get the north and east outside tree rows. Also, stand at southwest corner and sight from flag No. 5 north to flag No. 2 and from flag 4 east to flag 7, and we get the west and south outside tree rows. All of said rows are 15 feet inside of the outside boundries of the block.

Take the planting wire and iron stakes, two men to stretch it, two boys to stick pins with a sack of pins each. Begin at flag 1 and stretch wire exactly on line to flag 2, inserting one of the iron stakes through iron ring on end of wire and firmly into the ground close to flag 1. The man at the other end of the wire now straightens it by giving it a few throws and stretching it moderately tight, places his iron stake through the ring and presses it firmly into the ground exactly on the line of flag 2.

The boys now pass along the wire and stick a pin into the ground close beside the knobs on the wire which are 30 feet apart. When the pins are all in the men move the wire west one length and repeat the operation, and so on until flag 2 is reached. The pins are now in the ground 30 feet apart on the north line. Now move south to the southwest corner, and beginning at flag 5, work east with the wire, sticking pins along south line to flag 6 at southeast corner. These pins on the north and south line are to use in locating flags for sighting in opening furrows with lister for tree rows.

Set a flag midway of the block between flag 1 and flag 6; also one about 50 yards south of flag 6, both of which must be on exact line of said flags. Set a flag close beside the first pin west of flag 1 and one about 50 yards north of same, which must be in exact line with same pin in south line.

Take the lister with six good horses attached, four abreast and two in the lead, with a boy to ride it and one of the drivers standing on the four-horse double-tree. Sink it to the beam, beginning at flag 1, and open furrow for the first tree row, following the line by sighting flags. Be careful to have the flags exactly in line and get the furrow perfectly straight. When the center flag is reached move it to the next row west, and when the south side is reached move the flags there

two rows west. Return with lister north on next row, move flags and return south on third row, and so on until block is finished. Take the subsoil plow and four good horses and follow each furrow, sinking it as deeply as possible.

Now take the planting wire with the men and boys. Begin at a point 15 feet south of flag 1 (which will be the location of the first tree in first row), stretch the wire south in line with flags 1 and 6, sighting the flags to get wire straight, and stick pins in at each knob on the wire. Move south, sticking pins to end of row, which will be 15 feet north of south line.

Now move west on south line 300 feet (the length of the wire), and beginning at point 15 north of south line, stick pins on that line north to point 15 feet south of north line. Return south on row 300 feet farther west in same way, and so on until end of block. Move with wire back to starting point and begin at first pin 15 feet south of flag 1, stretch the wire west to first pin in the row 300 feet west and 15 feet south of pin in north outside line, and stick pins exactly at each knob. (If the furrows are straight each pin will come in center of furrow). When pins are set the men will move wire south to next pins and set pins as before, and so on until south line is reached. Then move wire west 300 feet and work north in same manner to north line; then south on next land, and so on until block is finished.

We now have pins set where each tree will stand, and they should row up perfectly straight in all directions.

A man will now take one of the planting boards and a sack of pins. Lay the board flat on the ground across the furrow so that the pin which is set where the tree will be shall fit snugly into the notch in the center of the board. He then inserts a pin through each hole in the end of the board and firmly into the ground, raises the board, leaving the three pins sticking in the ground, and passes on to the next pin and does likewise until he has gone over the tract. Following him comes men with shovels who open up the hole around the center pin large enough to allow all roots to extend in natural position; the pin is laid to one side.

We are now ready for the trees. Take the two tubs made from the oil barrel and set one close to where the trees are heeled in and fill it well with kerosene emulsion. Place the other in the wagon and fill with thin mud made from rich soil. When the trees are taken from the ground the roots should be dipped in the kerosene emulsion to kill any wooly aphis which may be among the roots, then dipped in the mud and placed in the wagon and covered with a blanket and taken to

the planting ground. If we have several gangs of planters a boy should be provided to distribute trees to planters from wagon.

Now take two men for a gang, one with a planting board, the other with a shovel. Begin at first row, drop the board over the two stakes and place the tree, after being again dipped in the mud, in proper position, so that it will fit snugly into the notch in center of board, and stand perfectly perpendicular. The planter then arranges the roots in the natural position, while his partner shovels in good surface soil, which he places among the roots and presses firmly with his hand until the roots are well covered. He then removes the board, and as the soil is shoveled in he tramps it down well and firmly, but leaves a couple of inches of loose soil on the surface. As each row is finished a stake should be placed at head of row with name of variety written upon it, and a record should be made of orchard as soon as planting is finished.

The trees should be wrapped also to protect against sunburn, which is bad on young trees the first season, when the sap is not circulating freely and the tree is struggling to get root. Also wrap to protect against rabbits. A good wrapper is made by the St. Louis Basket Box Co., of St. Louis, Mo., for $3.50 per thousand.

The pruning should be done immediately after planting. I cut the tree off three feet from the ground. If branched I leave three or four, but cut them back in proportion. I cut leader to force tree to head low, and leave top bud to form a leader the second year.

The above method of planting can be done at an expense of 2 to 2 1-2 cents per tree. If care is taken the trees will be in perfect line in every direction, and will well repay any trifling addition to expense in planting. I claim that trees will bear better when planted in nice, straight rows, for the man who takes such pains will give them better care afterward than the man who is careless in planting.

Buy trees from reliable nurseries as near home as possible. I have been a tree agent myself, and advise planters against them.

When unpacked, the trees should have all broken and bruised roots cut off, cutting from under side, and should be dipped in kerosene emulsion—not too strong—provided they are apple trees—then puddled in good rich mud, and heeled in with tops leaning well to the south, or in a place where the sun's rays will not strike them.

Opening the furrows with a lister and following with a subsoiler saves many trees the first season by forming an under-drainage when the season is very wet, and by storing moisture when very dry.

Out of 12,000 apple trees which I planted for the Darby Investment Company, on the Darby Fruit Farm at Amoret, Mo., last March,

not over fifty trees have died, and most of those were eaten off by mice getting inside of wrappers and making nests, or by drowning out in low, wet places.

I have omitted many details of planting which have been written of so much that all are familiar with them, and I did not wish to take your valuable time with a repetition of them.

FRANK HAMMON, Amoret, Mo.

Then followed the paper

How to Take Care of Apples.

To be able to properly care for and handle our fruits after they are harvested, so as to be able to realize the most possible out of them, is as much a part of the necessary education of the would-be successful fruit-grower as to be able to successfully grow them. The large fruit-raisers who make it their especial business fully realize this and prepare themselves with properly constructed fruit-houses or cellars, or take advantage of cold storage in their immediate vicinity, so that if the market is not satisfactory at gathering time they can store their fruit away until better prices prevail. They know that better prices are almost certain to prevail as soon as the surplus crowded on to the market at gathering time is out of the way.

A large proportion of our farmers have some portion of their farms devoted to orchards. These orchards could, if properly handled, be made to pay far better than any other part of the farms. But the most of these farmers, even if they succeed in raising good fruit, are not prepared in any way to store it so as to be able to take advantage of the market, but are compelled to rush their fruit to market as soon as gathered and sell it for what they can get. The fruit cannot be kept because it has to be sold, and sold at once, or it is lost. Their neighbors are pretty much all of them in the same fix, and the result is that during the few weeks immediately after gathering and before cold weather sets in there is such a large amount of fruit dumped on the local market as to glut the market and demoralize prices. And in too large a number of cases the growers who are thus forced to get rid of their fruit as soon as it is gathered take just as little care in gathering as they do in preparing themselves for taking care of it after it is gathered, so that it comes to market usually in bad shape and commands low prices.

Too large a number bestow very little care either on their trees or fruit. When gathering time comes the fruit is too often shook or

pounded off the tree, and whether imperfect or bruised, is taken to market to be sold for what it will fetch. Fruit gathered in this manner will not keep. Buyers understand this and guage the price they offer the farmer accordingly.

Apples, at least those that are intended for market or to be stored, should be carefully picked and carefully handled after gathering. Apples thus treated can be easily kept till the latter part of the winter or early spring, provided that one has a proper place to store them, and this brings me to the leading idea which I wish to treat of in this paper: that is, how can the average fruit-grower provide an economical and practical storage for his fruit whenever prices do not justify his selling at gathering time.

As a general rule the average fruit-grower can not erect or maintain a costly cold storage plant, and very few are so situated as to be able to avail themselves of the advantages of a cold storage plant carried on by others. In fact, I do not believe we need here in the country a cold storage plant, anyway. I am of the opinion if we have a good fruit-house properly constructed, or a good, dry, well-ventilated cellar, we can keep our apples till February, which will be fully as long as it will be profitable for the average fruit-grower to hold.

To show the profit to be derived from having a place to safely store and hold our apples, it is only necessary to look at the course of the market this present season. There is reported to be a very large crop of apples all over the country this year. Everybody has been predicting that the crop was so large that apples would go begging for buyers and prices would rule way down. At gathering time it looked as though this was going to be true. All those who were not prepared to hold their fruit rushed it on the market for fear that they would lose a chance to sell, and the local market was glutted and prices ranged from 10 to 15 cents per bushel. As soon as the rush was over and the surplus began to get out of the way, even with the reported large crop, prices began to advance and now buyers are paying from 25 to 35 cents and it is only the question of a short time before prices will reach 50 cents and over.

Picked apples were sold this fall in an orchard near here at 12 cents per bushel, the buyer going after them. The same apples could be sold now for more than double that price, but the grower was not prepared to keep them and had to sell. This is no exceptional case. The same thing occurs almost every year and it would seem as though experience would lead fruit-growers to provide themselves with a suitable place to store and hold their apples, especially when it can be done at a comparatively low cost. It is not necessary to go to any

extravagant expense, and, besides, it is not needed. Select a convenient gravelly hillside. Excavate to the required size and depth, and then wall it up with the stone picked off your fields. Then roof it over. A double roof is best, built in the following manner: Lay a plate on the wall and put on rafters and sheathing as for a roof. Cover the sheathing with building paper. Over this lay a second course of rafters with sheathing as before. Fill in between the two courses of sheathing with sawdust. Then put on the shingles. Before shingling a good ventilator should be put in, running up through the roof. Then with double doors to your cellar you are prepared to hold your apples. Care should be taken to see that the cellar is well drained and well ventilated. The main thing is to keep as near an even temperature as possible. In warm weather in the fall, after the apples are put in store, the ventilators should be opened at night and closed in the daytime. All of the work on a cellar like this can be done with the ordinary help on the farm. It does not require a skilled mechanic to excavate the cellar, to make the mortar or lay the wall. The roof and doors you can build as well. The work can be done at odd times during the summer, when you would not usually be otherwise engaged.

A good and satisfactory storage place for your fruits or vegetables can be put up even cheaper than the one I have described, and it would pay for itself almost the first season. After excavating the cellar and building the wall as before, set up a row of posts along the center the long way through the cellar, high enough when a ridge pole is put on to support the upper end of the rafters. The posts, ridge pole and rafters can be cut in the woods at a small expense. Cover the rafters with rough boards as for roofing, and then cover with dirt, well packed down and thick enough to turn the water and keep out the frost. The timbers should be of good size, sufficient to sustain the weight of the roof.

A fruit-house entirely above ground can be put up at not a very large cost, in which an even temperature can be maintained and which will keep out frost, as follows: Prepare a good, tight foundation of stone for the building. Use 2×4-inch studding for the sides. The sides should be about eight feet high. Sheathe on the outside of the studding with inch lumber and cover this with building paper and then on the outside of this with another course of studding, sheathing and building paper. Do this until the wall has three air spaces. The roof is constructed the same way to protect from heat as well as frost. The writer has recently constructed a cellar and fruit-house over it, as follows: The floor between the cellar and fruit-room above is laid with 2×8 joists, sealed above and below with inch boards. The space be-

tween is filled with sawdust. The studding for the sides are 2×6, eight feet high. Outside it is sheathed lengthwise with inch lumber and on this a layer of building paper. Then comes a course of inch pine siding and battened. On the inside a layer of building paper is tacked to the studding and then a course of inch lumber. The 6-inch space between the two courses of sheathing is filled in with sawdust well packed. Building paper is tacked to the under side of the rafters and inch pine ceiling is put on, and the 4-inch space between the roof boards and ceiling is filled in with sawdust. It is ventilated with windows at each end.

The main points to be kept in view when planning a storage place for our apples are good drainage, good ventilation and security from heat and cold. Here in this climate we are very apt to have in the late fall and also during the winter months warm spells of weather, and during these warm spells the ventilators should be opened at night after the atmosphere has become cool and kept closed during the daytime. In this way a nearly even temperature can be maintained, not so low, perhaps, as in a costly cold storage plant, but sufficiently low as to meet the requirements of the average fruit-grower.

J. M. PURDY, Neosho, Mo.

A lengthy discussion was held on these two papers.

DISCUSSION.

Mr. Murray—I think that the paper was certainly a very good paper. Of course each planter must use his own judgment in planting. Everyone has his own peculiar methods of doing things. I think especially the idea of using care and precision is a splendid one. It certainly saves work. In preparing the ground I loosen it to a considerable depth which makes a nice condition for the trees to grow. I like the idea of doing things with some precision—with some care. That is just where we Missourians have been failing. We have been doing things with a lick and a promise, in a great hurry, and have not given enough care and precision to the laying out and planting and cultivation of our orchards that they require and that they will justify. I am perfectly well satisfied that if the fruit-growers of Missouri, as a class, would take as much care of their orchards as the fruit-growers of the Pacific Coast take of theirs, we could beat the people of the Pacific Coast so bad they would not be anywhere. Of course there are certain lines of fruit in which they will always excel, but there are others in which we can and will excel them.

In concluding my remarks I will say, that whatever will pay at all for doing in this world, will pay best for doing well.

Mr. Tippin—In relation to the planting of the trees—as to the depth to plant, I should like to hear from Mr. Hammon. It is a very important point, and I simply ask the question for the benefit of those who expect to plant.

Mr. Hammon—In regard to the depth of planting, it has been my plan to plant deep if necessary. The soil will settle an inch or more than at planting. I loosen the ground for nearly two feet around, filling in with a subsoil after. Where there was a strata of hard soil underneath the surface, I broke it up and left a chance for the roots to go down. Then I opened a trench for the water to run off underneath, and formed a reservoir to store the water that collects in the winter for use in the summer. The ground will settle a great deal and one must judge for himself how deep a tree ought to be planted. It will not do for a tree to be planted too deep.

Mr. Tippin—A great many orchardists have made the mistake of planting the trees so deep that they have become stagnated and the roots have rotted, and then they lay the blame on the nurserymen or wherever they obtained their trees. One of our largest planters made a serious mistake in this line; he left the planting, however, to his superintendent, and he made the mistake. He planted the trees six inches deeper than they stood in the nursery row. I think the best rule is not to plant to exceed an inch and a half deeper than the trees stood in the nursery row. That is my experience and observation.

Mr. Evans—This question of the depth of planting trees is an important one, but there is another question of vastly more importance that suggests itself in the paper. The most important point made in the paper is the loosening of the ground to the depth that Mr. Hammon speaks of, or, in other words, subsoiling. This question is one of the most important in my mind in connection with the planting of trees, and while we are agitating the question of irrigation all over the Western country, we seem to have lost sight of the question of more importance than irrigation—subsoiling. We can irrigate nearly every acre of land, but if we only agitate the question of irrigation, then we leave out of the question entirely that which would and could be made to do more good.

Mr. Murray—I do not wish to take up the time, but I agree with all that has been said, I believe. Preparing the ground deeply, and the same time depending somewhat on the kind of ground. It ought to be done in the first place with an eye to drainage, as well as to subsoiling. If the land is prepared deeply under the trees in such a way

to take the water in and no plan to take the water out, it may become, an injury. I agree with this idea of preparing the land deeply, but you must have an idea to draining the water. Root rot is attributed to deep planting. and some attribute it to an invisible disease. Of course, all these things combine together. The right thing is to get them as near as possible to the depth they were in the nursery.

Prof. Waters—I would like to say that in Barry county, with the soil inlaid at the depth of 12 or 16 inches with a stiff retentive soil that will hold water, subsoiling has been tried quite thoroughly. Both the drained and undrained land, used not only for orchards but for common farm crops, was tried. It was believed before we began that it would not be beneficial unless drained. It has not shown any beneficial results from subsoiling. I do not mean to draw a general conclusion from this. There are not many localities where land cannot be profitably subsoiled for orchards. It should be tried carefully and on a small scale, for as Mr. Murray suggests, there are many instances where the injury has been serious and great from subsoiling, and many others where it has been used advantageously.

Mr. Durand—I would not plant on any land that would hold water, but on land that would naturally drain itself. There is plenty of land in any section in Missouri that does not need any underdraing for commercial orchards. If one wants an orchard for his own, then of course he must prepare it in the best way he can.

Mr. Goodman—Mr. Gardner struck the key-note about root rot, woolly aphis and bores throughout the southern country, but there are certainly other causes. I do not know whether he is correct in saying that most of the trouble comes from deep planting. I believe that the woolly aphis is the cause of the destruction of a great many trees in Southern Missouri. We have found a fungus growth upon live roots. The Professor of the Department of Pathology at Washington examined 100 different trees in different parts of the State. He was satisfied that there is a fungus growth upon the roots of the trees, and as we have found fungus growth among all varieties and ages.

The great trouble has been the deep planting. One remedy has been suggested, and that is that we subsoil. If we subsoil we will overcome this somewhat, but we never can overcome the bad effects of too deep planting, unless we plow away from the trees. Too many have been killed by planting too deeply, but in some places it seems almost necessary to plant a little deeper than in others. Where the ground slopes it is almost absolutely necessary to make a bank on the lower side, and it is necessary to have these trees planted deeper. As to the woolly aphis, I believe an emulsion of kerosene oil will kill them.

I am very anxious to hear from Judge Wilkerson, of Altenburg. He has an orchard of 100 trees of Ben Davis apples, 10 years old. He was afraid the woolly aphis were going to destroy his trees, and he sprinkled a gallon of pure coal oil under each tree, and I asked him to send a report of the result to this meeting. I think this will kill woolly aphis. I think woolly aphis kill a great many of our trees, and we can overcome them to some extent by good cultivation. The woolly aphis will attack roots. I think deeper planting a protection against these, and the best protection is good, thorough cultivation.

Maj. Holsinger—I agree with what has been said about planting the tree about as deep as nature had it in the nursery row, but I should take three things into consideration with trees so planted: First, that the ground is loose, and will settle some after the tree is planted; second, that when the frost recedes the next spring, the new tree' newly set, has been lifted out of the ground; third, in the spring we generally have a great deal of wet weather, and the ground is soft all around the tree, and the winds come from all directions in this Western country, and they will lift a tree out of the ground. I was well acquainted with a man who had a 60-acre orchard, who left a great deal of his planting to an Irishman who followed nature, and did not get the trees quite deep enough, and did not take into consideration these three things, and the next spring some of those trees were lying flat on the ground. The winds and frosts and looseness of the ground had made that orchard a flat failure. The same result will be produced in the tree by aphis that comes from root rot. As far as this question of fungus is concerned, the tree begins to rot somewhat, and the bark of the tree begins to decay around the collar before the inside. Wherever there is any rot formed there is a fungus formed. In the first place, on roots of the tree where all others have died, wherever on these roots a new sprout has sprung up, this fungus has not gone any further than the root to the place where the sprout came up, I think the root is perfectly healthy, and no sign of fungus. If that fungus killed the tree it is almost a question of proof if it would not have killed that sprout. Another reason: You will find that on these trees a great number of them it seems that the bark has been broken. This bark around the collar of the tree has been hardened, being under the ground, and not being exposed to the elements it hardened, and the thawing and the frosting and the prevention of the sun and wind coming to that part of the tree makes that tree so hard that when the process goes downward, frequently this bark will be broken by the effort of the tree itself to force the sap down into the root. Wherever you see a tree that is girdled this way, it shows that if the tree

had not succeeded in getting that sap downward the tree would not have been girdled and would have died.

Mr. Murray—I stated that I did not beleive that there was an invisible fungus disease. There is of course a fungus growth on everything. The position that I take is that that is not the primal cause of the death of the tree, but that there are other things that go before. It is just like this: two persons may drink of a pail of water in which there are poisonous germs, one of them may be in a condition to resist these germs of disease and the other may not, and I think that where the Secretary and Mr. Gardner have struck the key-note is where they say it is poor orcharding, and a great remedy I think is cultivation and better care to resist this fungus disease. Of course I do not pretend to stand against our scientific men, but I think that when they are damaged by aphis, too deep planting and by water stored there, these things all prepare the way for this fungus growth. Give them a chance for their lives and I think they will live here as well as anywhere.

Mr. Davidson—Some of our men of large experience contend that woolly aphis never killed an apple tree, while others say that it does, and there we are standing today. We cannot arrive at any conclusion. I am very glad that it is called up today and I hope that the question will be continued and that we will some day arrive at a solution of the difficulty.

Prof. Whitten—I would like to ask one question regarding root fungus: Has anyone ever found it prevalent in orchards where there did not exist any great deal of decaying matter? Does it ever occur on old land where the roots are thoroughly decayed out and where there is no rotten vegetation?

Mr. Evans—We have had some experience with woolly aphis at our farm at Olden. One orchard was planted, 60 or 75 acres, and right in the midst of that was a spot of old land and we planted right through that the same varieties that we planted in the other part of the field, and in the old field we did lose a good many trees by the woolly aphis. We had to dig them clear out, and nothing ailed them except that the woolly aphis had destroyed the roots. Where the land was new and strong and was well cultivated, we did not lose a tree by the woolly aphis. When we found out that was what killed them, we went to work with bone meal and ashes. After that we planted trees in there and no more of them have died.

Prof. Whitten—I referred to the root fungus, the white thread-like fungus growth that occurs in the roots of the trees. So far as I have heard it has always occurred on new land where there is a great deal of decaying vegetation. So far as I have been able to trace the

matter, orchard trees that are affected by that pecular white fungus occurred only in new orchards. That more than anything else has led me to believe that that fungus actually does attack the new trees and causes them to die, rather than being a resulting growth after the tree is dead. I have not seen anyone who has been able to trace any of that fungus in any way to the old thoroughly cultivated orchards, where there is no decaying vegetation.

Mr. Straus—I feel very much interested in this discussion this morning, particularly, as I want to plant about forty acres of apple trees this coming spring. I would give an experience that I have had. I have ten acres of orchard planted nine years ago and five acres in another place, about a half mile apart. This season I lost about four trees in the ten-acre orchard by root rot. I commenced studying the cause. In the ten-acre orchard I have been cultivating strawberries and every season I would plow them in June or July. In the other orchard we planted early potatoes. The cultivating was done early and after that, after the potatoes were out, the cultivating was principally done with. Well, the idea led me to this: I was raised in the timber, and when we wanted to kill the timber we always took the latter part of June, July and August. The idea led me to think that by plowing the strawberries in June and July I had plowed a little too deep and had cut the roots, and I found that it had injured them. I made up my mind that after this I would plow my orchard after the sap has gone down. I am not scientific in this, and I give the idea to let the scientific men work on it, and it may be that this breaking the roots through that part of the season will cause some disease, as it has done in my orchard.

Mr. Hammon—I would like to give a incident of deep planting in California and its results. I was connected with a large orchard and nursery there, and we made a sale of trees, 200 trees to one man. We questioned him very closely when he bought the trees, regarding the man he had to do the planting. He assured us that he had a first-class man as foreman. The trees were planted and nothing more was said for some time. After a time he came back very angry and said that the trees were all bad and that they were all dying, and laid it all to the trees, of course, like they always do. I was sent to examine the orchard and I found the trees planted about eight inches below the ground or collar of the tree. They were stagnating and would not make any growth. I examined them and found the roots rotted badly. There was a fungus growth on all of them, healthy and rotten roots alike, and, by-the-way, they said this land had been farmed for wheat-raising for twenty-five years. I will mention, by-the-way, that

the orchard was irrigated. I found the trees very unhealthy with root rot and stagnated, and I am satisfied that this fungus growth comes on the roots because they are unhealthy. Planting trees so deep stagnates the tree, because the warm sun cannot draw the sap, and it is so cold. A good healthy tree will not sunburn and the sap will circulate.

The firm made a contract with this party to replant his trees next year, and if they did not make a good orchard of it they would furnish the trees for nothing at all, and if they made a good growth, satisfactory to him, the orchard should be paid for at market price. We tended the planting the next year and we got as fine a growth as you ever saw on the same ground where trees had all died because of deep planting. I do not think trees properly planted will be troubled with any fungus growth.

Maj. Holsinger—It seems to me that that is an important thought, to determine the responsibility between the nurseryman and the planter. I am a nurseryman. I think the nurseryman is often blamed for what he is not guilty of. This question of how to determine to adjust the blame is a question that we ought to give careful attention. I want you to understand that I am not one of those who sings out "me too." And I am not one of those who says that aphis ever killed a tree. The Chairman has made a statement of what they did at Olden. He said the ground was poverty stricken, and I think the trees died of poverty and not of aphis. It was simply another case of "poor old Missouri." If you will plant trees, put them on your better land. I have had a good deal of experience with trees and I was fool enough to burn thousands of trees, because I wanted to be an honest nurseryman, but I would not do it again. I have heard it said that a man who would sell trees affected by aphis ought to be hung. I have planted trees that were badly affected with aphis. One mistake is in our cutting at the top. I want to make a statement right here at this meeting. If you recollect the Sarcoxie Nurseris presented us with a lot of trees that had been kept in cold storage. I took four plum trees. When I took them home I divided those trees. We cut nearly all the roots off two and left the tops; on the other two we left the roots and cut the tops. I can show you today the two where the roots were cut off and the tops remained, the other two died.

Mr. Tippin—It is my opinion that the root louse or woolly aphis has come to stay. I am very glad that the discussion has taken the trend that it has and that we have made a distinction between the fungus and the woolly aphis. I think the woolly aphis is a disease of itself, and I want to say that conditions govern the degree with which it attacks our orchards, our nurseries and trees. Whenever you have a

wet spring with warm July and August, you are going to have woolly aphis in abundance, whether you have a particle of it in your orchard or not. In a season of this kind, where you have had a limb cut off where they can get in, you will find a cluster of woolly aphis along up the body, in the forks and even in your trees where web worms have made a net on the limb. So, it is a distinct disease and the idea that it will not occur in new land is preposterous. You may take the virgin soil of Newton county and plant apple trees and in a season like this, 90 per cent of them will be worthless. Because, it is here to stay, we have got to fight it, and you must take especial care of your trees. Keep the web off above the ground, and keep clean at the basis of the tree with good cultivation. I think the aphis attacks the roots near the surface. It is at the surface or nearly so that we find the most of them, which proves that the whole thing is the result of the condition of the season, and when we have seasons of this kind we will have it to fight. Never lay it at the feet of the nurseryman when you come to find that you have aphis. There is also a lot in poor land. Your tree is like your body; if you have perfect physical health, you can be exposed to disease and it will not affect you, and if your tree has a perfect flow of sap it is in good condition, and if it is in good soil and has good cultivation it has something upon which to grow and to fortify itself against the ills that apple trees are heir to.

In Webster county a doctor planted 40 acres of orchard in one-year-old trees, and there was no aphis in them. He never cultivated them or cared for his trees and the result was in two years his roots were a solid knot and the trees were all dying, and he said it was the fault of the trees. The land was too poor to support the trees. If they had been planted in land that was strong enough to give them growth, the aphis would not have killed them. Whenever the circle becomes diseased, it is in proper condition for diseased.

Mr. Murray—Having had experience in nurseries all my life, I would like to make a statement or two in regard to my experience back in Virginia. We had a great deal of trouble with aphis. I used to grow a great many—about 100,000 of apple seedlings for my own use, and also to sell to other nurserymen. I grew them on old land that had been used for 50 or 75 years for various crops. Just as certain as we got our trees a little too close we would lose them with aphis. We would find thousands, and sometimes hundreds of thousands of them, with perfectly rotten roots, and they were on rich land, too, just as rich land as there was in that country. I know that in New York men in the last few years have almost abandoned growing the apple stock, because the woolly aphis was in their ground, and because they can

buy better trees in Illinois and Missouri. We have so little woolly aphis now in my part of the country that we do not give it any consideration. I do not think we have ever lost a single tree with aphis or root rot there.

Mr. Russell—I have had some experience with aphis, and have been engaged in the nursery business. Would it not be possible to so wrap the body of the tree that the woolly aphis would not enter the ground at all? Does the spraying of trees have any effect upon the roots?

Prof. Whitten—Spraying will affect only that part of the tree which the spray comes in contact with. It will not be absorbed into the tree.

Mr. Reese—In regard to the rich soil—it is almost the reverse in my neighborhood. Where I have the richest soil I have the most trees to die. I have planted trees there five or six times and they will not live. My neighbor had an old field that was a very high hill, and in that part of his orchard all his trees died. In regard to trees blowing over I want to give my experience. I had two trees that were blown over and one of them died. Afterward I was digging a cistern and taking the dirt and throwing it in the orchard, and I raised the other tree and filled up with this dirt, and it is alive now and bore a good crop of apples this year. The tree was almost dead. Different localities need different methods. My trees nearly all live and do better where the land is not so good and rich.

Mr. Tippin—I did not mean when I said good soil, rich soil—I meant land that would make an ordinary crop.

Mr. Lamm—I want to help you people some. You are getting in a terrible fix in Southwest Missouri, and I think I have a pretty good receipt. Com · up into our country where we don't have any root rot or woolly aphis either.

Mr. Gilkerson—In the farm land around Pertle Springs you find just acres of land there with 30 and 40 acres set out with Ben Davis and they are on sandy soil, that of a wet season gives plenty of rain and this year we have root rot. I do not know wether it is aphis or what it is. It may be deep planting. I have also some trees as big as my arm and the tree is girdled, but above that it is healthy and nice bark and the leaves staid on and it was alive and thrifty until late this fall. I have come to the conclusion that may be it was deep planting. One man went to the orchard and said it was woolly aphis. He examined the tree below this girdle and found a cluster of fine roots like white threads, but above the girdle it was clean and smooth, and the bark looked healthy.

Mr. Culp—In regard to the girdling at the collar of the tree. I have made some experiments myself in fruit trees. Some 8 or 9 years ago I had some one-year-old trees in my ground, and that year we had some very early frosts and my trees were full of sap, and after the frost I examined my trees and found that right close to the ground there was a little white speck like frozen sap. I left these trees to see what would be the results, and the next year nearly everyone of them died. Below the surface of the ground I found that the root was nearly one-fourth smaller than above, and I lay it to the frost opening the bark and the water covering down until it has closed this.

Mr. Bagby—We have had experience with aphis on the roots of trees in the nursery, and it has been a troublesome experience, but we have never found any remedy, but when we find a lot of trees affected with aphis, we burn them and are careful not to use that land in less than three years.

Mr. Wild—Now, that the root rot and the woolly aphis should be the same thing, I am inclined to believe is not the case. I can see no reason why the root rot and aphis are alike. As to the aphis that is one of the things we would like to know how to get rid of, not only as a nurseryman, but as a fruit-grower, and while we have been discussing them, there has been nothing said about a positive remedy, only so far it has been intimated that cultivation is a remedy. My experience has led me to think that they are wrong. Now, as to experiments with these aphis on trees and seedlings and in the nursery row and in the seedling row, I see nothing that we can apply that is more in the line of a cure than to use coal oil, but that is hard to apply. In the first place, if we use it in a dry time of year the evaporation is so quick that we lose the benefit. With seedlings or trees if we could take them and dip them in an emulsion or preparation and then leave them for a number of days in a cellar, or some place where you can fully cover them, it will kill the aphis. It is a good plan dipping them in a coal oil bath before planting them out, thus doing something in the line of destroying them before the tree is set out. But how are we going to get rid of it after it comes in the orchard? As has been stated, an emulsion of coal oil will be sufficient to kill aphis on an orchard tree, and if applied in dry weather it would be no use, and if the ground is wet it would have to be done after a heavy rain, so that there would be very little time for another rain following it. I fail to see where a thorough cultivation will get at the roots and destroy this aphis. I cannot see how you are to get rid of the rot by cultivation. Some of the best trees we have are badly affected by aphis, so it is not only the unhealthy trees they come on. Now, as to the kind of land, I have

noticed that on wheat stubble that the aphis affected the trees more than on old land. If cultivation is to be the remedy, I believe in early and thorough cultivation, but I do not believe there is a remedy.

Mr. Bailey—I know that bichloride of lime killed the aphis in my trees.

Mr. Gardner—There seems to be an impression among some, and I have seen it in the papers that woolly aphis is a fungus disease, and I notice that that impression is prevalent here and I was told that it was fungus. It is not a fungus, it is an insect.

Mr. Monses—Those two questions of woolly aphis and root rot have been discussed in the State and local societies. We have never been able to arrive at any conclusion as to the cause or remedy, and I believe we have admitted that we do not know anything about it, and when we come together again perhaps we can some of us tell something more about it. Mr. Whitten I think made a clear distinction between the woolly aphis and fungus, that one is an insect and the other a fungus, and we find that fungus on the trees that have died with root rot.

Mr. Evans—Will someone name some of the best varieties of apples for a commercial orchard? I think nothing makes so much money as the Ben Davis.

Mr. Tippin—I am glad to be able to say that I come from the home of the Ingram apple. It is a seedling which originated in Greene county. It is a seedling of the Geniton and is a strong growing tree. It is an upright tree, good bearer and the fruit sets close to the limb, not pendant like Ben Davis. We even have Ingram apples when a great many others are killed by frost. The Ingram apple will keep splendidly until April and May. Not a small per cent of them will keep until April and May. One of our orchardists has a large orchard of bearing Ingram trees. He has this year a magnificent crop and he will keep them safe until spring.

Maj. Holsinger—York Imperial is the finest, and it is command ing the highest price in Chicago today. It is up to Ben Davis in everything except quality, in which it is superior. The apple originated in New York, I think. I had a tree which was planted in '71 on bottom land where nearly all others die out. I believe it is the best tree in the orchard, as it is one of the very best for commercial purposes.

Mr. Hammon—I would like to ask if the varieties of apples in Howell county and Southwest Missouri will do as well in the central and northern part.

Mr. Gano—Varieties of apples which succeed in Central Missouri do very well in Southern Missouri.

Mr. Monsees—As far as the fruit is concerned, I like the Clayton. It is a good keeper and the fruit is good, but it is not a good tree.

Mr. Durand—With reference to the Willow Twig, we commenced to plant it very extensively, thinking it would take the place of the Ben Davis, and there seemed to be a great deal of demand for it, but we found that it is the worst apple to be affected by the bitter rot. It seems to be worse affected than anything else, so that we are dropping off from that, and I want to ask the gentleman from Greene county about the Ingram: How does it compare with the Ben Davis as to being prolific?

Mr. Tippin—The Ingram is a good bearer, and very regular. We had a good crop last year when we did not have anything else.

Mr. Murray—I want to say a few words on the question of varieties. Now, I think very little of a man's taste that would not prefer a Ben Davis over a Willow Twig. Mr. Durand has spoken of the bitter rot. I have seen trees that would have barrels and barrels of apples on them that were not fit to eat. I have one in my orchard, and I do not expect to have another. We have grown some Willow Twigs separate in the nursery simply because there seems to be a demand for them. Now, then, while I am up I want to name the three commercial apples of North Missouri: The old standard, Ben Davis, next after that the Geniton, a fine apple of high quality, and next the Winesap, which people appreciate in all markets. I would not plant the Clayton, and I notice that those who have tried the York Imperial and wanted to plant more trees have quit asking for them—there is no call for them. You cannot judge a tree unless you have a life-time experience with it. I am not speaking for your locality, I am speaking for North Missouri.

Mr. Tippin—I hope everybody who has listened to the discussions will be governed by the locality. In South Missouri you do not want Winesap nor Willow Twig. Our largest growers in Greene county commenced cutting down their Willow Twigs three years ago. Mr. Love has 500 four-year-old Willow Twigs in his orchard. They had a few apples, but there was a trace of bitter rot in them, and he is going to take them up.

Question—What is the nature of your soil, Mr. Tippin?

Answer—Our Greene county soil is limestone land. We have no hard pan.

Mr. Gilkerson—I have a hundred Willow Twigs. They are 15 or 16 years old and I have made more money off them and they have been better and more regular bearers than any other trees. I planted too many varieties, but three years ago I picked 1000 bushels of assorted commercial apples off those Willow Twigs, and they have borne every season since they were five years old. The Winesap, so far as my experience goes, on my place, has not been a good tree.

Mr. Lamm—I want to condemn Willow Twigs. I have lost some by turning black and sun scale.

Mr. Winn—I want to say to the gentlemen that my experience with the Missouri fruit is not entirely new. I saw your exhibit at the World's Fair and without question Illinois and Missouri had the best fruit there. I know what men want to buy. Last year my instructions were, do not let any Willow Twigs or Jonathans escape you. Do not buy Ben Davis unless they are the very finest; do not get too many of them. Ben Davis is alright, but you can have too much of anything in the apple line. Ben Davis makes a good show.

Mr. Durand—As a general rule people can make more money by raising Ben Davis at lower prices. Mr. Winn mentions the Jonathan. That with me has been the most successful and the most profitable of any apple. I think it will bring more money in Chicago than any other. From the way the market goes we need something else with Ben Davis; I would by no means discard it. I missed several sales because I could not give them anything but Ben Davis, and I lost the sale because I had nothing else. The Winesap is a good apple, but it has got to be scabbing so much that it is not profitable. If I could raise Winesap I would raise a large proportion of them.

Mr. Francis—I want to inquire what is the best soil for Jonathan; whether a sandy light soil or a black soil; I want to have the experience of the Society.

Mr. Durand—My land is a light limestone soil, reasonably well underdrained. It is not much sandy prairie land. I wish to state in this connection that this land does not grow Ben Davis successfully. This year, however, the Ben Davis were full when the storm blew them all off, and the Jonathans were stripped completely. The Ben Davis, as I said, were full this year, and had it not been for the storm I would have had a fine crop.

Mr. Gardner—With regard to the bitter rot on the Willow Twigs, it seems to me that is a question that should be brought out anew. Bitter rot is a fungus. The germ gets on the apple and is developed by hot weather, and I believe that a thorough spraying of the trees along in August and September, will do a very great deal toward getting rid of bitter rot.

The Family Orchard.

I think, Mr. President, our worthy Secretary could have found some one better qualified by larger experience to write an article on "The Family Orchard" than myself. With my limited experience as a horticulturist, I feel myself almost incapable of writing an article on any subject pertaining to horticulture that will be either interesting or instructive to any member of this Society. The greatest inducement for me to inflict any article upon this meeting is that I indulge the hope that by giving a short sketch of several years of practical experience I may be able to aid some fellow fruit- grower—a sort of guide-board for those who are to follow us in the line of horticulture. Certainly the "Family Orchard" ought to personally interest everyone who has a farm, of any dimensions, or even a vacant town lot large enough to put out a few trees or plants upon.

I am noted chiefly for my generosity, especially to the appetites of myself and family. And for that reason I have tried to grow—and have been fairly successful—almost every kind of fruit that is adapted to this locality. And we manage to have some kind of fresh fruit to use almost every day in the year.

APPLES.

In planting out my family orchard of apples I endeavored to select such varieties that would furnish a succession of ripe fruit from the earliest to the latest. I have found Yellow Transparent to be one of the best very early summer apples, and especially adapted to small lots on account of its close growing habits. It bears while very young and ripens its fruit earlier than Early Harvest. I have one tree of Transparent, planted six year ago, from which I have picked perfectly matured fruit for three years, with an increased quanity each year. The size of the apple is larger than the Early Harvest. As an eating apple I do not think it as good as the Harvest; but it is an extra good cooking apple. The Early Harvest is so widely known and well established that comment on it is unnecessary. A few trees of both Transparent and Harvest should be planted in the family orchard.

These may be succeeded by "Duchess of Oldenbury" and "Saps of Wine," or "Summer Golden Sweet," the two latter for eating, while for a good cooking apple the "Duchess" is not surpassed. All three varieties are reliable in this locality—Buchanan county, Mo, The trees are thrifty, vigorous growers and bear early and often. Many other

varieties might be added to this list of summer apples, but the above list, while mostly old-fashoned, will be found reliable and should satisfy the most of people.

For early fall we plant about as follows: For eating and for apple butter but few, if any, can excel the old-fashioned Rambo—a tried and true one for the last forty years or more. Then, for general family use and an all purpose apple, the "Milam" is as good as any ever propagated. It succeeds everywhere, and is good from September to April. The handsomest apple grown and the most exquisite for table purposes is "Chenango Strawberry." In rich, well cultivated soil, Chenango grows remarkably fine, but I will not reccommend planting it extensively. Jonathan and Grimes' Golden Pippin are both the very paragon of excellence in the apple family, and for any purpose you may wish to use an apple. I regard Grimes' Golden Pippin as being the most desirable and elegant table apple in existence, and the fruit-grower of the future may safely plant largely of it if he wishes a good and profitable apple. "Tulpehocken" cannot be omitted from the list of late fall or early winter apples without missing a great treat. In this locality the trees grow to perfection and are heavy annual croppers. The apple is extra large, of fine quality and a good keeper.

Of the very long list of winter apples (late keepers) I do not believe there are any other two varieties which have been thoroughly tested that are any better adapted to the family orchard than "Minkler" and the good, old-fashioned long-tested "Jeniting." In the Jeniting we have about all the desirable qualities needed in a good family apple, a cider apple, a good cooking apple, a splendid eating apple and a long-keeping apple. Some persons may wish to substitute the Winesap for Jeniting. Winesap is a very desirable apple, but has more faults, I think, than Jeniting. Were I to name a substitute for Jeniting I would name "Ingraham." However, I have no personal knowledge of the Ingraham, but it comes so well recommended from such high authority that I would not hesitate to plant it. Minkler, like the Jenet, has been recommending its own qualities of tree and fruit for so long a time that it only needs to be mentioned to be appreciated. In the line of sweet apples, which every family orchard should contain, I know of none more suitable for family use than Paradise Sweet and Tallman Sweet, or Broadwell Sweet. Paradise and Tallman are both especially good for preserving.

Just here allow me to say that Maiden Blush should not be omitted from the list of fall apples, for it is undoubtedly one of the best all-purpose apples in the whole catalogue. I will only add one or two more long-keeping varieties to carry us through the entire season, and

none, of which I have any personal knowledge, fills the bill so well as "Little Red Romanite." Not the best eating apple in the world, to be sure, and a poorer cooking apple, but it is the most reliable long-keeping apple I have ever tried. I have had Arkansas Black and Salome trees growing for six years, but have never had any fruit from either. Both are highly recommended for good quality and long-keeping.

Now, my friends, as my list contains so many old-time varieties, some of you may be inclined to dub me "Old Fogy." But allow me to suggest that if you will get a few trees of each of the above-named varieties, and prepare your ground thoroughly, by very deep plowing, and pulverizing, set them carefully, and give them perfect shallow cultivation, not very much pruning, and, my word for it, in ten years or less, you will feel amply repaid for all your trouble by the large returns of luscious fruit which they will yield, and continue to give you as long as you continue your kind treatment to them. Just try them, my friends.

But, lest some of you doubt them,
I'll whisper the secret, now, seeing it is you—
I've tried them and know all about them.

PEARS.

I have tried several varieties of pears, and most of them have done reasonably well. Have had but little blight in several years. I have one variety, name not known, which gave fully matured and ripe fruit by the 25th of June last. It was fine in quality and showed no sign of rotting at the core. It was almost maroon in color and larger than Seckle, Bartlett, Howell and White Doyenn. Each did well for me this year. So also did Duchess. The above, with Lawrence Keiffer and Gorber, will furnish any family with delicious pears from July to January, or later.

PLUMS.

I have tried ten or more varieties, and find Wild Goose, Miner and Golden Beauty the best for the family orchard. They ripen in the order named, and will furnish plums from about the 1st of July until November. Golden Beauty has a tendency to overbear and must be thinned in order to get the largest fruit, which, when picked and ripened off the tree, is very good.

Pottawatomie and Marianna are so very poor in quality that I regard them as being entirely worthless. And I wonder why such eminent horticulturists as our own N. F. Murray, of Missouri, and J. L. Budd, of Iowa, recommend them so highly—especially the Pottawatomie. Surely, they have not tested its fruit, and are relying on other persons, whose judgment and tastes are very much at fault, and whose

opinions are very misleading. The Abundance is the most disappointing and the most complete failure of anything I have ever tried, and falls far short of sustaining its wonderful reputation for giving an abundance of plums. Hereafter I shall try "Willard" in place of Abundance. I am informed that Willard is a very late bloomer, and for that reason I believe it will produce more fruit. Upon the strength of Judge Miller's recommendation I shall add Hawkeye to my collection for a late plum.

CHERRIES.

Early Richmond is the only true reliable one that I have yet fruited. I have Montmorency, Dyehouse, Gov. Wood, English Morello and Windsor. Gov. Wood is fine in quality, but too shy in bearing, and ripens so very uneven that I think it very unsatisfactory. Dyehouse and Montmorency have never borne enough to satisfy me yet. My Windsors are too young to fruit yet, but, judging from growth and appearance, I may hope for fruit further on. English Morello will do to plant for late.

APRICOTS.

I have tried four varieties of the so-called Russian varieties, such as Alexis, Alexander, Catharine and one other. They are not satisfactory, although I had some apricots to sell this year, which brought me $4 per bushel. They all have the same fault as the Abundance plum—they bloom too early, and the fruit gets killed after blooming. They are also rather too small, and I do not advise planting them.

GRAPES.

I am very conservative on grapes. Moore's Early and Concord (for black) are good enough for me. Perkins' (for red) and Moore's Diamond or Niagara are good white ones.

CURRENTS.

Fay's Prolific is no good, but Red Dutch and Crandall will give you plenty of them and good enough for any and all purposes.

BLACKBERRIES.

Snyder and Taylor are the best for this latitude, and if you wish plenty of blackberries every year, plant Snyder and Taylor and cultivate well and no doubt but you will have plenty of berries, and good ones.

RASPBERRIES.

My choice is Hopkins and Gregg, and for family use Shaffer's Colossal is a good one. As for red raspberries, I do not know which is best. I grow the Turner, and have berries every year.

GOOSEBERRIES.

I raise the Haughton and have gooseberries every year. They are not the largest, but they are good, and never fail to bear, and that's the main thing in fruit-growing.

Now, Mr. Chairman, this completes my list for the family orchard, and I do not consider any family orchard complete unless it contains every variety of fruit that is palatable and useful. And I have tested almost every variety named in this paper, and you will find those I have recommended to be valuable, while those I have condemned are unprofitable.

One suggestion more and I will close: There are so many things that have a tendency to retard or advance the growth of fruit trees and plants and change their qualities that it is simply impossible to make a list that will produce alike, even in a small locality. Location, soil, preparation and cultivation all have their influence on the fruits, and more on the small fruits than on the tree fruits.

Still, I say plant a "family orchard," if nothing more. Dress and keep it well, for it will make you a more intelligent and refined gentleman, and your family and friends will bless you for furnishing them with a bountiful supply of the most palatable and nourishing food in existence, and the many delightful surprises and rich treats you can bestow upon them. Keep yourselves well informed by reading some good horticultural paper, and attending all horticultural meetings you can reach.

J. H. KARNES, Oakdale Fruit Farm, St. Joseph, Mo.

WEDNESDAY, Dec. 4—2 p. m.

Pear, peach, plum, cherry and quince.

The first paper of the afternoon session introduced the subject of spraying. The Secretary read the following in the absence of the author:

When, How and With What to Spray.

The subject of spraying is attracting the attention of fruit-growers more and more every year, and every year we hear of what seems to be successes and failures where seemingly the same course was pursued and the same conditions present.

One says he sprayed thoroughly and the fruit was not so perfect as in former years when he did not spray, and he is ready to denounce spraying as a humbug and a scheme to sell spraying machines and

materials. How do we know he sprayed thoroughly? He may have used poor material; it may have been too strong; he may not have applied it in the right way or at the right time, or the weather may not have been favorable, or a rain may have washed it all away, and many other reasons why he failed might be surmised, and whether he did his work thoroughly or not.

Those who have had most experience in spraying say that they are not yet able to know just when the work has been done thoroughly—for thoroughly means right, and we all admit that we have not yet learned what is right in all its details. It is true that some who have had the largest experience are meeting with fairly uniform success, and are ready to say the principle is right, but we have a great deal to learn about it yet.

It is important that the material to be used should be of proper and uniform strength, or that it be prepared in a proper manner. The Bordeaux mixture is, all things considered, the best for all fungus diseases, as scab, black rot, mildew, etc., and for destroying insect life we add to this mixture Paris green.

It is also important that the machine to be used has sufficient power to force the mixture into a perfect spray, and at the same time return a stream to the vessel to agitate the mixture so that it will reach the tree or plant in uniform strength.

The spray should settle on the tree or plant like mist, and not in drops, as will be the case when too much is applied, or the spray is not perfect. If the material is of sufficient strength to do good, and so applied that it will stand in drops, all the strength in a drop will settle to one place and cause a brown spot on the leaf.

Of all the work of the fruit-grower, spraying, in all its details, requires the greatest amount of good common sense. No one has yet become sufficiently efficient in the work to be able to lay down a set of rules that will guide anyone to success all the time.

The season's conditions and surroundings are constantly changing, and what we did at a given time last year with success would fail this year if the conditions were not just the same; hence, we must use judgment in discovering these changes, and when to do the work, so that we may not lose our work and material; but the benefits of a spraying which might mean the loss of a large per cent of the crop. The question of when to spray is more difficult to determine than either the how or what with; but it has been decided by those of most experience that to destroy the various fungus diseases, spraying should be done in the spring before the buds open, and all recommend the Bordeaux mixture alone, but stronger than the regular formula, and that it

be applied very liberally to all parts of the tree or plant, and all over the surface of the ground. This is said to act in a limited way as a fertilizer, and I do not doubt it. The second spraying should begin as soon as the blossoms have fallen, and be finished as soon as possible, and followed with the third in about two weeks. Use the regular formula for Bordeaux mixture in the last two, with the added one of Paris green.

The only way to get the full benefit from spraying is to get the best machine and material, determine to do the work well, and as near the right time as possible, and as often as necessary. The best machine is one that is run by power from the wheel of the wagon. There are a great number of styles of nozzles made by different parties, all claimed to be the best, but the best of them have their faults. As stated above, none of us have learned all about spraying, but the theory is certainly right, and we are learning more and more every year; and it is only a question of time when spraying will be the rule, and not the exception; when the orchardist who fails to spray will get very little commercial fruit.

PAUL EVANS, Olden, Mo.

DISCUSSION ON SPRAYING.

Mr. Gilbert—I find that from almost every section of our State, San Jose scale bark has obtained a foot-hold. Some of the trees, of course, have only a single scale, but in a number of sections I have found that trees were destroyed completely in from three to four years from the time it first made its appearance. Of course we will have to spray, and spray thoroughly to keep this insect in check. If we do not do it, our orchards will be destroyed very quickly. I think that is one branch of the spraying business that must be looked after very closely if we hope to have any live trees in five years from now.

Prof. Whitten—I had a little experience with this insect. A gentleman called my attention to some of them. He said a good many of his trees were covered all over, and that they were dying off, and he wanted to know what to do with them. I wrote the man to apply kerosene for the young ones when they were hatching out. He applied this, and he afterward met me at the station and said these scales began to let loose, and that the young ones were immediately killed on all the trees. Six or eight others tried the coal oil as recommended, and they were all reporting good results. One spraying did not in all cases kill all of them, but the majority were killed, sufficient to show that if applied at the hatching time it would be very beneficial. Spraying

these scales at any time of the year with the emulsion is a great deal of anvantage, but it takes it stronger than it does in the hatching time. I think, that with persistent effort, kerosene will rid the trees of these insects. There are a great many formulas sent out, but unless the ingredients are mixed together in proper proportion you will not get a perfect emulsion which will injure the trees.

One way is to take a half pound of hard soap, or which is equally as good, a pound of soft soap, boiled in a gallon of water until it is all dissolved. While it is boiling remove it from the stove and add two gallons of kerosene oil, and stir it until it is a thorough emulsion. It assumes a milky or half creamy appearance long before the emulsion is perfect, and a great mistake is made in quitting stirring it together too quickly.

It should then be set in a tub of cold water, when it will cool into a firm, jelly-like consistency. If there is any free oil, it will rise to the top and can be taken off with a spoon, or drawn off with blotting paper. You can apply it with almost perfect results. You want to dilute that in about one part to ten of clear soft water. It is best to use rain water; hard water is usually too mineral. And then by mixing that in about one part to ten or fifteen, and then applying, together with water, it is ready for use.

Mr. Goodman—Some parties made an emulsion in this way: One pound of concentrated lye to one gallon of coal oil. They dissolved the lye in hot water and then added the coal oil, and in that one gallon of oil, twenty-five of water.

Prof. Whitten—I think to get a perfect emulsion it would be better to have the combination of lye and grease that is in soap, although you can with pure water mix the oil enough.

There is a machine that is recommended this year for the mixing of kerosene with water which mixes perfectly. There is one compartment for kerosene and one for water. They work together so that they are perfectly mixed. If that is the success which they recommend it to be, it will save a great deal of trouble with the Bordeaux mixture.

Mr. Goodman—The question is on praying in general. I had a talk with G. T. Powell, who has had experience in spraying and has had good results. He says it is not so much the strength of the spray that is used as it is the thorough and continuous operations. In his orchard he has been successful in getting rid of insects, and he says it is only the thorough and continuous spraying that is effective, and he has used sprays in a much milder form than those given. We are going to have a great deal of trouble in our country with the curculio

and we have got to find out some way of getting rid of it. I have not had enough practical experience to say what would be best. I have found that lime was most effective in getting rid of these and black cucumber bugs. After putting it on they do not touch it. I believe that the lime in the spray is going to have a far greater effect in keeping away insects than any other ingredient. I think there is a little too much blue stone used and not enough lime. I have a great deal of faith in lime. The lime is a very good thing in your orchards anyway if you do not get too much.

Mr. Winn—I have corresponded with Mr. Howe. He wrote me that he would quit the fruit business if it were not for the spray pump, which he kept going for three months with good results. I have used the Bordeaux mixture. I think we have got to get these insects out the best way we can. I prefer cultivation without spraying.

Mr. Young—I have been in the apple business for six or eight years. The gentleman who has just left the floor says he prefers cultivation to spraying. If I had my choice I would take spraying and let cultivation go. I really think that spraying is as highly essential as cultivation and pruning. With some, spraying has not given satisfactory results. I attribute that a great deal to the time they spray, the way they spray and what they spray with. I do not want you to understand that I am an apple-grower at all, I am a dealer. I buy and sell. Mr. D——, who has a farm at West Plains is a thorough apple and fruit man. He sprayed four times. He tells me that he sprayed first when the tree was in bloom and then every two weeks after that until he had sprayed four times. His neighbor, only a quarter away, sprayed three times and the difference was just this: Mr. D's fruit was among the finest I have seen in Howell county and the other man's fruit was on the poor order. Probably he had a loss of one-fourth of his fruit and Mr. D——had a loss of about one-tenth of the picked fruit.

I can go into the cellars of the Olden Fruit Company and find that their fruit is clear of scab and smut. The fruit is also smooth in appearance and attractive looking. So I may say that spraying is just as essential as cultivation or pruning. If a man comes to me and says I have a lot of sprayed fruit to sell and his neighbor at the same time offers me unsprayed fruit, I will buy the sprayed fruit even at an advanced price over the other party. A man came to me with a variety of apples for sale. He said he had sprayed four times. At that time I was paying $1.50 per barrel for apples. He said he had five or six hundred barrels that had been sprayed. It was the finest fruit I ever saw. The apples resembled wax, and had a fine polish. He said he would take $2.50 per barrel for them, and so I bought them at that

price. The very next day there was a gentleman from Southern Illinois came to buy apples and I told him I had a lot of very fine apples that I would sell at $3.00 per barrel. The result was he took the sprayed fruit at that price and finished up the car on unsprayed fruit. There is no question in my mind that there is always a demand for fine fruit. If you have something nice, clear of scab and black rot, you can always sell it, no matter how enormous the crop, and the right way to get the finest fruit is to spray.

Question—Do all pay more for sprayed fruit?

Answer—I pay more for sprayed fruit if the apples are alike in size. My reason for that is this: by spraying the fruit is cleared of worms, and consequently keeps better. By spraying you invariably get fruit of a better quality, it has a better polish and it is worth more money. You take an Italian and let him pick apples out of every barrel. If an apple polishes nicely he will buy it. Of course, the Jonathan will take on a high polish without spraying, but it will take on a better polish with spraying.

Mr. Goodman—We have a communication from Mr. Stedman of the Missouri College. He calls attention to the San Jose scale. He states that it has been brought into the State, and would like anyone that finds a specimen of it to send it to Columbia. This insect will be found at this season of the year. Individual scales are a little less than one-eighth of an inch long.

COLUMBIA, MO., NOV. 20, 1895.

HON. L. A. GOODMAN, Secretary State Horticultural Society, Westport, Mo.:

DEAR SIR—Will you kindly read the following to the members of your Society at their next meeting:

In view of the fact that the San Jose scale, which is the worst insect enemy to fruit trees in the United States, has undoubtedly been introduced into this State through nursery stock within the past year or two: and also, in view of the fact that this insect is not readily detected even by experienced horticulturists and nurserymen, until it has done a vast amount of damage and spread over large areas; and since it is to your advantage, as well as to the good of the State, that this insect be located and means taken to prevent its spread and to exterminate it, I hereby respectfully request each member of this Society to examine carefully every limb and twig, on every young tree purchased, and set out within the past three years, and also every graft or cutting purchased, and if suspicion is aroused, cut off a few twigs that you think have the scale on them, and wrap them up in a paper and mail them to me, not forgetting to put your name and address on the package, that I may be able to locate the specimens and communicate with you.

I have every reason to believe that the San Jose scale was introduced two years ago, since infected stock was unconsciously purchased in California by a nursery in this State, and sold to parties in the east where the scale has now appeared upon said stock. It, therefore, seems probable that in the natural course of business this company must have disseminated some of the infected stock in Missouri, either directly or indirectly, on the California stock, or indirectly on the contaminated home stock.

A circular will soon be published and sent to those whose names are on the Experiment Station mailing list, or to any person who may request the same. This circular will give a short description of the insect, and state how it appears and affects the parts of the trees infected, so that together with the figures one can readily determine whether or not

the scale in question is present. But even then none but experienced persons can determine for a certainty, and ultimately specimens will have to be sent to me for determination.

In brief, the insect or scale will be found at this season of the year on the twigs and branches where, if it be in sufficient numbers, it will give a grayish and scurfy appearance to the bark, which would otherwise appear natural. The individual scales are a little less than one-eighth of an inch in diameter and are practically circular, flat, and of a gray color with a darker center. When the scales are not too thick upon the young stock, they give to the bark a purple color around each scale. Strange as it may seem, the scales are harder to detect when they are most numerous, and at such times may require a magnifying glass to see them. This is due to their overlapping one another and covering up the bark so that the difference between the natural bark and the scales does not attract attention.

The following trees should be examined at once: Apple, pear, peach, plum, cherry, quince. This is only a partial list of the trees liable to be infested with this scale. Keiffer pears seem to be least infested while other varieties of pears are the principle fruit trees affected.

Very respectfully,

J. M. STEDMAN,

Entomologist Missouri Agricultural Experiment Station.

DISCUSSION.

Mr. Winn—We had a lecture from Prof. Johnson who gave a talk on the bark lice and the San Jose scale. He said that these scales were discovered on oranges. I have bought a great many apples, and I have been dealing in them for about 20 years, and this is the first time I ever heard anyone state that they would give more for sprayed fruit than otherwise.

Mr. Murray—You will find varieties in the collection that have the scale.

Mr. Goodman—Not the San Jose scale?

Mr. Murray—No; the ice scale bark.

Keiffer Pear.

Will give you our experience in pear-growing for this year. When the time of spring arrived, we were very anxious and watched the development of buds, leaves and bloom. But at one time during a late cold snap all hopes for a crop seemed to have been destroyed. But the trees this year seemed to have put forth special effort to make the horticulturist's heart rejoice, and give thanks to that merciful Creator from whom all blessings flow, and who has poured out treasures with such a bountiful hand.

The pear trees opened up with such an amount of vigorous bloom that the leaves were perfectly out of sight, and it seemed as if nearly every bloom had set young pears. The cool weather prevented insects

doing much harm, and consequently, a large amount of pears grew to perfection, less infested with insects and specks than we ever saw before. Our pear orchards consists of 2000 trees, mostly Keiffer, from two to eight years old. This season we have gathered and marketed about 1500 bushels of the choicest fruit, which we sold at from 50 cents to $1.50 per bushel.

The Keiffer is outgrowing its former reputation, and is rapidly coming to the front as a fruit of fine quality and appearance. It seems the quality of this pear depends largely on the soil where it grows. This pear needs thinning out at least one-half, as soon as the fruit is properly set, for it is an enormous bearer.

We gather when the stem parts readily at the joint, by simply lifting the pear upward. We place away in bushel boxes and barrels, in a dry, cool cellar, just as we gather them in the orchard, and did not touch them until they colored; then we assorted and graded them, making three grades—No. 1, all sound; No. 2, smaller, but sound; No. 3, wormy and specked. We marketed mostly in barrels, in car-load lots.

Our orchards are planted 18 by 18 feet apart. We practice cultivation from the start, having planted black raspberries in between, so we can cultivate both ways. This year at the last cultivation, we sowed to cow-peas, which did admirably; keeping the ground moist, shaded and free from weeds; it also kept the fruit which fell, in fine condition, as the sun could not reach it. After gathering the peas, we turned the hogs in; they bedded the vines down, eating the peas.

We are very little troubled with blight. We are always watching, and as soon as there is any sign, we cut it out, and our orchards are in a thrifty and healthy condition.

POLSTER BROS., Wright City, Mo.

DISCUSSION.

Mr. Gardner—I am interested in pears, as I have a few. I have been thinking of planting a good many, and the question is, of course, what of the blight? I do not know of anything that is so destructive to pears as the blight. Mr. Nelson suggested that he had a great success with his pears by making a cut in the outside bark and slitting up from the ground. The pear does best, I think, in ground that is not cultivated to any great extent; that is, it is not so subject to the blight. It has occurred to me that it might be that the blight is caused by a tightening of the bark in cultivation. The bark may not be able to

expand fast enough. Near the ground it is all right, and the blighting goes clear up to the top.

Mr. Evans—On the subject of pear blight, it is only our new members who dare to talk about it, and they do it because they do not know any better. There are three things which are not to be discussed here. They are religion, politics and pear blight.

Growing Peaches—Our Best Hardy Ones.

This is a business I am interested in and have been experimenting in at Wymore, Neb., for the last 16 years. To be successful in growing peaches with us we must acquaint ourselves with the different varieties, and plant only of sorts that have been tested and proved to be hardy in bud as well as in wood. Many seem to think that a peach that is hardy in wood and will stand our severest winters without being killed to the ground would naturally be a good bearer, but we find that many of our poorest bearers (which are tender in bud) are hardy in wood, such as Stump the World, Mixon's Cling and Free, Crawford's Early and Late, Foster, Mary's Choice, Mt. Rose, Steadly, Lemon Cling, George the 4th, and others. When peaches are killed with us, it is generally by extreme cold, while buds are dormant, or nearly so. Of course, the degree of cold they will stand depends, to a great extent, on the maturity of the previous year's growth. The peach, while more tender in bud than the plum or cherry, will stand more frost while in blossom.

After testing many varieties, we find the following sorts to be profitable for a commercial orchard: Beginning with the early sorts, we plant Alexander, Amsden, Waterloo and Wilder, but these are so near the same peach in quality, time of ripening, etc., we plant mostly of Alexander and Waterloo, which never rot on the tree as they do in some localities farther south. The Early Rivers ripens next, is a large white peach, with red cheek, of fair quality, a poor shipper, and even more tender to handle than Alexander, yet it is very profitable, as we are so near the market. Hale's Early is profitable, and also free from rot. Cooledge's Favorite, Wager, Hill's Chili, Wright and Heath Cling are good varieties. The Wager is not quite as good a bearer as the others, but is a fine peach. For late sorts we still plant a few of Smock and Salway, but they are not very profitable. Have Elberta planted three years last spring; so far they are unpromising. Planted 400 Champion two years last spring, which bore a few fine peaches this season. Crosby not fully tested yet. In addition to these we have an

experimental orchard of nearly 2000 trees planted with pits from our hardiest and best varieties from which we already have some fine peaches that we think will prove of more value than any kind we have yet tested. These we designate by numbers—three of which we have colored plates—which I intended to bring along, but forgot them.

I have here a lot of testimonials from fruit men, to whom we sent specimen peaches. We have planted altogether 140 acres, but nearly three-fourths of our old trees are a worthless kind, and only a small proportion of our young trees are old enough to bear. We are now grubbing out the most of our old trees, as they are mostly worthless sorts. We have had five crops in the last 10 years, amounting to 15,000 bushels, mostly from the old orchard, which would seem to be a light yield from so many trees ; but when our young trees all come in bearing we expect better results, as they are mostly of the best bearers. From what we have learned by experiments and other sources, I feel encouraged, and intend to keep on planting, for I am satisfied that the commercial peach orchard of Southeast Nebraska has come to stay. We cultivate thoroughly, mostly with disc harrow. We also have a large shovel-tooth harrow to level the surface when it becomes ridged. Many people seem to think that when a tree is damaged by freezing that it is because of too much cultivation, and probably the next season do not cultivate at all, and the tree becomes stunted and never amounts to much. The best way to manage such a tree is to cut back the damaged wood and push the cultivation the season and put on as heavy a growth of new wood as possible to support the damaged heart or inside wood. In this way you not only get a larger tree and prolong the life of it, but get a better quality of fruit.

J. M. RUSSELL, Wymore, Neb.

DISCUSSION.

Question. What is your most hardy peach?

Answer. The one most hardy—Hill's Chilli is very hardy, and then a peach that is called White Seedling; that originated up there.

Question. What is the size of the Waverly?

Answer. It is about medium.

Question. How is the Old Mixen?

Answer. They do not do at all with me.

Question. How is Trouth's Early?

Answer. They do not bear.

Question. Have you any new varieties of seedlings?

Answer. We have some that bear very young. We have the earliest ripening free-stone that I know of.

Question. What do peaches average per bushel in price? What can you clear?

Answer. It will run a little over $1 per bushel.

Question. Are they mostly buds or seedlings?

Answer. Mostly buds.

Question. What is your experience in propagating from seed?

Answer. They do not come true from the seed.

Question. Have you ever practiced letting trees down?

Answer. No, sir.

Question. You know how it is done, don't you?

Answer. Yes, sir; I expect Mr. Murray has had more practice in that.

Mr. Holsinger—We heard that you had been grafting peaches on Myrobolean plum stock.

Answer. I did not.

Mr.——And people have been stating that they would stand 35 below zero.

Mr. Goodman— What kind of agents do you have up there?

Mr.——The kind that sell.

Mr. Russell—So far as that is concerned, when things are damaged by the cold the top is damaged.

Question. What kind of protection have you?

Answer. None. I use the highest ground I can get.

Question. What do you do with Hill's Chilli? Does anyone buy it?

Answer. Yes, sir; I will send you a sample.

Mr.——In Central Missouri we have a disease that is doing great damage to peaches, and I thought perhaps you could tell us what it was. The fruit ripens prematurely, from two to four weeks. The flesh outside shows red spots and inside the flesh is red.

Answer. No, sir.

Mr.——I have nothing further to say on the peach question further than to endorse what Mr. Russell has said. I have known him for 17 or 18 years. When he moved out to Nebraska to start a peach orchard, everyone thought he was going daft. The idea of going to Nebraska to start a peach orchard was something that no one else had the courage to think of. However, he went out there and started it. I think he put in 50 acres the first planting. Whenever I would go out to Mr. Russell's peach orchard I would always find him digging

around in it, and one day I found him digging with a piece of wire among the roots and he said he was killing borers. It takes work and it takes care to successfully do anything.

As a result of Mr. Russell's vigilance, he is able to tell you that he has a successful peach orchard. Since coming to Missouri it has occurred to me that if Mr. Russell can raise peaches in Nebraska successfully, there is no reason why I cannot raise peaches in Southwest Missouri. I do want to indorse every word he has said in this paper, and I hope that his visit down here will result in a few years in doing as he has recommended, because these varieties will grow well down here.

Uncertainty of Peach Growing.

The old adage that "there is nothing certain or sure in this life except death and taxation," applies as well as or better to peach-growing than any other branch of horticulture. Why so many disappointments and failures? In the first place a man to be a successful peach-grower, must be studious, wide-awake, thoughtful, patient, a close observer and an all-round good business man, with practical experience and money to back the enterprise. How few of the growers in our State would stand 100 in a thorough examination of the above eight very essential points before a competent board of examiners.

I say essential points, because if he lacks any he cannot hope to attain what most growers are working for—a good, fat bank account.

If he is not studious, thoughtful and wide-awake, his competitors will leave him so far behind in the race that he can never overtake them. He must be patient, for orchards are not made in a day; a close observer, or he will not detect the decline of his trees or the many new lessons to be learned almost daily. If he has not the practical experience, he will make many errors that will take years to correct in which losses will occur, the amount depending upon the extent of his planting.

Money is indispensable, for we can carry on no business without it. The all-round business man is equally important, or the grower will not be able to realize satisfactory returns after he has produced a crop. Being possessed with all these talents, he will be better able to fight the borer, and all other drawbacks to the peach-grower.

Suppose, however, that we should have very few, or even be free from all these pests, and that every one planting a peach orchard should have bountiful crops, what would you do with the thousands upon thousands of bushels that would be produced? Do you not

think that we should of necessity be compelled to be thoughtful if we realize anything for our fruits? Should we not want something new, especially in the mode of distribution? Yes, that is it. Distribution. Did you ever stop to think that when the market at Kansas City, Omaha, St. Paul, Chicago, St. Louis, New Orleans and other large cities were flooded and prices demoralized that there were thousands of little villages and towns of moderate size throughout the north, northwest and northeast that did not have a peach? Distribution, distribution, distribution should be branded on the brain of every fruit-grower before me today until we shall perfect such an organization that will be able to place fruit where it is needed most, and avoid the gluts of the markets.

If we study our country markets closely we shall find that from Kansas City there can be distributed at least three to four cars daily to points within easy reach. St. Louis the same quantity. A dozen other inland towns will each distribute one car per week. In Kansas, in addition to those received from Kansas City, there can be placed one car per day on each of the five leading roads running westward through the entire State and Eastern Colorado.

Nebraska will use not less than five cars daily, and Iowa eight to ten cars and possibly more. The people in Minnesota and Dakota are half starved every year for peaches, and to say that these states would consume a dozen cars per day is putting the estimate entirely too low.

To say nothing of the demands for our luscious peaches east and west of the territory mentioned and the new south we will have to produce forty cars of peaches per day. It will readily be seen that the supply is entirely inadequate to meet the demands of the people at the present time, and as soon as we would produce orchards enough to supply the present demand, the population of the country mentioned will have increased materially, making a still greater demand for our fruit.

I see that my friend over there is smiling. I suppose he thinks this all sounds very nice on paper, but he is anxious to know how we are going to do it. Simply by systemized co-operation of the fruit-growers. If the growers, as a whole, whether they have one acre or two thousand, persistently refuse or neglect to join hands and to all work in harmony, and abide cheerfully with the regulations of the combine, they must expect to have failure stare them in the face.

The association can handle strawberries, raspberries, blackberries and other small fruits in the same manner as peaches, and would be a great benefit to the apple trade, but the apple is grown over a larger area of country and is not so easily handled.

The strawberry, it is true, grows over a larger area than the apple, but its season is so short for each individual section that if the growers would combine and have the distribution properly made there would be no gluts, no broken-down markets, no failures in the business, but there would be more swollen pocket-books, a greater attendance at our State meetings, and each grower would have a confidential smile wherever met. Our wives, sons and daughters would laugh and rejoice over the great change that had so quickly taken place, and that, too, without the aid of any political party. Possibly they might think that Bellamy's Looking Backward was not very utopian, but an accomplished fact.

I do hope that my friends here will commence now and agitate this matter of co-operation in distribution, and God speed the day when such an organization, most desired, may be perfected in every detail, and that no man, woman or child who has ten cents shall be deprived of strawberries, raspberries, blackberries or peaches in their season.

Until such an association has been effected I fear we shall still have to howl over the uncertainty of peach growing.

S. W. GILBERT, Thayer, Mo.

DISCUSSION.

Mr. Goodman—What are your best varieties?

Mr. Gilbert—The best are, in the way of ripening, the Gilmore, which is not the real name, I think, which I obtained in Arkansas. It ripens before the Alexandra, or those of the Hill family. The next good peach is the Lindsay White, which is a large white free-stone. The trees were sold to me for Lindsay's White. Following that is the Vequette and then comes the Elberta.

Mr. Evans—Have you not found the Bonanza profitable?

Mr. Gilbert—They are very shy bearers and are not profitable. I have only about twenty trees. I will say that I have some Gold Dust and I think they are the richest peaches that I have. It takes finances to run the peach business.

Mr. Goodman—How long does one have to have finances before he begins to get finances out of the peach business?

Mr. Gilbert—That is a pretty hard question to answer.

Mr. Goodman—If a man makes money out of an orchard, he puts the money right back into it, to extend it. I think as soon as the trees begin to bear they will repay the finances that you put in on them.

Mr. Gilbert—I believe that by selecting the proper varieties, propagating the trees yourself and taking good care of them, a peach orchard will give a considerable amount of profit, no matter whether it is 25 acres or 500 acres.

Maj. Holsinger—I am satisfied that this list along that line will give you a continuous list of peaches throughout the season. They are varieties which we have tried, and we know whereof we speak. I would commence with Alexandra, with Troth's Early, Hill's Chilli, Old Mixen, Elberta, Resplendent, Gold Dust, Salway, and I have added Gemina. I have tried Gemina only for one year, but I am satisfied that we are safe in planting it. If it will stand 22 degrees in Nebraska, we rarely have more than that in Kansas City. We have very many other varieties which we have discarded, but these we have found are healthy and will stand our winters. The peach has given us fully as much profit as the apple, and as many crops. During the past season the peach gave us more satisfaction than any other variety of fruit. I want to say right here that I received from Mr. Gilbert, some seven years ago, a box containing about a bushel and a half of Salway peaches. They were gems, and I concluded that right then was the time to commence propagating. I planted 150 of the seed. I have some of those varieties, but they all run Salway, that is, the Salway blood is so distinct in them that you can trace it. There are too many clings. Possibly one-half of the number run to clings. There was not a single peach from those seedling Salways which showed white blood. They were all yellow.

I will say that I have one tree that I believe is going to be worth more than all the rest, in that it holds its fruit. I picked seven baskets full of peaches from that one tree after everything else had gone.

Best Plums For Profit.

This subject having been assigned to one who is not a regular shipper of plums, consequently I will not attempt to show which variety, and to what extent a variety may be profitable, but rather cite the varieties that do well enough for profit, beginning with the variety Wild Goose. This variety is too well known to need description here. Ripens here July 4th to 10th. This variety does well in the southern half of the State, and when planted with other varieties of plums or in the vicinity of wild plums, bears much oftener as well as much more abundantly than when planted alone.

Plums should be planted about 16 feet apart with some other variety planted in to pollenize such varieties as are deficient in pollen, of which the Wild Goose variety seems to be one. When properly pollenized no other variety of plums could possibly bear more abundantly. There is much difference in the size of this plum on different trees, but when budded or grafted on peach stocks it is more uniform than on the common plum stock. When allowed to grow on its own roots the suckers or sprouts that grow out therefrom must be kept down or the fruit will be smaller in size.

Next to Wild Goose comes Roulette, a variety from New Mexico (not Mexico as first reported). In growth it is similar to Chickasaw. Fruit ripens here July 25. In size it is not quite so large as Wild Goose. Color is red, much like the Wild Goose. This variety does so well here that we believe it will become a leading variety.

Forest Garden is a red plum of good size, ripening here first week in August. This variety succeeds in colder localities than the former, Southern Iowa being well suited for it. For pollenizing other varieties this is said to be excellent. There is no plum of the American class that will compare with it in sweet flavor.

American Golden—not the Golden Beauty, which is good if larger. Tree a good grower, distinct. Fruit yellow, round. Size medium or above. One of the very best plums for canning. By some classed equal to grapes.

Miner is a medium-sized plum. Tree very hardy. Does well over a wide range of territory. Ripens here August 15th to 25th. If it was not for its small size it would be largely planted.

Wayland is another medium-sized red plum. Ripens here the last week of September. In deep soil the ripening period often extends much later, quite often to October 10. This variety will become very profitable owing to its being the latest so far, and on the market would find very few competitors.

JAPAN PLUMS.

This class of plums has not been fruiting here for several seasons. We are unable to determine as to the best varieties. In hardiness of tree, Ogon stands first. Boton (Abundance), Chabot, Yellow Japan, Burbank and Satsuma are not hardy here.

The varieties which do well in some localities, but fail to give satisfactory results in others are:

Caddo Chief—Early red. Ripens here with the late varieties of strawberries and early cherries, and on this account are not sought after on the market.

Mariana—Red, early. Rots too badly in wet seasons.
Pottowattomie—Deficient in size of fruit. Tree very thorny.
Weaver—Too slow coming into bearing.

JAMES B. WILD, Sarcoxie, Mo.

Japan Plums.

These plums are attracting much attention throughout the country at the present time. In many sections remarkable success with them is reported. Early and profuse bearing of an excellent quality of fruit follows their cultivation in many of the states. Being rapid growers, attractive and striking in appearance they find a place in gardens and orchards wherever success can reasonably be expected with them.

In this part of Missouri they have not been thoroughly tested, although several varieties have fruited and promise well. The hardiest here are Ogon, Boton (or Abundance), Chabot, Sweet Japan and Burbank. Boton is best known, and probably as reliable as any. The trees are strong upright growers, and the fruit is of large size and good quality. Burbank is somewhat more tender than Boton, but the fruit is excellent. I do not consider Ogon valuable, as the fruit is inferior, but it has proven to be the hardiest of all the Japan type, trees of this variety having passed through the winter of '93–4 without injury, while others suffered more or less. The fruit buds of all, though, were killed at that time.

The greatest drawback to the growing of these plums in this section is their tendency to bloom too early, thereby making them liable to be caught by late frosts. They are also affected by warm days during winter much like the peach, although it is very seldom that they will suffer on this account, only in such winters as the one just spoken of.

European plums do not succeed in parts of the west, and the American varieties that do succeed are mostly inferior in quality, so it behooves us to give these Japan kinds a thorough trial. The quality of the fruit of several of them is very good, size large to very large, the growth of the tree all that could be desired, and they are more hardy than our hardiest peaches; so for these reasons they should certainly receive our careful attention.

They are now being crossed with our best American plums, some of the varieties thus produced combining the large size and fine quality of the foreign with the hardiness and adaptability of the native. In these and others produced by this method we may hope and expect to

grow a class of fruit of great merit, succeeding almost everywhere that the wild plum is found.

It is my opinion that the Japan plums are to have a permanent place among our fields in Missouri, or, at any rate, to work, in the manner above referred to, such an improvement upon varieties now grown as to be of great value.

In conclusion, I will repeat, let us test this type of plums thoroughly. Also do some experimenting in cross-fertilizing in a scientific manner, each one on his own account. The result may astonish us. The best is none too good and all should have it.

F. H. SPEAKMAN, Neosho, Mo.

DISCUSSION.

Mr. Wild—With regard to the Wayland plums, they have been exhibited at the Sarcoxie Fair for five years in succession, and their Fairs are held the first week in October, so that is its general ripening period in this part of the country. I think it originated in Kentucky, but how far north it would do to plant I am unable to say. I do not think is would do further north than this State.

Question. Which are the most remarkable growers?

Answer. The Wotan has proven to be about the best of the growers, so far as I know.

Question. Is it not a fact that the Japanese plums are all good strong growers?

Answer. Yes, sir; Ogontz is not so good as the Wotan.

Question. Why cannot the blue plums, damsons and others be grown in Newton county?

Answer. I can see no reason why a damson plum cannot be grown here successfully. That the damson cannot be grown in Newton county is a surprise to me. In Jefferson City damsons were a drug on the market.

I ask the question for information. I never see them, and I do not see why they cannot be grown here. The trouble is they will not hold the fruit. They cannot tell why they cannot be grown, whether it is worms or what it is. I think they can be grown here.

Mr. Tippin—Our experience with blue damsons in Greene county is that the tree will not hold its foliage. They were loaded down in most instances, and the fruit is still on the trees. One would begin to rot, and in a few days the whole cluster would be rotten.

Mr. Durand—There are only a few damsons in our country, but they seem to bear very well. This year they ripened well as far as I could see.

Quinces for Preserves and How To Get Them.

I shall not, in this paper, undertake to convince any one of the profitableness of quince-growing in a commercial sense in this State. In the first place, I do not think our soil is naturally adapted to that industry, and then there is so little demand for the fruit that the business could not be engaged in extensively, as compared with other branches of fruit-growing, even under otherwise favorable conditions.

It might be argued by some that a demand could be created if we could produce the fruit, and this may be true in a limited sense. But it must be remembered that the quince is used only for flavoring, and so strong is the flavor that but a comparatively small part of quince is needed to do the work. The flavor of the quince, to many, is the most exquisite of any of our domestic fruits, the peach and strawberry not excepted. The much-abused Ben Davis apple in the hands of the skillful housewife, and flavored with quince may be converted into a "nectar fit for the gods."

Few quinces are consumed in this State and throughout the west generally. They seldom find their way to our small towns or into the homes of our farmers. This state of things ought not to exist. The bulk of the quinces consumed in this country are grown in Western New York. Prof. L. H. Baily, of Cornell University Agricultural Experiment Station, in a bulletin on the quince industry of his state says that last year the fruit sold for $2 to $2.50 per barrel, which he considers a "fairly remunerative price." At the prices quoted I think we could all afford to indulge in quince sauce, and I think many of us would do so if our country merchants would bring the fruit from the large cities and give us a chance to buy it.

I know of no reason why our farmers may not grow their own quinces with reasonable success. If well cared for, the quinces comes into bearing early—somewhat earlier than the apple. The variety known as the Orange, so far as I have observed, is perfectly hardy and is perhaps the only variety that ought to be planted in this State. Some speak quite highly of the Champion, but my experience with it has not been so satisfactory as with the Orange.

The quince should be kept in a thrifty, growing condition, but it is not best to stimulate too rank growth, else the energy of the tree will be expended in wood-growth instead of fruit. Chip dirt, in connection

with wood ashes, is a good fertilizer, so also is bone meal. Stable manure should be used sparingly, if at all, as it contains a considerable amount of nitrogen, and will cause a rank growth of wood which, as I have before intimated, is not desirable. If the tree persists in making a strong growth, the top should be shortened in quite close during the winter. The ground about quince trees should not be allowed to become hard and dry nor soddy, but should be kept in a loose, friable condition by clean, thorough cultivation.

The round-headed borer, so well known to the apple orchard, is also an enemy of the quince. The codlin moth also attacks the quince the same as the apple. Both these insects are now quite successfully overcome by the live fruit-grower. There is one disease of the quince, however, that is not so easily overcome. I refer to fire-blight. This disease also attacks the pear and the apple, and there is no remedy except to cut away and burn the blighted part.

In conclusion, I would say, let us plant the quince—not for market, but for the use of our families. The fact is, no farmer who owns his home is doing his whole duty to his family unless he plants not only a few trees of the quince, but also every variety of fruit that can be grown with a fair degree of success; and in the planting and caring for these and partaking of their fruits we shall find happiness and health, and shall have the satisfaction of knowing that the world has been made better by our having lived in it.

G. P. TURNER, Meadville, Mo.

QUESTION BOX.

Question. Does it pay to evaporate apples, and is it best to bleach them?

Answers:

Mr. Durand—That was my question, and I put it in for information. I would like to hear from somebody else.

Mr. Gano—So far as I can see, they do not want bleached fruit; no one likes it. They prefer sun-dried fruit. If it were not bleached the people would eat more of it. If we want to do anything in that line it should be with the understanding that we all do without bleach. I think it will pay. We sell twice as much at better prices.

Mr. Durand—What did you get for your fruit this year, or have you sold?

Answer—I have four car-loads. I have an offer of 5 1-4 net at home, and I take it that I make about 1 cent per pound profit. So, I

think it pays even to buy apples. I bought 11,000 bushels and paid 20 cents per 100, and I think it will make a very fair profit if I get 5 1-4. I hope for more. With reference to bleaching, I cannot help but think it pays to bleach, because when you put apples on the market without bleaching they will not pay more than about half as much as they would if they were bleached. In some localities they prefer the unbleached fruit, and will pay more for it, but the market will not take it, and I want to give them what they want, and it costs nothing to bleach. My evaporating machine has a capacity of about 500 a day.

I should like to ask Mr. Durand what machine he prefers. We run by hand and we use the Excelsior machine. I also use the Bonanza and the York.

Question. Is the autumn or spring the best time for planting?

Answers. Stone fruits should be planted in the spring on account of too much evaporation. Other fruits should be planted in the fall.

We planted 16,000 peach trees in December, and we did not lose one per cent of the entire plant. I have made two failures in planting stone fruits in the fall.

Question. What is best to fertilize to give color and uniform quality to the Ben Davis?

Answers. You cannot do it. You cannot fertilize with anything that will improve the color or quality. If you grow a seedling you may get a better variety than the Ben Davis.

Question. Would it be better to plant some other variety with the Ben Davis than two large blocks together.

Answers. Have others mixed with them instead of having large blocks of one variety together.

We have large blocks of Ben Davis, and we wish we could arrange them so that they would not bear quite so much. We have to thin them out.

Fertilizing will not improve the color and quality. I know from the best authorities that it is not correct to thin out everywhere. I have had the Ben Davis planted in close proximity to other varieties, and at the same time the block of Ben Davis did not bear scarcely any. I think we get better crops by having other varieties interspersed. I find in the Olden report where a man planted 50 Ben Davis in his orchard by themselves, and at the end of 15 years, having planted 400,000 standing with other varieties, had borne full, uniform satisfactory crops and the other had been a failure.

Question. Can a commercial orchard be thinned profitably?

Answer. Certainly, if it will pay to gather apples it will pay to thin them.

Question. What time of year?

Answer. Any time before the seeds begin to harden.

Mr. Murray—Pick off the imperfect fruit and if they have codling moths, put them in a kettle, boil them and kill the insects.

Question. How can you learn how to use commercial fertilizer intelligently?

Answers. Prof. Irish—No very systematic experiments have been carried on. One of the conditions necessary to know before we can tell, is the mechanical analysis of the soil. We cannot tell whether the soil will prepare the fertilizer so that they can be assimilated by the plant, without experimenting in each case. That must be taken into consideration.

Mr. Gilbert. I have an analysis here of my soil. If I want to raise bigger strawberries or more of them, what must I do? I will read you the analysis:

Phosphoric acid	0.19 per cent
Equivalent to lime phosphate	0.41 per cent
Nitrogen	0.13 per cent
Equivalent to ammonia	0.16 per cent

Do I want any fertilizer at all, and if so, how much?

Prof. Irish—A little more nitrogen and a little potash, possibly half and half by weight. The potash I consider the best for producing fruit and the nitrogen for producing plant growth. For a healthy growth, nitrogen, and for healthy fruit, potash.

Mr. Gilbert—The largest foliage measured 26½ inches in diameter. How much larger should I grow them than that to get the largest fruit? I have thousands of plants over a foot in diameter. It seems to me from what little experience I have had with our soil in Oregon county that the only improvement I could make at any time would be to get an irrigating plant and give the plants what water they need. I have produced berries that measured 7½ inches.

Prof. Waters advised me to plant eight rows of berries, fertilizing the first row with potash, the second with phosphoric acid, the third with nitrogen, the fourth with nothing, the fifth with potash and phosphoric acid, the sixth with potash and nitrogen, the seventh with phosphoric acid and nitrogen, and the eighth with nothing, and compare the results.

Has anyone here fruited the Yenshing peach introduced from Northwest China by J. L. Bud?

No.

Did anyone test the value of salt for pear blight, as recommended at the Carthage meeting, December, 1892, and is in the following annual report?

Which of the three following things injure horticulturists the most, insect pests, excessive toil or carelessness?

WEDNESDAY, Dec. 4—2 p. m.

The first number on the program was music by the double quartette.

With a few remarks in praise of Missouri's boys, President Evans introduced Prof. Waters, of the Agricultural College.

Value of Clover and Cow-peas as Fertilizers for Orchards.

Given a soil reasonably fertile and otherwise adapted to orchard growing, will it retain sufficient fertility and a suitable physical condition for the best results without manuring when handled in the approved manner, viz., the growing on it of tillage crops, such as corn, potatoes, etc., among the trees while they are young and giving it clean culture thereafter, as long as the trees remain vigorous and productive?

The failure, or indifferent success, of numerous orchards handled in this way furnish the strongest possible negative answer. A few fundamental principles, briefly stated, will make clear the reasons for failure:

1. The removal of one or more of the elements of plant food faster than they can be rendered soluble by the usual processes of nature.

2. The burning out of the vegetable matter or humus, leaving the soil heavy, compact, or, in a sense, dead. In this latter condition the water-holding power of the soil is greatly reduced; less water enters it when a rain-fall occurs, and it is physically unsuited to the best growth of fruit trees or agricultural crops. It not infrequently occurs that both of the conditions just described are present in a soil that has been grown for a long time in tillage crops, or in a soil grown in orchard trees for a long time when constantly tilled. It is a well-known fact that tillage greatly facilitates the loss of vegetable matter and nitrogen. It has been found, for example, that for every pound of nitrogen removed in the corn crop, three pounds were lost by cultivation.

The three elements of plant food most often depleted by continued cultivation and the removal of crops are potash, nitrogen and phosphoric acid. Unless this process of depletion has been carried too far, or unless the soil was naturally thin and weak, a season of rest will render this soil again fairly productive for a short time, inasmuch as a portion of the plant food yet contained in this soil is made soluble and accumulates there. By this process, however, nothing is added to to the soil, and the supply of plant food already there is drawn upon in the most expensive manner.

An application of barnyard manure, or the plowing under of a crop of clover or cow-peas will produce the same effect as the summer fallow or rest, and further improve the soil in the following ways:

1. It adds a supply of readily available plant food upon which the trees and succeeding crops can feed at once.

2. It is well known that the vegetable manures of this class serve other equally important purposes in the soil, otherwise many strawy stable manures, from the application of which good effects may be seen for several years, would not be worth hauling to the field and spreading. That is to say, the potash, nitrogen and phosphoric acid contained in them could have been purchased and applied in the form of commercial fertilizers for less expense than the hauling and spreading of these manures would amount to. Then, by the addition of this vegetable matter, the physical condition of the soil has been improved; it is made more friable, more easily tilled; its water-holding capacity has been greatly increased, at the same time that its capacity for absorbing the water which falls on its surface in the form of rain, snow and dew is increased. An example of the difference in water-holding power of soils, due alone to a difference in the amount of vegetable matter, is reported in a recent Experiment Station bulletin as follows:

New soil, cultivated two years, contained 3.75 per cent of vegetable matter, and contained at the time the samples were drawn 16.48 per cent of water. A similar soil adjoining, which had been cultivated until the vegetable matter had been reduced to 2.50 per cent, contained at this time only 12.14 per cent of water. This means a difference of 1 ½ quarts per cubic foot of soil. Other cases are reported in which the soils with a normal amount of vegetable matter contained more than one-fourth more water than those in which this material had been burned out by cultivation.

Not only do the soils containing the larger amount of vegetable matter contain more water, but this water is given off more slowly by evaporation. An experiment with the two soils above described in which they were subjected to the same temperature, having been wet

to the same degree before beginning, show a difference of more than a quart table of water per cubic foot in favor of the new soils.

3. This added vegetable matter makes the soil warmer and quicker than before, notwithstanding the increased amount of water held, for the color is made darker, enabling it to absorb more of the sun's heat, and the decaying of this vegetable matter produces sensible heat in the same way (although to a much less degree) that the decaying of the manure in hot-beds maintains a high bottom heat. It has been observed that frosts did no damage on soils rich in humus and of dark color, while those similarly located and adjoining, which had been depleated of humus by cultivation, had been visited by killing frosts.

4. This humus is a powerful solvent of the inactive potash, phosphoric acid and silica in the soil. It was found that in soils well supplied with humus there were 1500 pounds of phosphoric acid, out of a total of 8750 in the soil, combined with the humus, and 1000 pounds of potash, out of a total of 12,250 in the soil, combined in the same way. In soils poor in humus there was nearly as much total phosphoric acid and potash, but less in available forms.

COMPARISON OF THE APPROXIMATE FERTILIZING MATERIALS CONTAINED IN AN ACRE RED CLOVER, COW-PEAS AND CRIMSON CLOVER.

	Yield of crop of hay.	Nitrogen.	Potash.	Phosphoric acid.	Value per acre
Red clover hay	4,000 lbs.	83 lbs.	66 lbs.	28 lbs.	$17 22
Red clover roots	2,000 "	39 "	27 "	28 "	8 72
Total	6,000 lbs.	122 lbs.	93 lbs.	56 lbs.	$25 94
Crimson clover hay	5,400 lbs.	152 lbs.	35 lbs.	95 lbs.	$30 42
Stubble and roots	1,704 "	38 "	10 "	14 "	7 18
Total	7,104 lbs.	190 lbs.	45 lbs.	109 lbs	$37 60
Barnyard manure	10 tons.	98 lbs.	86 lbs.	64 lbs.	$22 54
Cow-peas	6,197 lbs.	117 lbs.	88 lbs.	31 lbs.	23 80

In the Eastern states, where the farmers and orchardists depend largely upon commercial fertilizers for their supply of plant food, it is found necessary to apply barnyard manure or grow clover every four or five years to keep up the supply of vegetable matter.

It is not possible for the commercial orchardist to cover his land with barnyard manure, even though he desired to do so. Hence for the vegetable matter and a supply of available nitrogen, potash and phosphoric acid he is compelled to rely upon some green manuring crop and tillage. For this green manuring practice and scientific experiments have clearly demonstrated that no plants will produce as prompt and satisfactory results as clover or cow-peas.

Where the largest amount of green manure is desired in the shortest time, without reference to the hay crop, mammoth or sapling clover should be selected. If the land has not been too fully depleted of its humus by long cultivation and cropping, and hay is desired as well as manure, the common red clover is preferable. In the southern half of the State it is quite likely that the cow-pea would prove quicker and more certain than either of the clovers named. At the Experiment Station in Boone county this plant has done well, yielding this year three tons of field-cured hay, cut before the pods opened. This crop returned to the soil 117 pounds of nitrogen, 31 pounds of phosphoric acid and 88 pounds of potash, disregarding the stubble and roots. This plant food would have produced several maximum crops of apples, peaches, grapes or pears, as will be shown a little later.

In any section at all adapted to the cow-pea, crimson clover should do well and will be of great value as a winter cover for the soil and for furnishing a fair supply of rich, green manure early in the spring.

The reason for selecting the clovers and cow-peas for green manures will be apparent when we consider that they have the power of gathering from the air at least a portion of the large quantity of nitrogen they contain. No other agricultural plants have this power so far as we know, and they are obliged to depend upon the soluble supply of food already in the soil. If nitrogen exists there in soluble forms in abundance there is little need of manures of any kind. But with the burning out of the vegetable matter we have already learned there is almost certain to be a depletion of the available nitrogen supply. Common red and sapling clovers have the power of drawing a portion, at least, of their supply of manurial food from the subsoil, where it has been leached by the percolation of rain water. Bringing, as we do, these valuable mineral elements to the surface in considerable quantities and storing them in their tops and fleshy roots, they are, in a short time, in the best possible form to feed the fruit trees.

Again it appears that these particular plants have a great power of gathering and organizing into growth the desirable mineral elements, potash and phosphoric acid, than have most agricultural plants. In other words, it appears from recent experiments that these plants are able to use certain soil compounds of potash and phosphoric acid, which are not available to wheat, and possibly but slowly available to fruit trees. If this is true the clovers have the power to draw upon supplies of these valuable elements of plant food that are not available to other agricultural plants, except to a very limited degree.

The values attached to the three fertilizing ingredients in the table on page 191 are not fictitious, but are prices we have to pay in the market for these materials when purchased in commercial fertilizers.

It will be observed that a large proportion of the plant food returned to the soil, in an available form, consists of nitrogen—costing on the market nearly four times as much per pound as either potash or phosphoric acid. It is now well established that a large part of this nitrogen is derived by these plants from the air, hence it represents so much clear gain in soil fertility.

It may be urged that the growing and bearing orchards do not require such large quantities of nitrogen as are furnished by clover and cow-peas, and that by the continued use of these crops for green manures we feed the trees an unbalanced ration, which, in the end, will prove detrimental to their bearing qualities.

An investigation of this phase of the question will readily discover the unsoundness of these objections. For example: to grow apple trees (without the fruit) 7 pounds of nitrogen are required for every pound of phosphoric acid, and for every three pounds of potash. For peach trees the proportions are 4 pounds of nitrogen, 2 pounds of potash and 1 pound of phosphoric acid. In the clover manures, as will be seen by reference to the tables just quoted, the proportion of these ingredients is: for red clover 2 pounds of nitrogen, 1.75 pounds of potash and 1 pound of phosphoric acid, while for the crimson clover the proportion stands, nitrogen 4 pounds, potash 1 pound and phosphoric acid 2 pounds. In cow-peas the proportion is: 4 pounds of nitrogen, 3 pounds of potash to 1 pound of phosphoric acid. Instead of an excess of nitrogen, there is an actual defficiency.

Disregarding the growth of the trees and assuming the average yield reported to us by an extensive fruit-grower in Dauphin county, Pennsylvania, an acre of the staple fruits, remove fertility when compared with corn (whole plants) from the soil, as follows:

Fruit.	Yield per acre.	Pounds per acre.			Value per acre.
		Nitrogen.	Potash.	Phosphoric acid.	
Apples	300 bush	23.4 lbs.	34.2 lbs.	1.8 lbs.	$5 47
Pears	835 "	16.0 "	13 4 "	4 9 "	3 63
Grapes	8,160 lbs.	18.0 "	22.0 "	7.5 "	14 25
Peaches	335 bush.	.....	40.2 "	8 4 "	.....
Corn	54 " & stalk	90.0 "	32.5 "	31.3 "	17 26
*Strawberries	5,000 lbs.	7.5 "	15.0 "	4.5 "	2 47

*Reported by S. W. Gilbert, of Thayer, Mo.

For the production of fruit alone there is an apparent excess of nitrogen in the clover manure, but not more, it is believed, than is necessary to maintain a vigorous, healthy growth of the trees and vines at the same time that average crops of fruits are produced. It will be noted that a two-ton crop of clover, with its stubble and roots, supplies sufficient nitrogen for five crops of apples, seven crops of pears, or six crops of grapes—assuming that no growth of trees and vines occurs.

The nitrogen supply (in almost every branch of crop-growing the most perplexing) is, therefore, practically assured by growing and plowing under every four or five years a crop of clover, or by growing clover every two or three years, removing the crop for hay and turning the stubble and roots under. On fairly good soil, clean tillage during the time the land is not occupied with clover, will liberate sufficient potash and phosphoric acid for a healthy growth of the trees, and for maximum crops of fruit.

SOME POINTS TO BE OBSERVED IN SECURING A GROWTH OF CLOVER.

It often occurs that poor hillsides, or lands that have been badly run down, are planted to orchards and vineyards, and considerable difficulty is experienced in getting a growth of clover at first. In such cases an application of air-slacked lime, at the rate of 50 to 75 bushels per acre on the plowed ground, and harrowed in, will usually remedy this difficulty. I would not recommend the use of lime except to induce a growth of clover. This is a very common practice in the East. If lime cannot be burned and applied at less than 8 cents per bushel it will be cheaper to use a potash fertilizer, such as muriate of potash, at the rate of about 200 pounds per acre, sown broadcast and harrowed in. It will be remembered that fruit trees and fruit require a large amount of potash, so that the orchardist will be doubly repaid for his use of this fertilizer, inasmuch as it will greatly benefit the fruit trees in addition to inducing a good growth of clover.

GROWING RED CLOVER.

On those very poor or naturally very dry soils it will be best at the beginning to grow clover alone and turn the whole crop under. A good practice is to seed the land with oats, at the rate of about one bushel per acre, making the ground very fine, and sowing the clover at the rate of ten to twelve pounds per acre (with a pound or two of timothy or orchard grass added) and covering very lightly with a brush or smoothing harrow. If the oats should grow very rank and threaten to smoother the clover, run the mower over it, set rather high. In

any case cut the oats for hay when in the milk, running the mower higher than it would be set in ordinary mowing. If the weeds spring up latter in the season, mow again, this time setting the cutter-bar 5 or 6 inches high—allowing the weeds and clover tops to remain on the ground as a mulch and manure.

GROWING CRIMSON CLOVER.

If the orchard is grown in corn it will be safer to seed to crimson clover immediately after the last cultivation of the corn, at the rate of about 16 pounds per acre. If the soil is dry it would be well to run a light one-horse harrow between the rows to cover the seed. Should you fail to secure a satisfactory stand from this seeding, it may be repeated as late as September 15, although the chances of getting a stand at this late date in the average season, are less than from early sowing. It will need no further attention until it is ready to be turned under the following spring.

GROWING SOUTHERN COW-PEAS.

It is safe to say that cow-peas may be grown anywhere in Missouri south of the summit of the Ozark mountains. Very satisfactory crops are grown on the very summit. Even as far north as Central Missouri, on the Experiment Station in Boone county, a crop of three tons of field-cured hay was secured this year in a fourteen-year-old orchard. In South Missouri it is believed that they will prove to be a more satisfactory green manure crop than either red or crimson clover, inasmuch as there is less risk in securing a stand, and the dry, hot weather of mid-summer will not kill the young plants. It has already been shown that a large amount of the needed plant food is furnished by this crop.

The peas should be sown at the rate of from 1 to 1½ bushels per acre on wellprepared seed bed, either broadcast and covered with a harrow or corn cultivator to a depth of two or three inches, as early in the spring as all danger of frost is past. On well cleared land a good plan is to use a wheat drill, stopping each alternate hoe, having the plants in rows 16 inches apart. When sown in this way they may be cultivated shallow and level once or twice if the weeds become troublesome.

In the southern part of the State, two crops may be grown in one season, if the Whippoorwill variety is used. The first crop will be practically matured by July 10, when they should be plowed under and the land reseeded as above described. In specially favorable seasons, the second crop will mature in the extreme southern portion of the State in time to be plowed under for seeding to crimson clover. It will be

very much better for the land to have it covered during the winter with growing clover.

When the second crop does not mature in time (September 15) to allow crimson clover to be sown, the best way to utilize the peas is to pasture with hogs. The hogs will do very well on this feed.

Farther north, where the growing of the cow-pea is more problematical, it is suggested that the Whippoorwill variety be used, and that they be sown in the manner described as early in the spring as danger from frost will permit.

If a later maturity and slightly larger variety than the Whippoorwill is desired, select the Clay. For a very large, late maturity variety, which will be very valuable as green manure for the southern section of Missouri, select the Unknown or Wonderful.

In many sections it will be found profitable to broadcast cow-peas between the rows of corn just before the last cultivation of the corn. If the season will allow them to mature seed, pasture with hogs after the corn has been removed, and turn the vines under for manure.

A good practice will be to sow peas on wheat stubble, provided the wheat can be removed and the land prepared by July 10. It should either be plowed or thoroughly cultivated with the disc or spading harrow before sowing the peas.

The cured vines and pods make excellent hay. For this purpose they should be cut when most of the pods have formed and the first pods are beginning to ripen. When delay beyond this stage of development a loss of leaves and peas by shattering will occur.

TIME TO PLOW UNDER.

The mistake is often made of plowing these crops under before they are mature. Recent experiments with the common red clover, show that the largest amount of nitrogen will be obtained by allowing it to pass out of blossom. When plowed under at the beginning of blossom, but little more than one-third as much nitrogen was secured as when allowed to mature. In the case of crimson clover the amount of nitrogen yielded per acre, by the entire plant, including the roots and stubble, ranged from 103 pounds when the plants were from 5 to 7 inches high—April 24—to 212 pounds when the plants were fully matured, May 31. The fertilizing value of the crop at the different stages of growth were: April 24, plants 5 to 7 inches high, value $21.94; May 12, plants 12 to 14 inches high, value $34.64; May 24, plants in bloom, value $37.06; May 31, plants fully mature, value $43.96.

A SUGGESTION CONCERNING THE PURCHASE OF CLOVER SEED.

Through no other medium is it as easy for the seeds of noxious weeds to be disseminated as through clover seed. The seeds of very many troublesome weeds may be in the clover seed in considerable quantities and pass unobserved. Several instances of the introduction of narrow leaved plantain—one of the most troublesome weeds in Ohio and Pennsylvania—to Missouri soil by this means, have come under my notice this fall while attending the Farmers' institutes. It would be well, whenever possible, to purchase home-grown seed that you know to be free from such contaminations. When you are obliged to go into the open market for seed insist upon having a sample—not less than a pound—and send it to the Experiment Station for examination. The botanist is able, by means of the microscope, to readily detect the presence of these impurities. This will cost you nothing except the trouble of getting the sample and the postage required to send it through the mail, and the information given you by the Experiment Station may save you many dollars in the labor of ridding your farm of troublesome weed pests.

H. J. WATERS,
Dean and Director Agricultural College, Columbia, Mo.

A second number by the quartette was rendered.
Mrs. Robeson then read her paper on "Ideals."
Miss Alberta Murray recited a humerous selection.

Salem Darius and the Apple.

Salem Darius, from his earliest youth,
Had what the good wives call an "apple tooth."
He never was content, a single hour,
Save munching apples, either sweet or sour.
He loved all kinds that grow beneath the sky—
The Pippin, Baldwin, Russet, Northern Spy,
The Seek-no-further, Greening, Fameuse Red,
Pound-sweets, and even Ox-hearts, dry as bread.
Whatever sort in any orchard grew,
Salem could tell the name—and flavor, too.
For various temporal prizes men may grapple;
Salem, like Eve, desired but one—the apple.

His first excursion—at the age of three—
Was to the orchard, where, with infant glee,
He patted and made friends with every tree,
And wondered what the bursting buds might be?
And there, too weary with his first emprise,
They found him sleeping—dimpled, rosy, wee,
With blossoms drifting down upon his eyes.

Arrived at boyhood's wild, untutored age,
Fate well-nigh wrote the "finis" on his page,
And but for modern scientific skill,
Salem Darius had but once been ill.
But, thanks to many a bitter dose and draught
Under compulsion hardly gulped and quaffed,
Salem survived, with scarcely an impression
Of several hundred colics in succession.
Scarce from the awful pangs once more set free
He sought with speed his favorite orchard tree,
And oft his greed unwittingly divulged
By the abnormal way his pockets bulged.
Green apples were his passion and his bane;
They twisted him with many a tortuous pain,
And yet the moment he could stand up straight
He filled his hat and pockets full—and ate.

In course of time, this greedy village youth,
Attained such stature, long-limbed and uncouth,
It shamed him longer to endure the rule
Of the fair teacher of the village school.
And so, his father furnishing him the dollars,
He left his home and cast his lot with scholars.
The college was not large—but 'twas select
(More so than Salem had been led t' expect)
And it was only by sore toil, alas,
That he maintained the tail and wagged the class.

Meanwhile his "apple tooth" survived, of course—
Indeed, his appetite, if aught, grew worse.
But, pressed for long due sums, too poor to buy
Such store of fruit as would his need supply,
Too honest far to beg, conviction grew
He e'en must steal, as he was wont to do!

It chanced the finest orchard in the town
Belonged to Salem's friend, Professor Brown.
It sorely went against the young man's grain
To give his benefactor needless pain;
Yet, what in conscience could Darius do?
For Brown had luscious Fameuse, Pippins too,
And Seek-no-furthers, veined and specked with red,
And Pound Sweets, to the summer sunshine wed.
'Twas plain, if he *must* steal (his conscience said),
From all the circumstances of the case,
Professor Brown's young orchard was *the* place.

Thus moved by reason and by appetite,
Salem Darius one dark and autumn night
Toward the professor's orchard set his face.
He found the house as black as any spade—
Except the parlor windows. Peeping in,
He saw Miss Brown (an intellectual maid,
By day severe and somewhat thin)
Now sitting on the sofa, fireward-faced,
With Tutor Doyle's long arm around her waist.
"Aha!" quoth Salem;" this is mighty well!
If Doyle molests me, I've somewhat to tell."

Without delaying longer, Salem crept
With cat-like steps across the lawn, and stole
Straight by the kennel where the house-dog slept.
Lethean dreams fast-chaining all his soul;
Down through the garden Salem took his way
And stood at last where thickly round him lay,
Like nuggets of pure gold, the luscious fruit
Creaking and crunching 'neath his heavy boot.
But sweeter, sounder fruit, Darius knew
Hung from the freighted limbs. He stretched his hand
And touched the fruit, all moist with beaded dew,
And round and smooth and delicately sleek
As any maiden's plump and peachen cheek,
Then Salem laughed a quiet laugh and bland,
And spreading out the ghostly pillow-case
Filled it with the choicest fruit from every tree;
"Ah, this is like the good old times!" quoth he.

At last the pillow-case would hold no more;
So Salem most reluctantly forebore.
But still he stuffed his pockets with such store,
That Falstaff, panting in his doublet wide,
Had been a puny pipestem by his side.
Then stealthily he took the backward track,
Staggering beneath the burden of his sack.
Safe through the garden passing he had gone
Some twenty paces o'er the quiet lawn,
When suddenly a smack his ears assailed,
The front door closed, and Salem quaked and qualed,
For, to undo his dreams, his projects spoil,
Obliquely down the lawn walked Tutor Doyle.

Poor Salem stood with weak and shivering knees,
And all the blood within him seemed to freeze.
The man of learning stopped—and then came closer.
"Is this you, Salem?"
Salem answered "N—no, sir!"
"It is, you rascal," thundered Doyle severely,
"And I smell apples—you've been stealing, clearly.
Now, sir, explain your conduct straight to me,
Or you suspended with disgrace shall be."

Salem Darius set his apples down,
Took off his hat, and slowly scratched his crown.
"Well, I'll explain, sir," he at last replied
(His swollen coat-flaps striving hard to hide):
"As I was passing the professor's house,
With this, my washing, in a pillow-case
(I think it was not far from twelve o'clock)
I heard a well-known sound that sent a shock
Through all my nerves—'twas so explosive, too!
Someone was kissing someone—was it you?"
At this sharp thrust from wily Salem's foil,
A shudder shook the frame of Tutor Doyle.
"I crept up to the window," quoth Darius,
"And—"
"Heavens!" faltered Doyle—"you didn't spy us?"

"Aye, that I did!" cried Salem; "and I saw
You take her slender hand, and gently draw
Her to your side; and then, sir, then you placed
Your arm around the fair Amelia's waist,
And—"
"Stop!" cried Doyle, as white as driven snow,
"This story, Salem, must no farther go "
Quoth Salem, "It shall not on one condition."
"Name it," said Doyle—"remember my position."
" 'Tis this, said Salem. "Twice in every week,
While apples last, you shall this orchard seek,
Bidding Amelia keep the dog in chain,
And with much learned talk the Prof. restrain,
While you shall gather, in a bag to suit,
At least a peck of extra, hand-picked fruit.
This you shall bring to my retreat,
South hall, room 8; and I will be discreet!"

"Done!" cried the tutor, with a grateful sigh,
And now, my good friend Salem, let us try
What silent tongues we men of books can keep!
Let both our secrets in locked bosoms sleep "
"Agreed!" cried Salem, and went his way.
And Salem lacked not fruit for many a day.

A novelty in the propram was a cornet solo. Then followed a paper by Prof. Whitten on

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Fungus Growths.

The subject that has been assigned to me is one of so great importance to fruit-growers, that I only regret we do not know enough about it to have already discovered remedies for all our fungus diseases, and thus solved the problem of destructive rots, blights, scabs and rusts. So much good work has been done in fungi during the past 15 years, and so much has been published by scientific workers and experimenters, that at first it may seem like the repetition of an old story, to speak upon fungus growths. However, we are confronted with the fact, that during the present season thousands of dollars have been lost to the apple-growers of the State, by bitter rot alone. Apple scab is more or less prevalent throughout the State, and, one year with another, causes more loss to apple-growers than any other fungus disease. While in our young vigorous orchards, the scab has not yet reached the firm foot-hold that it has in some of the Eastern states, still it is altogether too prevalent. and frequently may be found in premature stages upon the large, choice fruit of our show tables, showing that it is working its way into even the most vigorous orchards.

The plum rot is another disease that demands more attention. Very few varieties are absolutely proof against it. In case of some varieties, like the Lombard, susceptability to rot is the only draw back to their profitable culture. These diseases are destructive to profits, not only on account of the fruit which they actually destroy or render of small, poor quality, but also on account of often compelling the grower to find a market or use for his sound fruit, at a time when prices are low. During the past autumn great quantities of apples were sold at a very low price, taken east to cold storage, and are now being shipped back and sold for four times the price paid in autumn. In many cases these apples might have been held for better prices had it not been that the presence of the spores (seeds) of bitter rot, rendered their keeping uncertain except under favorable conditions of cold storage.

Realizing the importance of these problems, a great many growers have vigorously adopted spraying. Perhaps never in the history of horticulture has a new measure been so rapidly and so generally adopted in so short a time as spraying in the past few years. The results have generally borne the cultivator out in his taking the trouble to spray. In fact, it may be stated that spraying has become an established part of horticultural operations.

There are, however, a number of plant diseases for which we have no established remedies. Frequently remedies that are generally efficacious fail in the hands of some careful cultivator. These facts, together with the fact that the nature of a fungus renders spraying at just the right time essential, necessitates an understanding of the life history of a fungus disease. It may be of interest to describe what a fungus is and how it grows, and how spraying checks its growth. This will be following more closely the subject assigned me, "Fungus Growths."

The fungi (singular fungus) are a low class of plants which have no green foliage and which feed upon organic matter. They are not capable of assimilating inorganic matter from the soil, as are ordinary flowering plants. There are a great many kinds of fungi, from the large toadstools, mushrooms and puff-balls, which feed upon decaying organic matter in the soil, to the tiny blights, rots, rusts, scabs, smuts and mildews that feed upon the juices of living, cultivated plants, and are so small that their shape and manner of growth can only be made out by the aid of the microscope. Even these minute forms that cause disease in cultivated plants differ as much from each other as do the various kinds of weeds that infest our fields.

The manner in which a fungus propagates, or reproduces itself, must be known before we can successfully check it by spraying. We

know that the noxious weeds of our fields propagate, or reproduce themselves by ripening what we call seeds, and these seeds germinate and produce other weeds like the plants upon which they grew. The fungi reproduce themselves by ripening what we call spores, and these spores germinate and produce other fungi. To follow the growth of the toadstool, or mushroom, will enable us to understand the growth of those minute fungi that cause disease in our plants. When going out of doors some morning, particularly after a rain, we frequently find that a great number of toadstools, or mushrooms, have sprung up during the night. It is frequently a source of wonder how such a growth could have occurred so suddenly. If we dig carefully down in the ground, however, we will find a net-work of tiny, grayish threads permeating the soil in all directions. This is the body, or mycelium, of the fungus, and may have been growing there all summer, taking up food from the decaying roots, leaves or manure between the particles of soil. The toadstool, or mushroom, itself, is only the fruiting part of this fungus. Its sudden growth from the net-work of mycelium below ground, is no more remarkable than the sudden appearance of a morning glory flower from an unnoticed tangle of vines. In a few days the toadstool begins to turn a dark color and produces a great quantity of black dust from its gills beneath. This dust is the spores (seeds) of toadstool. They are so much smaller than the seeds of plants to which we are accustomed, it hardly seems possible that a single one of them is capable of germinating and producing toadstools. However, such is the case. One of these spores finds lodgment in decaying matter in the soil and germinates, much as a morning glory seed sprouts or germinates. It puts out those tiny threads of mycelium, which permeate the soil much as a morning glory twines about above ground. After a while thickened places are produced in the mycelium, near the surface of the ground, just as flower-buds appear along the morning glory vine. Some night, when conditions are favorable, toadstools spring up from these thickened parts, much as morning glory flowers burst forth from flower-buds. Thus the round of life of the toadstool is completed. The puff-ball, which produces a great quantity of black dust, grows very much as the toadstool, or mushroom, does. The dust, or smoke, which puffs out when the puff-ball is pressed, is the spores, which, in turn, germinate and produce other puff-balls.

The black dust or "smut" which forms on the ears of corn or heads of wheat, the orange rust on blackberry leaves, and the brown masses of powder on plums effected with rot, are all the spores of fungi, the mycelium of which is growing in the tissues of the plants. These spores are blown about by the wind, or undoubtedly may be car-

ried about by birds, animals and insects, and are finally lodged on healthy plants, where they germinate. In germinating they send their thread-like mycelium into the healthy plant, suck up its juices, destroy its tissues, and eventually produce fruiting parts (similar to toadstools or puff-balls, only very much smaller), on the leaves or fruit, which shed their spores as described. Some of these fungi produce spores that are too small to be seen by the naked eye. In such cases we only see the clusters of fruiting-heads, or the decaying and shriveled parts of the host plant, where the spores are breaking out. The little black dots that occur in blotches called apple "scab," and the concentric rings of dots on the bitter rot of apples, are each a spot where a fruiting-head of the fungus is breaking through the skin of the apple, and pouring out a quantity of tiny spores.

It is sometimes asserted that these diseases of fruits are caused by the weather instead of by fungi. This statement is similar to saying that weeds are caused by hot weather instead of growing from seeds which are scattered through the soil. It is true, that these fungi grow best when conditions of weather are favorable. Most of the rots, scabs, rusts, etc., develop most rapidly during moist, hot weather. The grayish fungus which causes root-rot of young apple-trees develops best in a cool, wet soil. Mushrooms spring up most plentifully when cool, wet nights follow a long hot spell. In all these cases, however, the fungus grew from spores and only waited for favorable conditions to develop other spores, just as weeds grow from seeds when the weather is warm, and develop other seeds. Just as weeds grow, only when weed seed is present, so do these diseases of our fruit develop, only when these fungi are present.

Since these fungus diseases propagate by means of spores, the key-note to the spraying operation is to spray the plants with a mixture that will kill these spores, as they lodge on the plant ready to germinate. In order to do this successfully, however, we must understand the entire life history of the individual fungus we wish to fight. It is not enough to simply apply a spray a few times during the growing season of a plant and conclude that it is sufficient to cure all its ills or kill all the fungus diseases with which the plant may be effected. We should know at just what season each fungus ripens its spores, when and where these spores are most liable to germinate, whether the fungus lives over winter in the mycelium stage, and a host of other complications that may arise.

Since this paper is written mainly to emphasize the need of a better understanding of the fungi, rather than to give the formulas and rules for spraying that are so frequently published and so easily acces-

sible, I will beg leave to mention a few complications that may confront the cultivator in spraying for these diseases. If these fungi were all animals, like wheat and oats, so that each fungus lived but one summer, ripened spores for next year's crop, and then died, it would be a simpler matter to deal with them. Just as some flowering plants live over winter and start in spring from underground root-stalks, as well as from seeds, so do some of these fungi live over in the mycelium stage, in the tissues of the host plant. Some have more than one kind of spores and behave differently in their different stages. The apple scab not only ripens spores to live over winter and attack healthy plants, but it also passes the winter in the mycelium stage within the tender twigs. Even though all its spores were killed the fungus would thus survive and perpetuate itself the coming season, just as raspberries sprout up from the ground. Spraying does not effect the mycelium that is growing down in the tissues of a plant, hence the scab fungus may spread from the twigs to the developing leaves and fruit in the spring, even though spraying is carefully done. The black rot of the grapes produces three kinds of spores and attacks both the leaves and fruit of the vine. The apple-leaf rust is a bimorphic fungus. It exists in the one stage as a rust on the apple, haw and kindred plants, where it develops spores that germinate on the red cedar, producing the well-known "cedar apples." These cedar apples ripen spores that germinate on the apple or haw leaves and there produce the rust, thus completing the life round of the fungus.

These cases are sufficient to show that we may sometimes apply a remedy carefully and still miss the object in view. Persistent effort, however, in the use of the fungicides recommended by the Experiment Station will eventually eradicate most of the diseases. Experiments at the Station at Columbia show that a two-pound solution is more effective in preventing scab in an orchard that has been sprayed three or four seasons than a six-pound solution is in a similar orchard that has never been sprayed. Continued spraying, year after year, will enable us to weaken our solutions until the labor of applying them will be the principle part of the expense.

Another phase of the work that I would emphasize as being most important, is to spray all orchards and fruit grounds from the time the plants are started. It is easy to keep orange rust from a blackberry plantation by spraying before it ever gets in, but a slow and difficult work to eradicate the disease, once it has become prevalent. In a young orchard on the horticultural grounds the trees have been sprayed for insects and fungi since they were started from the graft and no traces of these diseases have appeared among them, though

similar unsprayed young orchards in the neighborhood early develop the leaf fungi, and, become breeding grounds for insects. In this, as in most other cases, prevention is better than cure.

J. C. WHITTEN,
Horticulturist Mo. Exp. Station, Columbia, Mo.

Thinning Fruit—Its Benefit to Size, Color, Quality and Quantity of the Fruit, and to the Life of the Trees.

A SYMPOSIUM.

This is the subject assigned me by your Secretary. It is one of depth, breadth and magnitude; and it means much or little, as it is accorded acceptance or the reverse. No one realizes more than I do that nothing new can be told you about it; and the testimony I am to submit is offered only as line upon line, precept upon precept, here a little and there a little, that your good minds may once in a while be stirred to an effort to remove one of the obstacles in your way, and one impediment to your success.

Success involves profit, a paying profit; and this, in the very nature of things, is the result of labor, enterprise and skill. We have outlined the day when chance has either part or lot in matters of business. We succeed by the exercise of our own genius, or fail for want of knowing how. Fine horses, fine cattle, fine hogs and fine fruits are all the products of man. As we find them in their native states they are as dissimilar from those in the show yards or on our tables as the wild almond from our noblest peach, the wild hog from our finest pure bloods, or the Indian pony from our fleetest trotter. The one is nature's product without man's training, and the other the evidence of the Creator's wisdom in giving man charge over the beasts of the field, the fowl of the air, the fish of the seas, and over every living thing.

The law of progression is a part of man's nature, but is unknown to any other part or division of the animate world, or to anything having life. Neither wild animals, wild fruits, nor wild flowers know any law of progression; the wild crab and cherry remain today as they were thousands of years ago, and the same is true of wild animals. But man has too the opposite law, that of retrogression, and its pace is a much more rapid one than that of progression; and his improved stock, fruits, flowers, and even his own kind will go back by neglect much more rapidly than they went forward by care, skill and attention. Hence, an animal, a tree or plant will, when left to itself, degenerate,

and lose the quality that gave it eminence, and in a very few generations, lose almost entirely the character given it by the experienced and careful hand of man. Our trees and bushes and vines, then, need watchful care, and the skill that made the fruit what it is, fine in color, in flavor and in size, if we would have them acceptable in the markets and successfully sold at profit-paying prices the world over.

This brings me to the subject-matter of my address: Thinning for quality, color, size and quantity; for annual crops instead of biennial. Such fruit as always and everywhere commands a market and prices two, three or four times those obtained for fruit neglected and unskillfully handled.

In the names of the gentlemen whose letters I have secured, you will recognize some of the most experienced in the State, men whose judgment commands respect the world over. In reading them you will discover that, though strongly impressed with the necessity of thinning, and though that feeling prompted the symposium, I have given facts rather than theory, and experience rather than mere supposition. The effort was suggested during the summer, when thousands of trees were being ruined by attempting to carry too much fruit.

GEO. LONGMAN.

TESTIMONY OF J. C. EVANS.

My dear Mr. Longman—I have your letter of recent date asking some questions relative to the thinning of fruit. I assure you there is no part of the work of an orchardist or small fruit-grower that is of greater importance, and I am truly glad the question is to come up at so important a meeting. I trust it will start the ball rolling, and that ere long all growers of anything will come to realize the importance of thinning. If a crop of turnips, corn, oats, or any of our annual crops are planted too thick the damage is only to the present crop; but if a tree or shrub (either fruit or flower) be allowed to bear too full, the damage injures the value of the next and perhaps two or three future crops.

If a peach tree, for instance, is quite full, it may be thinned to one-half any time before the seed hardens and still be able to produce as many pounds of fruit as it would if not thinned, and of course of better quality. It is the maturing of the seed that exhausts the vitality of the tree.

Some varieties of fruit are recognized as alternate bearers, and the reason is obvious. They are so busy maturing their enormous crop this year that they have no time to prepare fruit-buds for the next; besides their vitality is so exhausted that they require a year or

more of good care to prepare for another crop. By proper and judicious thinning these same trees may be brought to a habit of annual bearing of good and profitable crops that will handle quickly, sell readily and for double or treble the price of small, knotty fruit.

You cannot be too positive and earnest in urging the importance of thinning fruit or flowers, or, indeed, crops of any kind.

Yours truly, J. C. EVANS.

THE COMMISSION MERCHANT'S EXPERIENCE.

The experience of fruit-growers up to date this season (September 3, 1895) must furnish them with food for reflection. Notwithstanding the great abundance of fruit and the low prices ruling everywhere, it must be admitted that those who marketed choice fruit did not labor in vain, but have been fairly and fully compensated. When good fruit can be profitably marketed in such a season as this, it is evident that it must pay well in average seasons. The question, therefore, arises, what must we do to secure annual crops of desirable marketable and profitable fruit? Take the apple and peach crops, which form so prominent a feature in this year's crops, for example; it might be said that one-fourth of the offerings graded good to choice, and one-eighth choice to fancy; and even this estimate is probably to liberal, so rare is the most desirable and perfect fruit.

The first important step toward securing the best results may very justly be considered careful, thorough and prudent thinning out of the fruit while yet small, and before it has drawn very heavily upon the strength, resources or vitality of the tree. If three-fourths of the fruit is then removed, that which remains has a good show to become the finest of its kind in quality, size, attractiveness and acceptability to the purchasing and consuming public.

The majority of fruit-growers excuse themselves from undertaking the thinning of their trees of fruit by saying that it involves too much time and labor, but this is the poorest of excuses, as is demonstrated in the case of those having carefully and thoroughly attended to it get good and profitable prices for their fruit, even when the market is glutted, as it is now and has been for the past two months. The situation as between the men who care for their orchards—and the thinning of the fruit at the proper time embraces a good part of that care—has been more clearly shown the present season than for years past. So long as the work so essential to success is ignored, so long will the fruit-growers remain poorly rewarded. There are some business methods and practices essential to success; this is one of them, and should be generally adopted. P. M. KIELY.

TRITE BUT EARNEST WORDS.

Mr. Longman—I will give you a few points :

1st. No tree should have more fruit on it than it can hold up well and mature in perfection ; that is to say, that the trees should not be so loaded as to require their being propped, or so much that the branches bend very severely. This checks the growth of the fruit to such an extent as to injure the quality.

2d. Every time a tree has too much fruit it weakens its vitality to such an extent as to require two or three years to recover, or so checks its growth that it begins to decline and is permanently injured.

3d. In the production of an over-crop it costs the tree more to ripen the seeds than to make the fruit.

4th. If, from a tree heavily loaded, there is taken one-half or even three-fourths of the fruit, there will be more bushels of fruit than there would be if all were left on the trees.

5th. By this practice there will be less poor fruit put upon the market, and the good will bring better prices and give infinitely better satisfaction.

6th. Thinning makes the fruit of much better quality, makes it keep longer, and produces finer, handsomer, more attractive, and much more desirable and salable fruit.

7th. When our orchardists shall look upon thinning as important as cultivation, pruning, care and attention, they will succeed in supplying our markets with perfect fruit and of the very best quality, and thus increase the demand, enhance the value, and give vastly more satisfaction to both the producer and consumer.

L. A. GOODMAN.

EXPERIENCE IN THINNING.

Editor Rural World—Yours of the 3d inst. regarding the thinning of fruit is here, and I wish to say that I am aware of its value and familiar with its practice, first in the increase of size and quality, and second, in the keeping of trees and vines in a more healthy condition, and thus the more likely to become annual bearers instead of every other year, and preventing trees being weakened and broken down from an overload of insipid and comparatively worthless fruit, in which there is little money and less profit to those who send it to market.

Though I do not feel capable of being of much aid to you in writing your paper, for I well know that you can do the matter justice, I will give you a few points by way of illustration. I now have a few grape vines that were entrusted to an employe that are in consequence

overloaded with insipid fruit, and a part of the berries so green that they will never mature. I did not have time, or rather did not take it, to go over my vineyard at the time of pinching back the first time; and having so many varieties that my man did not know the habits of, or rather did not know the varieties, such as Worden, Pocklington and Woodruff, all three excellent grapes when properly grown, but all apt to set more fruit than they can mature, and this is the consequence.

The job of thinning tree fruit is not an easy one and takes time. Fortunately, I have had but little of it to do thus far, and have not half a dozen trees that are overloaded. I am glad that this subject is being discussed, and hope that it will be as common for fruit growers to thin their fruit as it is for farmers to thin their corn. It was only yesterday I took some peaches to market from seedling trees, and when one of my neighbors saw them he remarked, "Why, you can get a dollar to a dollar and a quarter a bushel for them," while he had some that went begging for 50 cents; and if I am not mistaken, the seeds that my trees grew from were from his orchard; his trees are breaking down under their load of small and worthless fruit, whilst mine have but a light crop, though not thinned, of fine, large, luscious fruit.

You are right; we must thin our fruit and grow finer and larger and keep our trees in a healthier, hardier and every year fruiting condition. I have never yet seen the time when something really fine and good in the fruit and vegetable line would not sell at a fair, good price, when it was utterly impossible to sell the common, small and undesirable stuff. A market is hardly ever, if ever, overstocked with choice and fancy fruits. You have hold of a good thing; push it along.

Yours truly,

HENRY SCHNELL.

AN EXHAUSTIVE ARGUMENT.

Editor Rural World—In every line of produce at the present time the demand is not so much for a greater quantity as for a better quality, and we find this especially and eminently true in the production of fruit. And now, that we have an abundant crop and our markets everywhere broken down and demoralized, is it not time to inquire: What is wrong?

Some say we have an overproduction; but this will hardly hold good so long as the people of Missouri and states west of her send millions of dollars annually to California, New York, Ohio and other sections for fruit.

The fact is, the people of the whole United States have been and are, with few exceptions, growing their fruit in a careless, haphazard way. Many orchards of five hundred trees will have from 50 to 200 varieties; while others of from five to ten thousand trees will have but three or four varieties, and of these 75% will be Ben Davis.

But very few orchards are cultivated in the true sense of the term. Grass and weeds are allowed to grow at will, and then fall down and decay on the ground, making a desirable and effective protection for a horde of destructive insects that infest and ruin the orchards and both trees and fruit. The fruit is gathered in every stage from green and half-grown to dead ripe and half-rotten, and in these conditions sent to market. Is it any matter for surprise that fruit in such conditions sell for half nothing, or that the growers express surprise that the markets are broken down?

Our Legislature wisely passed a law last winter to have a water-melon inspector appointed to prevent the shipment of unripe melons by greedy growers; and I now suggest the necessity of a similar law and a like appointment to prevent the shipment of unripe fruit.

I do not wish to reflect upon the intelligence of our fruit-growers. As a class they are intelligent and progressive; but the marvelous growth of our fruit markets and the speculative prices fruit has often sold at within the past 20 years has caused a grand rush for quantity in many cases regardless of quality, crowding the markets with everything in the shape of fruit that would sell.

What shall we do about it? Stop planting and discourage this great and important industry? By no means. But rather let us follow the example of progressive and wide-awake horticulturists. Cut down all old, wornout, used-up and dilapidated orchards, and plant new ones, with but few varieties, and these such as meet with the demands of the markets of today, mostly of choice red fruit, desirable always and salable everywhere.

Then cultivate thoroughly, just like a gardener, have the surface loose two or three inches deep, and thoroughly pulverized. Have low heads with trunks not more than two feet; prune but little; allow no grain, grass or weeds to occupy the ground; cultivate its root crops whilst the orchard is young, and when it is five years old cultivate for fruit alone.

Do not allow the trees to overbear, thin out the fruit by hand-picking. Commence when the fruit is the size of a marble. Be careful to first pick out all that is scabby, wormy or ill-shaped, and boil it in water till cooked thouroughly to kill the larvæ of the codling moth and all fungus growths. Then thin enough more so that the fruit left will

have room and strength of tree enough to mature its fruit in its normal size, color and perfection. Pick when ripe, but do not leave it on the trees until overripe. Throw out all wormy and imperfect fruit and use it for vinegar or hog feed. Pack the sound and perfect fruit in new, clean barrels, of standard size, and in the best style. If you say that all this won't pay, I answer, do not deceive yourselves; I know that it will.

Our progressive orchardists are reporting the fruit of their orchards sold at good paying prices. N. F. Murray & Sons, of Holt county, sold theirs to a New York firm for $140 an acre. Some orchards sold last year for very nearly as much. Others in the same vicinity were sold at good and profitable prices, and yet there are many orchards in the same county that they could not afford to buy at any price, because the fruit was of such a character that it would not pay the freight to New York. Bear in mind that it costs just as much for barrels and freight and to pick and pack a barrel of poor fruit, that sells for a dollar, as it does one of the best and most desirable quality, that sells for three and four times as much. I conclude, then, it pays to plant new orchards in place of trying to infuse life into a dead one, to plant desirable varieties that command the markets, to thin the fruit early in the season so as to husband the vitality of the trees and to bring perfect fruit, to pick carefully, pack only selected fruit in standard packages, and always expect the best price the market affords. No poor man can afford to come short in these respects, and no rich man will.

N. F. MURRAY.

DAN CARPENTER'S VIEWS.

Mr. Geo. Longman—My experience is very limited, but so far as it goes it is decidedly in favor of thinning. It gives better size, more perfect fruit and, I think, improves the quality. I think the size will be improved enough to give equally as much in quantity. Unless it is thinned excessively and with a view to reduce the quantity as well as improve the size, I doubt the advisability of such a course. With improved quality we may hope for increased export trade, and with a normal financial condition at home, when labor is fully employed, I have little fear of supply being in excess of demand.

Fruit is entering more largely into the daily consumption of the laboring classes as food; and if labor was employed, as it should be, the demand for and consumption of fruits of all kinds would be such as to command fair prices. Thinning should be practiced to improve the size, color and perfection of the fruit, and such usually bring fair prices, even with excessive crops made up, as they are, largely of small and imperfect fruits.

Respectfully,

DAN CARPENTER, Barry, Mo.

THINNING PEACHES.

Mr. Geo. Longman—I hardly feel competent to furnish anything that would be of practical value to such learned body of men as you will meet. I do know, however, that it pays me to thin fruit. My peach trees today are heavily loaded with rich green foliage, as bright as in July, showing that they are perfectly healthy and vigorous. I believe that heroic thinning of the peach will make it a long lived tree.

I have letters this season from many different persons throughout the North testifying that they never saw peaches that excelled my fruit, either in size, general appearance or quality, and I take it for granted that I could not bring about such results without thinning. Many growers in the State this year were satisfied if their peaches netted them $1 per bushel, but I had no trouble in getting $2.50 per bushel on the cars here for all the strictly fancy fruit that I had. All this is due to thinning and thorough cultivation.

In the peach I do not know that thinning limits the quality at all. I do not get as many specimens, but those left grow so large that I have about as many or more bushels of marketable fruit as I would have if no thinning was done. Six inches apart on the limbs on an average is close enough for this fruit.

I have confined my remarks to the peach, from the fact that it is the only fruit, except a few plums, that I have ever thinned.

S. W. GILBERT.

THURSDAY, December 5—9 a. m.

Business Meeting.

Mr. W. A. Gardner was appointed to send a telegram of greeting and congratulation to the Minnesota State Horticultural Society in meeting assembled.

The following message was received in return :

MINNEAPOLIS, MINN., December 5, 1895.

L. A. Goodman, Secretary Missouri State Horticultural Society, Neosho, Mo.:

We heartily reciprocate your kindly greeting; let us shake hands.

A. W. LATHAM,
Sec'y Minn. State Horticultural Society.

To the Hon. President of the Missouri State Horticultural Society, in executive session at Neosho, Mo.:

DEAR SIR—We desire to extend fraternal greetings to you and the Missouri State Horticultural Society, and wish for you a most successful and profitable session. The time

has come when the State Horticultural Societies of the Union are gleaming in the grandeur of their glory in progress, prosperity, position and power, and their valuable work is being recognized as telling factors in this avenue of human industry.

Yours fraternally,

J. R. JOHNSON,

Vice-Pres. American Ass'n of Nurserymen for Texas.

Mrs. J. R. Johnson, Ex-Sec'y Texas State Horticultural Soc'y.

To the Members of the Missouri State Horticultural Society at Neosho:

MR. PRESIDENT AND GENTLEMEN—Regretting my inability to be present at your session today, I must content myself to give you a hearty greeting with pen and ink, and to add for your careful consideration the following minute, namely: In view of the fact that our hundreds of thousands of bushels of the so-called Big Red Apple does not satisfy the demand for a better dessert apple than the Ben Davis, as it is in evidence that Canada Bellflowers are imported into St. Louis, and are quoted at $3.50 per barrel, and that a demand for the Lady apple could only be filled at Circleville, Ohio, at $2.50 per barrel, transportation added (other like incidents might be multiplied): and in the further fact that only about 10 per cent or less of Missouri's horticulturists contemplate or think of establishing commercial orchards, that therefore the State Horticultural Society recommend and favor the cultivation of fine known dessert fruits (apples); and

2. That a committee of at least three members from each county, men of experience in apple-growing, and good judges of flavor, aroma and keeping qualities, be selected, who shall for their respective county or locality report the names of such superior apples as are known to do well in their section. And, further, that the Secretary be requested to publish such lists (with brief notes from the reporter), in order that a new-comer may be advised of the merits and qualities of such fruits, and govern himself accordingly in setting out new orchards. Had I the privilege of being present, I should certainly (if permission could be obtained) advocate the adoption of such a measure.

Very respectfully, yours for the best apple,

CHAS. W. MURTFELDT.

To the Missouri State Horticultural Society, in session at Neosho:

MR. PRESIDENT—Finding myself still on the Committee of Ornithology, I will attempt a brief report. Two years ago the black birds were hard on our cherries. It is seldom that we have a show to get even one mess of our sweet cherries, and we hardly expect it. That same year the brown thrush did yeoman service to help make way with our red raspberries, and also to take our grapes, although the grapes were "bagged." We have only four Early Richmond cherry trees, but they are such prolific annual bearers that we can spare a good share of the crop to the birds. The season just passed the birds did some damage on berries and cherries, but none of them took the grapes. Of these, many branches were left to decay on the vines, there being such an abundance that none could be sold.

I can not appreciate any considerable deminution in the annual crop of insects, and am of opinion that they (the birds) prefer grain, sweet corn and fruits to worms.

Respectfully submitted,

CHAS. W. MURTFELDT.

REPORTS OF COUNTY SOCIETIES.

OREGON COUNTY.

Officers—I. M. Culver, President ; J. D. Alderson, Secretary ; P. W. Sargent, Vice-President ; D. C. Huxley, Treasurer.

Sixteen members.

Meetings held first Saturday in each month, held alternately at Kashkonong and Thayer, and occasionally at homes of members. But few papers are read, discussions predominating.

The fruit crop as a whole was a moderate one.

Our trees and plants are in fine shape for a full crop another year.

S. W. GILBERT, Thayer, Mo.

SARCOXIE.

We, the undersigned committee, beg leave to offer the following report on the Sarcoxie Horticultural Association :

The Sarcoxie Horticultural Association meets on Thursday evening on or before the full moon of each month.

Officers—J. M. Davidson, President; James H. Foster, Vice-President; Henry Adkins, Secretary; John W. Osborn, Treasurer. Henry Adkins, James H. Foster and J. C. Reynolds, Executive Committee.

Annual election on the regular meeting in November.

Object: To advance the interest in growing and shipping fruits.

The Sarcoxie Horticultural Association was organized November, 1890, with sixteen members and sixty-five acres in strawberries. Now we have eighty-five members and 500 acres in strawberries, besides a number of fine young orchards.

First year we shipped fourteen cars of berries. Last year we shipped forty-three full cars, besides the express shipments off of 200

acres, and there were seventeen cars of apples sold through the efforts of the Society, which brought to our town about $40,000.

Prospect for next year's crop is good.

Society in good working order, with $300 in the treasury.

HENRY ADKINS,
JAS. H. FOSTER,
W. T. BURKHOLDER,
Committee.

GREENE COUNTY.

President, S. S. Hazelton; Secretary, G. W. Hopkins; Treasurer, J. Kirchgraber.

We meet the first Saturday in each month at the homes of the members and have a fine dinner and the business meeting afterward. Attendance usually about 40. We have had some very fine papers on different subjects.

JASPER COUNTY.

S. S. Riley, President; F. A. Hubbard, Vice-President; Z. T. Russell, Secretary and Treasurer.

The Jasper County Horticultural Society has about 20 members who attend meetings occasionally, four of whom have paid their dues for 1895. Meetings are usually held monthly, but for 1895 only three meetings have been held—all at Carthage. No papers have been read except one by the President on "Orcharding." Berry-box wood was again obtained through the Society.

The fruit crop was a good one. Apples were large and unusually free from worms and blemishes of all kinds, and the crop was a very large one, but the value in the aggregate is unknown to me. Pears, plums and cherries all produced good crops and sold at fair prices. Peaches were a failure. Strawberries a medium crop and raspberries a light one. Blackberriess a good crop and good prices. Prospects for the future not encouraging.

Z. T. RUSSELL, Sec'y.

LACLEDE COUNTY.

The Laclede County Horticultural Society is in a prosperous condition, though decreased somewhat in membership, yet it is made up of faithful earnest workers, and on the whole the orchard interest is

on the increase and many orchards will be planted this fall and winter. Our county has shipped about 110 cars of apples. We are not in the small fruit business, more than enough for home use. The officers are: A. Melson, President; E. B. Kellerman, Secretary.

Forty active members.

HOWELL COUNTY.

Geo. Comley, President; G. Tyler, Secretary and Treasurer.

The South Missouri Fruit-Growers Association have a good growing membership; 25 at present. We hold our meetings at Willow Springs, Howell county, Mo., the last Saturday of each month. We discuss all questions of importance to fruit-growers and farmers. And the people of our neighborhood are fast beginning to realize the necessity of mixing more mind with their muscle, and thus make their farm lives more pleasant as well as profitable.

GEO. COMLEY.

NEWTON COUNTY.

Newton County Horticultural Society, organized October 5, 1895, with 13 charter members.

Officers: John M. Purdy, President, Neosho; W. T. Bailey, Vice-President, Wentworth; H. S. Sturgis, Secretary, Neosho; F. H. Speak man, Treasurer; Geo. Hatzfeld, John Jaeger and J. M. Armstrong, Executive Committee.

Present membership, 22. Regular meetings first Saturday of each month.

LINN COUNTY.

We have just passed through one of the most abundant and low-priced fruit seasons. The different varieties of apples, pears, peaches, plums, etc., seemed to vie with each other in the matter of production. Varieties known heretofore as "shy bearers" were "in it" this season. Even quite young trees of such varieties as Huntsman and Lawver bore a few apples. Among the varieties of apple not so well known, in this section at least, which bore this season, was Stump, McIntosh Red, Bottle Greening, Mann, Allen's Choice and Gano. I think the two most beautiful apples I saw during the season was Chenango Strawberry, season July and August, and McIntosh Red, season August

to October. Early apples, with the exception of Maiden Blush and a few other good keeping varieties, were worth practically nothing, and and the main part of the crop rotted on the ground.

Twig blight of the apple did considerable damage. Varieties most affected by it in this section are Lowell, Willow Twig, Stark and Talman Sweet. I shall root out Talman and Lowell on this account, as I believe they infect other trees. The Ben Davis has not only sustained its good reputation, but has gained several points in the estimation of planters and buyers. In pears the "Ben Davis place" is still held by the Keiffer, in plums by the Wild Goose, and in cherries by the Early Richmond, with the Montgomery a close second.

The Kansas raspberry has behaved well the past season. The fruit is large and fine and the plant is strong, robust and healthy. The strawberry crop was practically ruined by cold weather after the fruit had set. Nearly everything in the fruit line made a remarkably good growth and is going into winter quarters in good shape.

G. A. TURNER, Meadville, Mo.

COLE COUNTY.

We have 35 members in our Society. Officers—J. W. Edwards, President, Jefferson City; J. A. Hunter, Vice-President, Bass; A. J. Davis, Secretary, Jefferson City; Walter Barker, Treasurer, Jefferson City; members enrolled are 35. Our Society extends thanks to J. C. Evans, N. F. Murray and A. Nelson, for attendance and valuable information so freely given at our regular meeting in February last. Also, the following members of our State Society: G. B. Lamm, Sedalia; R. T. Murphy and J. L. Erwin of Callaway; Albert Newman, Rolla; Jno. L. Bagby, New Haven. We extend to the State Society a cordial invitation to hold their next meeting at Jefferson City, where they will receive a royal reception from the people of our town, and our local society will feast them on strawberries and cream. We made a small display of fruit at our regular meeting in November, and the prospects of our county ranking as one of the fruit-producing counties of the State is more favorable than it was one year ago.

Another year has passed with its pleasures and profits, disappointments and failures; but to the true horticulturist his occupation means health and pleasure, with or without profit. The orchards of our county produced very heavy crops of choice fruit the past season. The hot winds of September caused the fruit to drop badly, and our farmers gathered it up and dumped all varieties together into a com-

mon farm wagon and hauled it over rough roads a distance of from three to twenty miles and tried to dispose of it in Jefferson City with the market in a glutted condition. Is it any wonder that they claim there is no money in fruit culture? If our farmers and fruit growers would build them good bank cellars, provided with double doors and ventilators so that they could hold their fruit until there was a demand for it, we would hear less of failure and more of profits. Another cause of our farmers' failure to make the orchard pay is they have altogether too many varieties, especially of summer and autumn varieties. If our fruit-growers would select not over three varieties of the hardiest and most productive kinds adapted to our soil and climate, they would soon find the orchard to be the most profitable portion of the farm. Our soil is one of the best, if not the very best, in the State for the production of all fruits grown in our latitude. All the small fruits grow to perfection in our rich, genial soil. There was about $10,000 worth of strawberries sold on the Omaha market the past season that were grown in our county; besides, there was quite a large quantity of cherries, plums, peaches and apples shipped from the county. Of the amount I have no data at hand on which to base an estimate. If our fruit-growers and shippers would report the amounts received from export sales to the Secretary of our local society so that it could be embodied in his annual report to the State Society, it would aid materially in advancing the interests of our county as well as to attract the attention of fruit buyers.

The following is a partial list of men who are planting commercial orchards in our county: L. V. Dix, J. W. Edwards, Alex. Stewart, David Dougherty, U. R. Wells, Henry Hintges, Frank Distler, Geo. W. Spurr, Theo. Schweigert, and several others have declared their intention of planting out good-sized orchards in the near future.

Our society meets first Mondays in February and November at the court-house in Jefferson City, other meetings held in different parts of our county are arranged by the Executive Committee.

A. J. Davis, Secretary.

BENTON COUNTY, ARKANSAS.

The Benton County Horticultural Society met at Bentonville, Jan. 8th, 1896. President Cordell called to order and the minutes of the last meeting were read and corrected. The last report should have said that Mr. Gano thought the Etris apple was the same as the Gano.

This being the annual meeting, reports of the officers were called for. President Cordell read his report as follows:

Gentlemen and Members of the Society—In my review of events transpiring in the cycle of time marked by today's monthly meeting—which is also our annual meeting—I shall be brief, having no triumphs to recount, although nothing has occurred in that time to discourage a man possessed of sufficient energy to battle with the natural enemies of the farmer and horticulturist. Our membership has been about stationary, our committee work has been about the usual order, but perhaps a little less labor was performed in the way of investigating insect enemies than in the previous year.

Our monthly meetings, though not large, have generally proved full of interest and of more than ordinary value to those in attendance. Some of our members who were here in a perfunctory manner at first have so grown into the work, and expanded with the work of the Society that I believe they would be loth indeed to dispense with what they have come to regard as a pleasurable recurrence. In this connection, one thing must always seem a mystery to us, viz: that where at least one hundred men and women should meet, full of interest, ten to twenty marks the limit. They tell us on the streets, "we can't bear in mind your meeting days, but we always read with great interest your published proceedings."

We shall have a report from the Secretary and Treasurer which releives me from entering into details more fully, but I must be allowed right here to drop a note of warning: The profuse fruit crop of 1895, may bequeath to us a legacy that will linger longer and produce more direful results than the weary labors and low prices. The defective fruit, of which there were thousands of bushels, will produce winged insects by millions, ready to contend for their share of the fruit of 1896. Foresight and preventive measures may do much to reduce losses from this source to a minimum. Our duty lies along this line.

Allow me to renew my plea for help for the Secretary. His duties while not irksome are too exacting to permit him to take any part in our discussions.

The claims upon our time occasioned by the heavy fruit crop prevented us from making any display away from home, but we had several creditable displays at home, both of grapes and of apples. I hope this feature of our work will be improved on each succeeding year.

How to dispose of the fruit is destined to become a question second only in importance to that of how to produce the very best quality. In this connection comes the question of good roads. These we must and will have. They are of the utmost importance to every industry

in the State, but to the fruit-grower, indispensible. If organization has any potency, if combined influence has any weight, let ours be used on the right side of this question. If we cannot enlist the whole population, may we not at least interest all fruit-growers in a measure so practicable, so important in its application and so unquestionably promotive of the public good.

The permanence of the Benton County Horticultural Society is no longer problematical; it is here to stay. With the hope that we shall all unite in promoting its efficiency, this report is submitted.

J. R. CORDELL.

The Secretary read his report:

To the President and Members of Benton County Horticultural Society—It becomes my duty as Secretary to report the work of the past year. The actual membership of the Society is 14, though a few whose duties are unpaid will, perhaps, entitle us to a membership of 17. The regular meetings of January, May and September were not held for lack of a quorum.

Papers have been read as follows: "Whole vs. Piece Root Grafts," J. Alvin Dickson; "The Farmer's Garden," W. H. Fry; "Cow-peas as an Orchard Crop," Dr. N. B. Cotton; "Birds as Aids to Horticulture," Maj. Geo. Bill; "Why Do We Plant?" Carl L. Brunskog; Poem, "Autum Days Not Melancholy," Maj. Bill. These papers and many other questions have been ably discussed by experienced horticulturists, and as Secretary, I have kept a record of the ideas expressed as well as I could. A fuller record of the opinions of a few members who attend these meetings would be of great value, and so far as I have been able to record them, they are generally read and highly appreciated as published in the Benton County Democrat.

As reported elsewhere, the income from the membership fees is slightly less than the expenditures, and the Society should raise its annual membership fees from its present low price of 40 cents, unless more than 15 or 20 persons should be found willing to aid the Society by their active membership.

At the last meeting of the Society I was instructed to ascertain from shippers, evaporators, freight agents and others, the amount of apples sold in Benton county in the year 1895. It has not been possible to get exact figures in every case, but it is believed these figures are nearly correct: There has been shipped out on 1083 cars 519,960 bushels of apples. There have been evaporated 211,000 bushels by 17 evaporators. The distillery at Bentonville has used 140,000 bushels and the cider factory at Rogers has used 35,000 bushels. Evaporated

and green apples yet to sell are estimated to be 94,040 bushels, or enough to make our sales a million bushels.

The amount consumed by families, the amount wasted in the orchards, and those still on hand for family use may be estimated at another million bushels.

Two million bushels is more likely to be under than over the apple product of Benton county in 1895. It may be doubted whether the million bushels sold has brought in over $150,000.

These statistics are largely the work of J. Alvin Dickson, and to the courtesy of the agents of the Kansas City, Pittsburg & Gulf road, and others.

It is appropriate and fortunate at the close of the year 1895 that we can thus sum up our horticultural triumphs after having faithfully recorded our numerous discomfitures.

Respectfully submitted,

I. B. LAWTON, Secretary.

The Treasurer, Dr. Cotton, reported as follows:

Balance on hand last report	$36 00	
Membership fees in 1895	5 70	
Total		$41 70
EXPENDITURES.		
For rent	6 00	
Postage and stationery	1 00	
Total expenses		7 00
Balace on hands		34 70

The Executive Committee compared the Secretary's and Treasurer's books and pronounced the Treasurer's report correct. By motion, all reports were accepted.

Mr. Geo Miller had a basket of sweet apples for distribution and to get the name. The members present pronounced it a seedling. It is a red, fair sized apple and no doubt an excellent keeper, as the samples brought were solid and free from any defect. Mr. Miller said even the dropped apples kept well and the tree was a good bearer.

On motion, the matter of publishing the proceeding of the Horticultural Society since its organization in a pamphlet form was referred to the Library committee, with instructions to report at the next meeting the probable cost of such publication.

Article five of the constitution was so amended that the meetings of December, January and February should commence at 10 a. m., and the meetings at all other months at 1 p. m.

The election of officers for 1896 resulted in the choice of J. R. Cordell, President; C. J. Eld, Vice-President; I. B. Lawton, Secretary; Dr. N. B. Cotton, Treasurer; Maj. Geo. Bill, J. Alvin Dickson, Executive Committee.

The President then appointed the following standing committee:

Committee on investigation of diseases of fruit trees—Maj. Geo. Bill, G. C. Davis, W. H. Fry, J. C. Rucker and Dr. Cotton.

On motion, the Library committee was continued. It is composed of J. R. Cordell, G. C. Davis and Dr. Cotton.

The President appointed Dr. Cotton to read a paper on spraying at the February meeting. Also appointed I. B. Lawton to read a paper on grasses.

On motion, adjourned to the first Wednesday in February at 10 a. m. I. B. LAWTON, Secretary.

A committee was appointed to confer with Mr. Hartzell in regard to his proposition concerning his plan of keeping fruit. The committee consists of Messrs. N. F. Murray, A. Nelson and A. H. Gilkerson.

Pure Water Spraying.

After spraying for years with all manner of poisons this old veteran of Nodaway county, Mo., a native of New England, says that spraying with pure water is a sure and valuable means of saving all manner of tree fruit from destruction by insect pests. One thorough spraying is sufficient. Time for spraying when full bloom is at greatest glory of blooming. He calls this period of fruiting time being born. Pure water cleansing at time of birth he says is most valuable in fruit as well as new born men and women. Pure water spraying is surely worthy a very thorough test, like friend Gilbert made with poison, of which he informed us so fully. Yours truly,

HARTZELL.

PROPOSITION.

To place in the full possession of all who are or may become members of the Society, my complete plan of keeping fruit in such way so that success in keeping fruit by this plan cannot be a failure to any one governed by the "plan."

The plan is, and must remain a secret for the benefit of those who desire to be benefited by the plan.

This is, therefore, a request asking the State Society, for a committee of three or more members of the Society to confer with me in

regard to the best means of bestowing the plan with all its completeness upon those who will accept it, and be fully governed by the plan. Many persons have accepted my formula, and paid for it, and then neglected it entirely; therefore, for the benefit of the more progressive, who will accept and use the plan, shall surely be benefited thereby. No one who has been governed by my plan ever failed, but all such have succeeded, and now my plan is more complete and more easily followed. No one can afford to experiment longer on plans of keeping fruit that have always failed, but they can afford to accept my plan and go by it until they can get something better. My plan as now completed is a true and reliable guide to anyone who will accept and be governed by it, which is very easily and cheaply done, by anyone willing to stop experimenting. I would be pleased to have a good committee, willing to correspond, and be ready to report at the June meeting next summer, 1896, at which time I expect to make an old-fruit exhibit.

Yours very truly,

CONRAD HARTZELL.

TRENTON, MO., Jan. 15, 1896.

L. A. GOODMAN:

DEAR SIR—In reply to your request I will give you a brief write-up of my patented "Insect Destroyer." It is an appliance to kill the borers, eggs and fungus parasites and in fruit trees quickly, cheaply and surely, without marring the tree with knife or other instrument. With it I propose to do away with 75 to 90 per cent of the labor and cost and all the risk from failure in "worming" fruit trees.

Broadly described, my appliance consists of a "jacket" with clamp and springs constructed to hold hot or poisoned water or other liquid about the lower body or stump roots of a fruit tree until the object is accomplished, which, with hot water, requires but from one to three minutes.

A single application yearly, after the borer fly has finished her laying, will keep a tree clean of worms and other parasites. A little boy can do the work easily and thoroughly, and treat from 100 to 150 trees a day, and expert, experienced men more accordingly.

It will take a little while to convince orchardists generally that scalding will not hurt trees, but they will soon learn it, and in meantime they can use any one of the numerous known liquid insecticides, only more slowly in operation.

As for the results of hot water, I will refer to my brother, Judge John O. Greene, of New Albany, Indiana, who has been scalding his peach trees for eight years, and who failed in an effort to kill some by scalding.

I hope to be able to furnish scalders in any quantities, with full printed instructions, for use early this spring. They will be made in three sizes:

No. 1 for trees under four inches in deameter No. 2, for trees over four and under eight inches. No. 3, for trees over eight and under 12 inches. Few orchardists will need the larger size. The price will be about $3, or two for $5.

Yours truly,

J. W. GREENE, D. D. S.

NEW CAMBRIA, MO., Jan. 26, 1896.

Mr. L. A. GOODMAN, Westport, Mo.

DEAR SIR—I thank you for horticultural report you kindly sent me lately. I live in the hills west of Charlton river where there are many sorts of soil, mostly, to my belief, good fruit land. Different fruits behave rather contrary here to rules of the books. I have the following apple trees adjoining one another, planted in 1882: Porter, M. Blush, Mo. Pip.,

Smith Cider, R. Beauty and R. Astrichan, all thrifty. Astrichan never bears more than from 1 to 12 apples at a time. R. Beauty bears young, overbears worse than Janiton. S. Cider always O. K., but no keeper. Mo. Pip. scabby, water core and useless, but it is good 40 rods away on poor land. M. Blush is much inferior to Porter every way every year. W. Twig is about equal to B. Davis, a slower grower and bearer and hardier, but fruit culls bad often on account of bitter root. I plant 99 per cent B. Davis. If I am not mistaken in variety, the Gilpin does well here in one orchard.

If it is not asking too much of you, will you make a few suggestions which will be an improvement on the following: I propose to plant 200 trees standard Seckel or Tyson pear, in rich, deep black side-hill soil, then top butt or graft thereon some of the new varieties—not Kelfer or Garber. How would Early Margaret, etc., do? I would like early bearers, etc., not coming in competition with Kelfer, Garber, or say Cal. pears, if such exist.

I have Garber and Kelfer, but I believe there is room for the best fruits remaining.

Yours truly,

E. L. WILLIAMS.

To the Missouri State Horticultural Society:

A letter was read at Trenton from A. Nelson, of Lebanon, Mo., in which he said that the Ben Davis apple originated in Kentucky nearly one hundred years ago, and was known as the Kentucky Red Streak.

The Ben Davis, or New York Pippin, originated in Howard county, Mo., about five miles south of Glasgow, and was known as the Hutchinson Pippin, or New York Pippin. My father lived on a farm adjoining this Hutchinson farm, on which the apple grew, so that I know these to be facts. My father and I grafted of this tree about sixty-five years ago. I am now in my seventy-fifth year. My only purpose in telling this is to give a true history of the apple. It went by the name of New York Pippin, or Hutchinson Pippin, and we grafted that apple on down to the present time.

The New York Pippin, Ben Davis and Kentucky Red are all different varieties, but close akin. The New York is the largest and finest apple. It can be distinguished by its having warts on the stem end of the apple or on the twigs.

ABSOLUM MCCRARY.

Origin of the Ben Davis.

The Ben Davis apple was brought originally from North Carolina along with a lot of other seedling apples. The Davis family moved to Kentucky and set the original Davis orchard in Butler county. The Hill family moved to Illinois and took along some grafts from the Kentucky orchard. The apple proving valuable, the question naturally came up as to what the apple should be named, and the answer came, "Ben Davis," for it was Ben Davis who brought the seedling sprout from North Carolina.

This apple is no doubt planted over a wider section of the country than is any other variety. A part of the original orchard is still in bearing condition.—Farm and Garden.

Origin of the Ben Davis Apple.

Editor Rural World: I have seen in the Rural World several attempts to give the origin of the Ben Davis apple. I cannot give the origin, but I can give the history of it in Southern Illinois from "away

back." My father migrated from Kentucky to Southern Illinois (White county) in 1819. In 1823 he planted out an orchard, most of which were seedlings, but had at least 25 Ben Davis apples. My father got his grafts, or slips, (did his own grafting) from a neighbor, a Mr. Funkhouser, and he from a Mr. Newman, who lived 12 miles further south in the same county. Mr. Newman brought the grafts from Kentucky previous to 1820, but I can't say how long; but the twigs were cut from Newman's trees that made Funkhouser's trees, and from Mr. Funkhouser's trees that made my father's. In the Newman neighborhood they were called the Newman apple and in Burnt Prairie or the Funkhouser neighborhood (Funk apple). After a few years we got the name of New York Pippin. For all I know or care, the Ben Davis apple had many origins, but the above is the way they got to Southern Illinois.

A near neighbor of ours went into the nursery business about 1838 or 1839, raised the New York Pippin extensively, and was the only nursery within our knowledge. They were spread far and wide; had then, as now, poor as they are in flavor, a great reputation. Of course, I have the word of others, but the above is a correct history of this apple in Southern Illinois. I am 70 years old, was born in this county, and the Ben Davis appie antedates me here quite a number of years.

EZEKIEL HENSINGER, Burnt Prairie, Ill.

Fruit Growing.

At your request for an article for the February number of your paper on fruit-growing, I will comply, and trust that after forty years' study and active practice in the nursery business and orchard-growing, twenty-seven of which have been spent in Holt county, Missouri, where, from a small capital to start on, through a knowledge of fruit-growing, I have made a success of it, I may now be able to contribute something that will encourage and aid new beginners in the business.

First, I will say that fruit-growing under the most favorable conditions, like every other industry, has its drawbacks and difficulties to be overcome. And it is well that it has, or fruit would have no commercial value. God created man and gave him dominion in this world and designed that he should work and overcome the many obstacles that would block the way to success and lead to the highest plain of civilization. When we go to market we sell the product of our labor. If it cost no labor to produce it, we would soon find no market.

The reason why some make money and others fail in the same industry (and this is true of every business and every profession) is not so much because one labors so much harder than the other. Both may work hard from sun to sun, one succeed and the other fail. Now, why this difference? Simply because one understands his business thoroughly and every move and every lick struck is directed by intelligence, while the other man doesn't understand his business, and every move and every lick is in the wrong direction and can never bring him success.

I have known men who were exceedingly industrious, always worked hard, early and late, year in and year out, who never had time to read or visit, who could not afford to even take a paper or buy a book, and with all his hard work could not make a good living for his family or rise in the world, simply because he was firmly anchored down by ignorance and groped his way in darkness. Now, I am quite sure that success in life is the happy goal we all desire to reach.

To all who are engaged in fruit-growing, permit me to say: If you expect success you must read and study the very best books and papers obtainable on the subject. Join a horticultural society, attend its meetings, take time to visit some of the leading fruit-growers of your section and learn all you possibly can and carry your knowledge into practice. Be energetic, strike out boldly, have faith in God, in your country, in your business, in your fellow man, in yourself, and you need not, will not and cannot fail to win success.

Having seen eleven of our states and having read up on fruit-growing in the most favored sections of the world, I am now prepared to say that I feel sure there is no other state in the Union that offers so many advantages to the fruit-grower as Missouri, especially the south half of the state, where choice fruit land can be had at prices ranging from twenty dollars to five dollars an acre and convienent to railroad stations.

But right here some of your readers may take a scare at these low prices and imagine there is something surely wrong with the country. I know that there is an impression abroad that South Missouri is a broken, worthless country, that the people are "moss-backs" and fifty years behind the times.

Having been over the State several times in Farmers' Institute work, I want to disabuse the minds of the people on these points. As to the country in general, some of it is rough and rocky, but a large per cent of it lays very well, is as level as need be. The country is well watered and healthy, climate mild, and the winters are short. Grass, grain and vegetables can all be grown in abundance and of the

best quality, while for all kinds of fruit-growing it is unexcelled. The towns and cities have all the modern improvements, such as water-works, electric lights, churches, schools and colleges. As to intelligence the people will compare favorably with those of any other part of the State.

With all these advantages offered by South Missouri, it seems strange to me to see men in many places renting land at three and four dollars per acre to farm. I know of many such now selling their corn at fifteen and twenty cents, and in some instances it will take the crop to pay the rent, leaving nothing for the farmer to live on. How much better it would be to own a home in South Missouri, if only forty acres, and grow fruit, for which a large tract is not required. It takes a capitalist to improve and carry on a large plantation like the Olden farm, but a man of fair intelligence and industry can, with a very small amount of money, improve a small place, make a comfortable home, and not only have the necessaries of life, but such luxuries as no one but a fruit-grower may know.

N. F. MURRAY, Oregon, Holt County, Mo.

Report of Secretary L. A. Goodman.

As the years go on we should learn more and more what to do and how to do it, but how few of us can prove that this is true of ourselves. The more we learn of all these things about the growth of trees and plants the more we stand in awe at the vast amount we know nothing of. Today we think we have some rule to follow, or some fact to guide us, when only tomorrow we will find the whole foundation knocked from under us. Today we see all sunshine before us and tomorrow clouds cover the sky. Today we are worrying over the poor prospects of a crop and tomorrow we find these dispersed and bright hopes shining out. Today we find a bounteous crop in plain view, but tomorrow we find it destroyed by a sudden storm or the crop so plenty that it seems hardly worth the marketing. We grumble and worry and find fault with all about us when we know not what we say or do.

When will we learn that two things are sure, disappointment and death? We think we know our success only in that we succeed, but such is not the case. Oftimes our success is in what seemes to us failure. We get too eager and too uneasy; we do not wait for things to take their course; we want to push matters along and so too often push them over the precipice into the sea. If we Americans would or could learn to be patient in our business, and not in too much of a

hurry, then we would enjoy our success and not have it grinding our lives out with extra business, extra cares, extra responsibilities.

The year has been one of strange surprises. We had the severe cold that destroyed most of the peach crop in the southern part of the State, and yet in the northern part the crop was a full one. The spring was one of the dryest we have ever seen, and yet when the rains came the trees responded so vigorously that we have never before seen such a growth on our young trees. It seemed in the spring that we might not have an apple, but when fall came everyone was wondering what to do with his enormous crop. The same people who allowed hundreds of thousands of bushels to go to waste and hundreds of thousands more to be sold from ten to twenty cents per bushel, are now without a peck in their cellars, while apples are bringing more per bushel than they did per barrel a few weeks ago. The warning so often given, "take care of your apples," was unheeded in far too many cases.

The whole song we heard all during the summer was: "The wonderful crop of fruit and what shall be done with it?" All the papers had to say, the greatest crop of apples Missouri ever had will be this year. The buyers from the East reiterated it, and added the false story of the great crop in the East. The farmers sang the song aloud over and over, but further than this, they left thousands of bushels of their apples to rot because of the surplus. What is the result? Today the surplus has gone into the hands of the speculator.

The cold storage houses are filled with the best apples that they have ever had, and there will be enough to supply the needs of the people, but the prices will be very high and the farmers get no benefit. The Jonathan apple is selling now in Kansas City for $2 per bushel, the Grimes Golden for the same, choice Winesap and Huntsman for $1.50 and Ben. Davis for $2.50 per barrel. Those who would not save their apples at 20 cents now have none to sell at 60 cents. When will we learn to take care of our products?

The growth of the fruit business has been a steady and rapid one in many parts of our State. Millions of trees have been planted during the last few years, and the end is not yet. From what has just been said we may understand what our product would have been worth if our farmers and fruit-growers could have held a part of their fruit until the present time or a few months later. It becomes us, therefore, to be prepared to take care of our fruit when we have it.

A sort of Western horticulture has grown up that is tending to spread over our country so that fruit-growing will be made as much a business as any other in our land. How will and how can this grow?

Because there are a hundred people who eat fruit now where one did twenty years ago, and these seasons of cheap fruit are a blessing in disguise to all our fruit-growers since they develop a liking for fruits that will take no refusal. Thousands will have a taste of fruit this year that have never had it before, and they will call for it ever after when not too expensive. From the first of the strawberries, all the way through the season there has been an abundance of fruit seldom seen even in this productive West, and although the prices have ruled low yet there is such a demand that we shall not see the end and the taste acquired will be our future market.

The strawberry crop of the State was worth a half million dollars. The raspberry and blackberry crop a quarter million each. The grape crop another million, peaches, $250,000, cherries and plums, $100,000 each, and other fruits another hundred thousand, besides and above the apple crop, worth a cool $10,000,000, making the fruit of the State worth more than $12,000,000, this year of hard times, fault-finding and uneasiness.

We complain the most when we have the most to do. We fail to succeed when we let too many idle moments pass by. No farmer has any right to be idle or lazy. If the farmer or fruit-grower will keep busy he will not fail of success in Missouri. If all the idle moments spent by our people at the stores, at the depots, in the saloons or on the streets could be put to producing something for them to eat and wear there would be no poor people in our land. If there could be added to this all the money spent for whisky and tobacco they could have homes also. No energetic young man with good health need go without a home as long as land can be had for $5 per acre where crops never fail, in this the State of all States, Missouri.

May I mention a mistake of our fruit men for their consideration? A great number wrote me in September that they would have one, three, five, ten thousand bushels of apples and they did not know what they were to do with them. At the last moment when everything should have been in readiness, it dawned upon them that they had no way to handle their fruit. What would they think of a merchant, or a grainman, or a stock-raiser, or a manufacturer who would let their products go to waste because they had not prepared to care for it! Make you a cellar or other place to store your fruits.

A fruit cellar for the storage of apples for the winter seems a necessity and a growing demand is made for such a place. An excavation into the side of a hill, making it as wide and deep as the necessities demand, is the best storage place for apples for the winter. The entrance to this cave must be strong and substantial, with logs for the

roof and sides, and then covered with soil from the cellar. An outer door, and then a short passage way to the inner door, where the cellar proper begins, is required. If a person can afford it, this outer wall and cover might be made of stone and then would be permanent. In some places the roof of the cellar proper might need the support of timbers, if made very wide; in other places the roof would be of stone and only need supports to make it as large as it might need.

If found impossible to get the side hill as here outlined, then the next best plan would be to select some location where the drainage is good and scrape out the cellar, only have it not to exceed 16 feet wide and as long as necessary. After excavation set a row of posts through the center and place a strong heavy ridge-pole on top of them. Set a row of posts on each side of the excavation with strong poles on top of them. Use logs for the cover and lay them close together; fill the cracks so that the dirt will not sift through and then cover it all with the soil; have the soil well packed, so that the rain will not penetrate. A ventilator at the rear end, extending to the floor with a valve opening at the top of the cellar, should be put in, so that cold air can be admitted to the bottom of the cellar or warm air can be taken out from the top.

Bins made on each side for the reception of the apples will be sufficient. Apples placed in bulk thus will keep much better than when placed on shelves. Keeping the air from the fruit will hold fruit much better than allowing the air to pass over the fruit.

If the apples are to be barreled, then put them into barrels loosely and stack the barrels one on top of the other until the cellar is full. When you wish to sell, take the barrels down, empty on tables prepared for the purpose, and sort out and pack ready for market.

Where these cellars cannot be made, then a double house with the space filled with sawdust and the roof double and filled with sawdust also, will be the next best thing, but much more expensive. A foot or ten inches of space should be allowed for the filling, in order that the temperature may not change in the house.

If we keep in mind the fact that it is the changes of temperature that injures fruit more than anything except "too warm," we can easily understand the necessity of care in the building.

Overproduction has been a bugaboo for lo these many years. This year we hear more of it than ever before, and too many have listened to the song until they have come to believe it and let thousands of bushels of apples and other fruit rot on the ground. Have you learned the lesson of having valuable market varieties to sell? On one side you will hear the cry, We have too many Ben Davis; and on the other

the refrain, If all my apples had been Ben Davis my crop would have been worth double. The scare of overproduction is answered by the solution of the question of transportation. If our transportation companies will only arrange to put our fruit where it is wanted there will be a long time pass away before we will be over supplied. In October of this year, while apples were being packed in Missouri at $1 to $1.25 per barrel, in Illinois and Michigan they sold for $1.50 per bushel.

Missouri is fast stepping to the front in the production of fruit, and especially of apples. New York, Ohio and Missouri is the order at this date, and it will not be five years before we will be first on the list. Hundreds of orchards have been and are being planted, having one, two three or four hundred acres, and it is getting to be a business of itself. May I urge upon you more thorough work in what we do? Let us prepare the ground better, let us plant better, let us cultivate better, let us wash, spray, prune, train, gather, pack and market better than ever before, and we shall soon see the result in good prices, bet-prices, the best of prices.

Our fruit show at St. Louis most of you know of it and its success. The reports that I made to the horticultural papers you have read. I believe that ours is the only Society that has ever attempted so many and so extensive exhibits, covering such a great territory and such a long time. One or two counties do not do it all, but a map showing all the counties making a display will cover many parts of the State. I show such a map to you with all the counties colored red which were represented. The good accomplished is, first, it shows that we are a live people and a live Society in developing our resources; second, it shows to out-siders that Missouri is a great fruit-producing country; third, it creates an interest among our own people in these fine fruits; fourth, it helps to create an appetite for fruit instead of meats among our city people; fifth, it educates the people as to varieties, productiveness, hardiness and keeping qualities; sixth, it gives the buyers an opportunity to compare varieties grown in different sections and locate them; seventh, it gives the counties making a show an increased prominence, people soon begin to inquire where it is, and what kind of people live there and what lands are worth, the kind of soil, the waters, the prairies, the timber, products, and soon are going there to examine them for themselves—one tells two, two tell four, four tell eight, and already they are coming to Missouri to settle.

These fruit displays and the work of this Society with the help of our local organizations and the horticultural press have all been instrumental in bringing about this happy result. You are now and will see

coming to Missouri the greatest stream of steady immigration that she has ever known.

MISSOURI FRUITS AT THE EXPOSITION.

Editor Rural World—I have noticed with a great deal of pleasure and satisfaction the interesting articles in the Rural about our fruit show and urging different counties to send in fruits for the display.

All the fruit that has been sent in has been very perfect and handsome. Some of the largest specimens I have ever seen have been on the tables. Pears from Jasper county that weighed 22 ounces. Apples from Buchanan, Crawford, Newton, Texas, Holt, Lawrence that weighed from 21 to 24 ounces, and measured 13½ inches to 16 inches in circumference. Big apples attract the attention of the people and no mistake. We have had admirers from morning until night and the usual old story is heard, "I did not know that Missouri could grow such fine apples," when the State is covered with them from one end to the other. A larger collection or a better one was never got together even by Missouri. The beauty of the specimens, the perfectness, the care in handling and the condition on the tables is the admiration of all, even the best fruit-men.

I shall find it impossible to give the names of those who furnished them, for some packages came without names. I think, however, that I have the names of every county and have given them proper place, credit and attention.

While our show has been a great success thus far, yet the hot weather has affected the fruit so badly that we have had to replace it often, and it will take more fruit than we expected to carry the display through the 40 days. I may, therefore, ask the counties to see to it that their tables are kept full.

At this writing there are 38 counties making an exhibit, and we have promise of a number of more before the Exposition closes. We should be delighted if one-half of the counties should make a display before the close, although we have nearly the number already, that we counted upon, before we began. Our number was 40.

Following is the list arranged alphabetically: Bates, Boone, Buchanan, Barry, Clay, Chariton, Crawford, Cole, Dallas, Dent, DeKalb, Franklin, Gasconade, Greene, Henry, Howell, Holt, Jackson, Johnson, Jefferson, Jasper, Livingston, Laclede, Linn, Lawrence, Lafayette, Newton, Miller, McDonald, Oregon, Platte, Putnam, Pike, Shannon, St. Louis, Texas, Vernon, Wayne—total, 38.

The condition of these county displays will depend upon the fruit men of the State, especially during this hot weather. All of the cold storage fruit has been put upon the tables, and all know how short a time it lasts. As the fruits ripens and get better color, we can replace all this fruit with better. The Society is receiving deserved praise for undertaking such a display and keeping it up for so long. All honor therefore, to our members and fruit-men, who so nobly uphold the cause of our State.

L. A. GOODMAN, Secretary.

OUR FRUIT SHOW.

Editor Rural World—Since my last communication our fruit show has been improving more and more each day. While we have not extended the scope of the display for want of room, yet we have been renewing the specimens with better and more mature ones that show the characteristics of each variety to perfection. Such splendid specimens of Winesap, Jonathan, Grimes' Golden, Willow Twig, Rome Beauty, Monmoth Pippin, Bellflower, Huntsman, Ladyfinger, Nonsuch, and a hundred others, and are seen each day upon our tables. There have been added to our display exhibits from Cooper county, Wright county, Stone county and Christian county, making 42 counties thus far heard from. At gathering time, now, is the time to send in your best colored and most perfect specimens to make the best showing.

L. A. GOODMAN, Sec'y.

MISSOURI FRUIT SHOW.

The display of fruit at the St. Louis Exposition is, as the Rural World predicted it would be, one of the finest State shows ever made on the American continent. It is fine in quality, full in variety, and as a complete whole is simply magnificent. True, the season here has been almost perfect; equally true is it that the trees were in the best possible condition for fruitage; and with the facilities afforded by the refrigerators the early fruits have been so kept as to be in excellent condition to show alongside of the larger and finer later varieties. But very few plums, peaches or grapes are exhibited; but the show of pears is good, both in quality and variety, and that of apples simply superb.

The fragrance of the fruit captures the olfactories the moment one commences to ascend the stairs, and on the floor of the room on which it is shown it is dispensed nearly through the entire space, thus invit-

ing the attention of visitors to one of the most characteristic displays of purely Missouri products in the entire Exposition.

The counties making displays are duly named by large cards a foot long, so that each has credit for what it has done, and as well for what it is capable of doing in the production of fruit. These are Buchanan. Lafayette, DeKalb, Platte, Holt, Howard, Miller, Jackson, Clay, St, Louis, Franklin, Wayne, Putnam and Laclede. Others will, in all probability, be added as the days pass; but those who are backward are losing the good that may be done them by advertising themselves to the ten or twenty thousands of people who daily throng the naves of the great building.

It would be invidious at this time to make comparisons as to which counties have the largest exhibits, the greatest varieties, or the finest fruits. Of course, one cannot help noticing these as he stops in front of each; but some are better able than others, some better prepared, whilst some others have a lack of enterprising men willing to undertake the labor and expense of gathering the fruit and sending it for exhibition. These will all be made known in time, and the best will insure highest results.

Mr. L. A. Goodman, Secretary, and Hon. N. F. Murray, Vice-President, are in charge, both of them thoroughly conversant with the fruit-growing interests of the State, and largely identified therewith; they are, therefore, fully qualified to give to strangers and visitors all the information they ask for, and to speak for the State generally.—Colman's Rural World.

The Show of Missouri Fruits.

The exhibition of one of the most successful displays of fruit which the Missouri State Horticultural Society ever made was brought to an end on Saturday night last, when the St. Louis Exposition closed its doors, after a successful run of 40 days. The fruit show far exceeded that of last year in quantity, size, number of varieties, perfectness of specimens, color, condition and quality. I believe that no other room in the entire building was more attractive to the general public, and to fruit-growers and buyers particularly, than the horticultural room, except, perhaps, the art gallery.

We have had on exhibition nearly all the varieties of apples that are grown in this State, from the earliest of the Yellow Transparent to the Little Romanite, making a long list of 227 varieties, and affording an object lesson to every one who cared to examine them, and a

true and comprehensive idea of the wonderful variety and unsurpassed quality of apples grown here.

They were shown in all sizes, from the largest Gloria Mundy to the small Lady apple, running from 16½ inches in circumference, and weighing 26 ounces, to that of the smallest Lady apple, weighing one ounce; and yet each and every one as perfect an apple as can be found. The exhibition was a more general one than was ever made before by the counties of the State, 47 counties being represented.

The counties which sent exhibits all did well, sending of their best the most perfect specimens, even though not large in quantity in every case; still, the quality was such as to make it respective in character, and a fair example of what Missouri can do when put to the test.

The pear exhibit was almost as perfect as that of the apple; embracing as it did the earliest, the latest, and all the standard varieties between. The display of the Duchess alone was at one time a sight worthy of admiration, for there were specimens in numbers that weighed 24 ounces, and many others equally large; 12 of them weighing 17 pounds. The lagest pears came from Jasper county, and the largest apples from Texas county.

The grape exhibit was not as large as might have been, but was very complete, and in quality perfect.

Peaches were exhibited from but a few counties, and the largest and finest, as well as the greatest variety, came from St. Louis county. This display was sustained until the close of the Exposition with Salway, Mixon's Late, Bilyou, Henrietta, La Grange and Bonanza.

The display of plums was fine, so long as it lasted, and the last one in the State was Wayland, from Jasper county.

The finest quinces were the Missouri Mammoth, from Howell county, and they were the largest I ever saw.

THE LARGEST AND FINEST.

The largest and finest Ben Davis apples came from Buchanan and Miller counties; the largest Rome Beauty and Smith's Cider from Oregon county; the largest Winesaps from Jasper and Jefferson counties; the largest Willow Twigs were from Crawford; the largest Huntsman's Favorite from Cooper and Linn; the largest Missouri Pippin from Lawrence; the largest Jonathan from Vernon and Dent; the largest Grimes' Golden from Newton and Greene; the largest Keiffer pears from Warren and Franklin, and the largest Willow Twig from Cole county.

OTHER HONORS.

The only apple on exhibition that sustained itself from the opening till the close was the Flora Bell, and it became as yellow as an orange. The finest collection of crab apples was from Jasper. The most beautiful crab was the Florence. The most beautiful apple was the Gano, from Warren county. The handsomest pear was the Flemish Beauty, from Crawford county. The most attractively colored apples were from Holt. The largest collection of early varieties of apples and pears were sent from Park College.

THE BEST DISPLAYS.

It would be impossible to say which county made the best display or the second best. Sometimes one county had it and then again another. The end had in view in making the show was accomplished when the spectators had seen what the respective counties could do and had done, and then what the State as a whole was able to do under normal circumstances. The following named, in their alphabetical order, are the counties entitled to honor as exhibitors: Barry, Buchanan, Bates, Boone, Cole, Christian, Clay, Chariton, Cooper, Crawford, Dallas, DeKalb, Dent, Franklin, Gasconade, Greene, Holt, Howell, Henry, Johnson, Jefferson, Jasper, Jackson, Laclede, Lawrence, Linn, Lafayette, Livingston, McDonald, Montgomery, Miller, Newton, Oregon, Pike, Platte, Putnam, St. Louis, Shannon, Ste. Genevieve, St. Charles, Stone, Texas, Vernon, Wright, Wayne, Warren, Washington.

L. A. GOODMAN, Sec'y.

The Late Fruit Show.

Editor Rural World—It was quite satisfactory to have people from different parts of the State come to admire the fruits of their locality, glad to see their part of the State represented; it was more satisfactory when the men who made the exhibit came to see the display and seemed surprised at the magnificent showing. But it was most satisfactory when we saw and heard people from other states express their admiration for the display and their surprise at the size and beauty of the specimens.

Many home-seekers came to inquire about the different parts of the State for their future home. Many apple buyers came to seek location for the purchase of apples in 10, 20, 40 and 100 car lots; nearly everyone of them wanting to get all their fruit at one place if possible.

This great influx of buyers has been the cause of the rapid increase in the price of our apples. In fact, this result was forseen at the start, because of the poor crop in the East. All apples well taken care of until the surplus is worked off will pay their owners a large per cent.

The exhibit as a whole was most satisfactory; to our Society, to the Exposition management, and we feel sure will be of much benefit to the State.

Near close of the exhitit the manager of "Missouri on Wheels," Mr. Frazier, came for a collection of fruits for his cars, and it was thought best to make a selection for him of five or six barrels for that purpose, which was done. Four barrels more were selected for the display at our winter meeting at Neosho, December 3, 4 and 5, and the rest were given to the railroad men, to the officers of the Exposition and the helpers there.

There were used during the 40 days about 125 barrels of apples. This large quantity was necessary on account of the very hot weather during September making it necessary to replenish the fruit much oftener that we otherwise would have done. At the close of the exhibit there were about 30 barrels of fruit on the tables, which were disposed of as reported above.

The Exposition management expressed themselves as well pleased with the exhibit, and requested that we repeat it again next year. It is a long and wearisome task to keep up such an exhibit, and no one knows how hard it is unless he has attempted it. The result will prove that it was a valuable one, and the State Society adds another to its long list of important efforts for the benefit of the State by advertising her fruit lands.

To the fruit-growers of the State, to those who so unselfishly gave of their time in sending specimens for the benefit of their counties, and to the nurserymen who sent such beautiful specimens of evergreens, the Society returns its best thanks. To those who responded to the call for help at St. Louis when help was most needed, we wish also to express our obligations. Above all are we indebted to the agricultural and horticultural papers, as well as many of our local papers for the enthusiastic manner in which they presented it to their people, and to these papers is due much of the success attained.

In the placing of these exhibits a great many apples were named incorrectly. It was my aim to always send to the party who sent them, the correct names. A matter of great importance is this correct nomenclature. Our apples will have a much higher standing if they can be correctly labled under all conditions; so that when a party buys a

barrel of Rome Beauty this time and wishes another barrel the next time he will not get Missouri Pippin or some other variety.

LOCAL SOCIETIES.

Some seven or eight local societies have been organized during the last year, and two co-operative societies for the selling of fruits. It will be a good day when we can have one or two large associations that will put all our fruit where most needed, and in uniform packages as well as make the proper rates for transportation. This great question of surplus fruit will be solved when our transportation companies will see the necessity of either moving the fruit at a low rate or not at all. I know of a few cases, and especially of one man, our treasurer, who made such an arrangement and secured a half rate for car lots on apples to our northern and eastern points. The local societies can do much in this same line of work and it behooves us well to organize for this purpose. We should have one society at least in all our fruit counties and their work should be not only the growing and proper care of fruit, but the packing and especially the transportation of the crops to market.

Our work is first one of development, of advertising our possibilities, of securing the best localities for our orchards, and of finding out the adaptability of different fruits to different locations, soil and climate. Second, one of concentration of our effort to do well what is done, to properly care for what we have undertaken, and to do right whatever we do. Third, one of instruction, that is trying to have the right thing done in planting, in cultivation, in fighting disease and insects, in pruning, and finally in packing, marketing and transportation. I can not follow these thoughts out more closely for want of time, but can only intimate to you our line of work and say that I feel sure that the State Society has done much to bring about success in these matters during the last twelve years of its work.

Our future, as our past, will be successful if we follow out the lines of work indicated. This time of specialties is the time when we will have our hands full if we attend to business closely. We will find avenues opening up for the student and experimentor such, as we little dream of today, and places to work for practical experience and work to your heart's content. Our future will be a successful one as long as we present a united front to the work. It is the desire of your officers that unity in our cause and with only one idea in mind, the best interests of our State, we shall go forward to accomplish still greater ends. Even now we occupy no mean position in the galaxy of states either in our fruit business or as a society, but instead are filling as

high a place as any sister state, and the Society is held up abroad as a model for others to follow. Let us then with a united effort press forward to the fulfillment of our high aims and occupy the field that stretches out in plain view before us. Our part in this is to do our best in every department of our work and to let this work and its results be known. Watch closely, work intelligently, be in earnest, accept suggestions, ask questions, seek to improve and success will follow.

L. A. GOODMAN, Sec'y.

REPORT OF A. NELSON, TREASURER, Dec. 3, 1895.

	RECEIPTS.		
June 17..	Balance from June settlemet		$547 53
17..	Membership received by L. A. Goodman		30 00
17..	" " A. Nelson		39 00
July 20...	Cash of State Treasurer		601 13
Oct. 14...	" "		746 45
Nov. 4...	" St Louis Exposition		236 81
	Total		2,200 92
	EXPENSES.		
June 15..	Miss M. E. Murtfeldt	100 00	
	Warrant No. 303		100 00
17...	Salary of Secretary	66 66	
17...	Express	1 55	
17...	L. A. Goodman, trip to Neosho, $9.45, hotel, $4.50	13 95	
	Warrant No. 304		82 16
17...	Premiums paid at Willow Springs	24 35	
17...	Expenses L. A. Goodman, $17, of A. Nelson, $25	42 00	
17...	" J. C. Evans, $15, of N. F. Murray, $35	50 00	
	Tablets, stamps, etc. $4.85, stenographer, $10	14 85	
	Warrant No. 305		131 20
21...	Paid G. B. Lamm, $10, premiums and express, $6.45	16 45	
	Warrant No. 306		16 45
29...	P. O. bill, $15, fruit report, $4	19 00	
July 20...	L. A. Goodman, trip to Carthage, $9, hotel, $4	13 00	
	Warrant No 307		32 00
20...	Paid St. Louis Refrigerator Co	50 00	
31...	A. Nelson trip to West Plains	15 00	
	Warrant No. 308		65 00
31...	P. O. bill, $11.15, freight and express, $5.20	16 35	
31...	Wrapping paper and twine, $6.95, Hudson, printing, $15.00	21 95	
31...	Salary of Secretary	66 66	
	Warrant No. 309		104 96
Aug. 24..	L. A. Goodman, to St. Louis and return	9 50	
24..	L. A. Goodman, to Neosho	6 50	
24..	P. O. bill, $24.70, freight and express, $4.85	29 55	
	Warrant No. 310		45 55
24..	Tribune Printing Co., $15.00, stamps, 60c	15 60	
24..	Express and packing reports	19 65	
24..	Freight on reports from Jefferson City	6 65	
24..	Hudson, printing, $2.50, salary of secretary, $66.66	69 16	
	Warrant No. 311		111 06

REPORT OF TREASURER—Continued.

Sept. 27..	P. O. bill, $38.29	$38 29	
	Warrant No. 312		$38 29
Sept. 30..	Freight on reports	7 50	
30..	Printing P. O. cards	2 50	
30..	Paid Pac. Express, $11.25; Wells-Fargo & Co, $8.05	19 50	
30..	Paid Adams, $7.70; Salary of Secretary, $66.66	74 36	
	Warrant No. 313		103 66
30..	Expenses of L. A. Goodman and money paid out as per bill	53 45	
	Warrant No. 314		53 45
30..	Money paid out at St. Louis Exposition as per bills Nos. 1 to 75.	224 48	
	Warrant No. 315		224 48
Oct. 14..	Paid Adams Express Co. (express) as per bills	40 21	
	Warrant No. 316		40 21
23..	Expenses of L. A. Goodman and money paid at St. L. as per bill	83 85	
23..	Salary of Secretary	66 66	
	Warrant No. 317		160 51
23..	Money paid out at St. Louis Exposition as per bills Nos. 76 to 107	65 83	
	Warrant No. 318		65 83
Nov. 6..	Stamps and telegram	2 44	
6..	A. Nelson expenses at St. Louis	16 30	
	Warrant No. 319		18 74
30..	Society expense account as per bills	162 99	
30..	Salary of Secretary	66 66	
	Warrant No. 320		229 65
	Total		$1613 20
	Leaving balance in hands of Treasurer		587 72
			$2200 92

NEOSHO, Mo , Dec. 5, 1895.

We, the Finance Committee, have examined the accounts of our Treasurer, Mr. A. Nelson. Have found receipted bills and acknowledgments for each and every item, and vouchers properly signed.

JOHN T. SNODGRASS,
M. BUTTERFIELD,
A. H. GILKERSON,
Committee.

By a vote of the Society, the regular rules of election of officers were suspended. The re-election of each of the officers of the Society was carried by a unanimous vote.

Mr. Tippin—Just at this time I have a resolution that I want to offer to the Society, and I do it in view of the fact that in union there is strength, and the stronger our forces are, the more power we are enabled to exercise over our legislative bodies, and are enabled to reach the common interests, and to that end I offer this resolution, which I hope will receive the unanimous vote of the Society:

Resolved, That the State Horticultural Society of Missouri, in convention assembled, do recommend to the State Legislature that the Constitution of the State Society be so amended as to permit the enlargement of the Executive Board, which is now composed of

the President, First and Second Vice-Presidents, Secretary and Treasurer, by the addition of three Vice-Presidents, to be selected from sections of the State not represented, and that they be regularly elected by the State Society.

The resolution was approved.

The following invitations for the next meetings were received and referred to the Executive Committee:

JEFFERSON CITY, MO., February 15, 1896.

Hon. L. A. GOODMAN, Westport, Mo.:

DEAR SIR—I enclose you herewith a copy of a resolution, adopted by our Club at a recent meeting, inviting your Society to meet here at its next meeting. We would like very much to have you meet here, and assure you a hearty welcome should you conclude to do so.

I am yours very truly,

A. J. BAUER, Secretary.

JEFFERSON CITY, MO., Feb. 13, 1895.

Resolved, By the Directors of the Jefferson City Commercial Club that the Club does hereby extend to the members of the Missouri Horticultural Society a cordial invitation to make Jefferson City the place of its next annual meeting; and the Club assures the members of the Society, if the invitation is accepted, a hearty welcome to our city and the generous hospitality of its citizens.

ATTEST: A. J. BAUER, Secretary.

MARCELINE, MO., Dec. 3, 1895.

HON. L. A. GOODMAN, Neosho, Mo.:

YOUR HONOR—We have a movement on foot to organize a local society at this place, and I think there will be nothing in the way, and extend the invitation to have the Summer State meeting at this place. Mr. Williams offers the use of his beautiful park free for the meeting. This park has ample buildings and well adapted for the occasion. Hoping the Hon. Board will favor us with the appointment. Wishing you a successful and pleasant time at your present meeting, I am

Yours truly,

S. H. LINTON.

L. A GOODMAN, Secretary:

DEAR SIR—In behalf of the South Missouri Horticultural Society and the Mayor of the City of West Plains, I am instructed to cordially invite the Missouri State Horticultural Society to hold its next meeting (or Summer) meeting at West Plains.

JOHN T. SNODGRASS.

W. A. GARDNER, Secretary.

J. M. Rice, in behalf of Carterville, asked for the June meeting to be held in connection with a strawberry festival at Lakeside Park.

D. A. Robnett presented the invitation for the Winter meeting at Columbia.

Profs. H. J. Waters and J. C. Whitten spoke for the same in behalf of the State college.

A. H. Gilkerson invited the Society to meet in June at Pertle Springs, near Warrensburg.

G. A. Atwood delivered the invitation for the next annual meeting to be held at Springfield.

G. T. Tippin added his words of welcome, and Miss Emma Lindsay spoke in behalf of the ladies of Greene county.

Some Notes on the Life, Character and Works of Prof. C. V. Riley.

Prof. Charles Valentine Riley, whose sudden death on the 14th of September last was such an irreparable loss to his friends and to the interests of natural science in America, was an Englishman by birth and received his education in the elementary schools near London, and after the age of eleven at Deippe in France and Bonn in Germany. In all of these he was distinguished for his love of natural history, his proficiency in acquiring languages and his talent for drawing and painting. In 1860, at the age of 17, being thrown upon his own resources, he came to the United States and joined a friend of the family who had emigrated and located on a large stock farm about fifty miles from Chicago.

Here young Riley, although entirely unused to manual labor or hardship, remained for three years, working with characteristic industry and learning all the details of farm life, especially the care of stock and training of horses. In the intervals of harder work he cultivated Mrs. Edwards' flower garden, studied the botany and especially the entomology of the locality, both so different from those of Europe. Nor did he neglect his pencil, but used it with admirable skill in portraits of the family with whom he made his home, in sketches of his favorite animals, and in illustration of his notes on insects. Although the labor was arduous and exacting, he always reverted to those days on the farm as being not only incalculably valuable in fitting him for his after profession, but as having afforded him great and varied pleasures.

Early in 1863, however, he felt that he owed it to himself to seek some employment that would give greater scope to his abilities and enable him to use to greater advantage the educational training that he had received. Naturally he went to Chicago, and, after some disappointments and failures, which he met with invincible courage and determination, he secured a position in the office of the Evening Journal, and a few months later a still more congenial one on the Prairie Farmer, then published by the genial and discriminating H. D. Emery. Here his acquirements in natural history in general, and his—at that time very unusual, knowledge of the forms and habits of both destructive and beneficial insects, combined with his skill as an artist, soon made him almost indispensible to his employers and added greatly to the usefulness and attractiveness of the paper.

While in the office of the Prairie Farmer he pursued his entomological studies with great enthusiasm and with especial reference to the species most destructive to agricultural and horticultural products, and here began the collection that at his death was such a munificent gift to the National Museum.

His love of gardening and his realization of the value to his health of systematic out of door exercise, led him to undertake the care of Mr. Emery's suburban garden, in which he was only too welcome to plant and cultivate and experiment to his hearts content. He was also quite an athlete, practicing regularly in the gymnasium, and a daring swimmer, enjoying almost daily a morning tussle with the cold waves of Lake Michigan. In riding and driving he had become expert while on the farm, so that, although a close student, his tastes and development were more "all around" than those of most professional men.

During the years 1866-7, the Colorado beetle ravaged the potato fields of the Mississippi valey; wheat and corn suffered severely from chinch bug; the curculio was worse than ever before on plums and peaches, and many other pests appeared in field, garden and orchard. Agriculturists began to awaken to the necessity of taking some measures to defend themselves against the unnumbered hosts of insect foes that seemed to threaten the destruction of all their crops. Illinois had already voted a small sum of the public money to compensate Mr. B. D. Walsh for experiments in treating injurious insects and the preparation of articles for the enlightment of the public on their habits. Massachusetts and New York had also each employed an entomologist on very small salaries to do similar work. This had suggested the importance of some similar officer in Missouri—a State which, from its geographical situation, could not fail to be overrun with insect pests. Accordingly, early in 1868, through the efforts of Col. N. J. Colman, then a prominent member of the State Legislature, Dr. L. F. Morse, of the Journal of Agriculture, and my father, who had just taken an editorial position on the Rural World; an appropriation was obtained from the State, the office of State Entomologist was created and Mr. Riley was invited to fill it, a position which he accepted in April of the year mentioned.

Missouri has never been considered by her sister states as especially progressive in which, in many respects, they do her injustice, but of one enterprise she certainly may be proved, viz: that it was she who furnished the pecuniary means for the development of the tallents and capabilities of such a man as Prof. Riley, who may not only be justly regarded as the originator of the profession of economic

entomology, but one whose discoveries, investigations and inventions have not only covered him with glory in the scientific world and reflected honor on his State and country, but who has demonstrated the means by which millions of dollars may annually be saved to the wealth of the nation, by judicious treatment of destructive insects. It ought to be the glory of our State that she retained Mr. Riley in her service for nine years, during which he published those annual reports which are now regarded as classics of the science, and which are monuments of patient and persevering investigation, valuable discovery, and literary, and artistic expression. It was in these reports that the complete life histories of the periodical cicada or 17 year locust, the grape phylloxera, the Colorado potato beetle, the apple-root aphis, the plum curculio, the army worm, the Rocky Mountain locust or grasshopper, and many other prominent insect pests were first worked out, and the proper remedies, or the best possible precautionary measures suggested.

But Mr. Riley is so well known as an entomologist, inventor, artist and writer, that it is not necessary for me dwell on these points. It may not be so well known that he was an enthusiastic horticulturist and an ardent lover and most successful grower of flowers. As my father, who had been associated with him on the staff of the Prairie Farmer, was the only personal friend he had in St. Louis, he came directly to us on Clark avenue, and, as we were able to give him room, established his first office, as well as his home, in our house. Our back yard was as unpromising as the usual run of city yards, as we had not, ourselves, been in possession more than a few months.

It had two advantages, it was quite deep and extended southward from the house. It boasted two trees, an (Ailanthous and an old apple, beside the kitchen door. A brick walk extended down the center to the alley gate on each side of which were heaps of ashes, coal cinders and various other accumulations. But even in all these Mr. Riley's eye saw possibilities, and during our second spring in the city he, with a little help from a man with a wheel-barrow, first effected a general clearing up and then dug up and laid out beds on each side of the walk; those on one side he arranged should be cultivated by "the girls"—my sisters—while he would take the other side thus to stimulate all parties by rivalry, to extra exertions.

The coal cinder was utilized for narrow walks between the beds. A row of corn and one of sun-flowers were planted across the lower end. Along the unsightly board fences were planted tubers of Madeira vine and seeds of morning glories. Then the beds were thickly planted with geraniums, verbenas, plumbago, heliotrope, balsams, ageratum

coleus and others that I do not now recall. A few strong, blooming plants of tea roses added distinction to the little garden, and flourished as tea roses seldom do in the smoky air of the city. By the end of June this garden was a veritable box of flowers in a frame of green, and was the wonder and admiration of the neighborhood, and the constant delight of the young gardeners.

Upon our removal to Kirkwood the following autumn, Mr. Riley accompanying us, as much of this city garden as was possible, was transferred to the virgin soil and clearer air of the country, where "Mr. Riley's flower beds" were for several years the gems of our garden. His florist friends, not only in St. Louis, but in other parts of the country, took great pleasure in sending him whatever was new or unique in the line of bedding or window plants, the descendents of some of which we still cherish, in his memory among our choicest house adornments.

In 1877 our State Legislature failed to vote the biennial appropriation for the office of State Entomologist, and Mr. Riley then absorbed in the investigation of the Rocky Mountain grasshopper, which had so devastated all the country between the Rocky Mountains and the Mississippi river, decided to accept the position which had been tendered him, of Entomologist to the U. S. Department of Agriculture. This had not, previous to his acceptance, been an office of much prominence or pecuniary profit, but after some obstructions and delays Mr. Riley's abilities, not only as a scientist, but as an organizer and executive, succeeded in raising the Division of Entomology to the first rank among the subdivisions of the Department, with an appropriation adequate to its needs. With the advantages of a corps of able assistants many difficult and important investigations were undertaken, most of which were brought to a successful issue and won fresh laurels for their originator, and were the means of untold sums in the choicest product of the country. With the exception of about two years Prof. Riley held this position, becoming famous abroad as well as at home, and having the most coveted honors showered upon him, until the summer of 1894, when circumstances in the Department, combined with failing health, induced him to resign. Some years before he had donated his collection to the National Museum and the trustees of the Smithsonian Institution, had in acknowledgment of the munificent gift, made him Curator of Entomology for life. Here he had proposed to spend his remaining years, working upon the insect fauna of the country and developing many subjects of purely scientific interest which more practical matters had hitherto relegated to the back-ground. His friends and admirers will never cease to deplore the sad fate which

prevented the fulfillment of these and many other plans for the advancement of natural science.

Prof. Riley was married in 1878 to Miss Emelie Conzelman, the daughter of a prominent and wealthy citizen of St. Louis, who with six lovely children mourn his distressing and untimely death. He had invested quite largely in real estate in Washington and had built a number of houses. His first home was on 13th and K streets, a very unique and pretty house embowered in wisterias and climbing roses and with a little garden at the side that was crowded, not only with the loveliest flowers, but with souvenir plants and trees from England and the various haunts of his boyhood on the continent.

In 1890 he purchased a considerable tract of land on Washington heights, upon which he erected an almost palatial mansion, and surrounded it with fruit and flower gardens in which it was his delight to work mornings and evenings, cultivating his roses, pruning and training his vines and trees with such success that "Sunbury" was one of the noted "beauty spots" of the city.

Among his difficult horticultural achievements was the successful introduction of several English oaks, first planted in his ground on 13th street, and afterward when they were quite large trees, removed a distance of two or three miles to "Sunbury" without any apparent check to their growth.

Another of his hobbies was the growing of hardy orchids, of which he had, at the time of the writer's last visit, a very interesting collection.

Nature was especially generous to Prof. Riley, endowing him with a tall and graceful form, a face and head with striking beauty and great agility and strength, in addition to his rare mental gifts. The admirable traits in his character were his high ambitions, his inflaging industry, his perseverance and invincible determination to succeed in any enterprise in which he embarked. His strength of will enabled him to resist all temptations to pleasures that might in any way unfit him for the work to which he was devoted. His enthusiasm in his favorite science was so great that his associates could not fail to catch his spirit, and though he was very exacting and critical, his assistants always enjoyed his just appreciation of original discovery or other meritorious work. His death, in the prime of life, is felt by all who knew and honored him as a profound personal loss, and to his family who idolized him, it is an overwhelming affliction.

As many of the horticulturists of the State had for years been his friends and correspondents, as all had been benefited by his investiga-

tions and inventions, it seemed but just that his memory should be commemorated, although most inadequately, by these few words of appreciation and sorrow for his loss.

M. E. MURTFELDT.

Local Fruit Exhibits.

A marked characteristic of '95 is this—men are giving careful attention to the workings and results of long established institutions. This can be well termed the age of criticism and education.

Our financial system, our banking institutions, our methods of making laws and public roads, our common school system, and even our every-day methods of farming and doing business, are all receiving an unusaual amount of attention from every thoughtful citizen in the land. People are trying to understand the reason why; they want to know the causes for certain results; and as sure as the Anglo-Saxon blood flows in the veins of the American people, that sure they shall sooner or later know; and when they know they can be depended upon to choose the right. I want to tell you that that is one conclusion upon which is founded the hope of this republic; and the other is that when they have found the right, they may be allowed to follow the plans which they know are just to them.

This introduces me at once to my subject—"Local Fruit Exhibits."

I want to note the influences and results upon a people who participate in exhibits of this kind. I want to show how these exhibits tend to educate men of different occupations to observe and think along the same practical lines. They are a means of showing men their relation to each other.

When the consumers and producers come together and see the fine products of a country so arranged as to show how they meet the wants of man, then both realize how they are helpful and depending upon each other. They see the sphere each holds to the other. The one seeks to supply, the other seeks to be supplied. Both have wants that never would be supplied without the aid and co-operation of each. Thus they become naturally interested in each other, which interests build up the noblest nature of man.

After looking over the exhibits together, the consumer gives his order for so many Jonathan, Winesap, Jenneting or Ben Davis. The producer says, "I shall be pleased to furnish them to you." Now, if two honest men have met, ever after they are likely to be friends and appreciate the new and happy relationship which they just formed.

A local fruit exhibit also teaches those who make the display how to work in harmony and in a business-like way with their fellow men. Every county is entitled to an annual exhibit of its product; and a fair ground is not at all necessary.

Our exhibit this fall was held in a hall centrally located in the county seat. It was an object lesson to the one who supports the orchardist, as well as to the orchardist himself. Our success as fruit-growers depends on the consumer understanding certain things in connection with the uses of fruit. He learned many of them at this exhibit. The picture of beatiful fruits that the observer carries home in his mind are not easily forgotten.

He thinks how nice it would be to have a few bushels of that fine fruit in his cellar. The fruit-grower also seldom forgets the size and form and color of the most perfect specimens, and carries them home and compares them with the kind he raises on his own farm. This tends to help him raise the standard of perfection a little.

At these exhibits you learn much of the character of trees and fruits in your own locality which you never would otherwise find out. The kind which produces well and the people want is the kind to plant. I need scarcely speak of the social part. People, living in the same county, and knowing of each other for years through the papers, would sometimes seldom meet if it were not for these annual exhibits. As the merchant cultivates acquaintance, so must we.

As he shows his goods, so must we; as he greets his customers, so, too, must we. We must learn the business ways of the world in fruit-growing and fruit-selling. The exhibit affords a splendid opportunity for this. Then, too, how much more to be desired are the associations at an exhibit of this kind than at a modern fair where gambling, drinking and horse racing are the principal attractions. The schemers usually get the benefit at such places. The people are getting tired of such attempts. They see no material good from giving a thousand dollars to see Nancy Hanks go.

Let us support these demonstrations which do so much good and out of which grow so little evil. At our exhibits, in no case did anyone give and not receive. If we needed money we sold tickets to get it. If we needed premiums we gave the merchants an equivalent in advertising. If the exhibitor was at an expense to show fine products, he got his recompense in a premium. The people who came to see paid an admission and were rewarded with the pleasure of seeing the finest the community had, all nicely arranged at their convenience to inspect.

If the County Court assisted in paying the expense, as our court cheerfully did, every man, woman and child in the county will receive directly or indirectly some equivalent benefit. In much of Missouri we are agricultural and horticultural people, and the forces that build us up are the forces that make us a bright star in the galaxy of states. If we set these forces to work all over the State, we are doing, as a society, one needful thing to help men to pay their debts and accumulate a competency.

Better show us the road to prosperity than the road to poverty. Better encourage the industrious, and teach people to get returns from honest labor than to scheme for a living. I know that these exhibits aid the worthy and build up the hopes of the deserving.

In our county every thoughtful man expressed himself happily surprised at the good results and voluntarily promised their co-operation in the future. There are merchants and business men in every county of this State who will unite with the fruit-growers and assist in getting up such an exhibit. Take it in your own hands and you will like it better than a fair, which is conducted on the modern style. You will soon learn what is necessary to make them a success. Let us welcome among us all such blessings to which no sorrow is added. They strengthen the industrial avenues of life.

We may not think we could compete for a prize at Chicago or St. Louis, but there is no county in Missouri too poor in resources to have a creditable exhibit of its own products, and for its own people. You will be proud of what you can accomplish.

The ladies in our county superintended some departments and kept all the book entries. They made a creditable display of jellies, preserves, canned fruits, wines and fruits, and expressed themselves satisfied in every way. You may include the products of the garden, orchard, farm and dairy, if you wish. The way to have faith in the virtues of these things is to give them a fair trial and see the results for yourself and you will believe.

G. B. Lamm, Sedalia.

Co-operation.

Our Association has been favored with excellent papers on how to raise fruits, not only at this meeting, but at all the meetings this Association has held since its organization. Largely through the influence of these able and delightful addresses by enthusiastic horticulturists thousands of acres of Missouri woodlands and prairie have been planted to fruit trees and vines by old settlers and new comers,

who caught the inspiration vim-writers and speakers imparted to their minds.

The allurements of horticultural work have had much effect, as well as the anticipated profits in inducing men to invest money and labor in fruit-growing. Year by year the work has progressed; the slopes of the Ozarks have been cleared of oak and hickory, and in their places apple, peach and pear trees and grape vines are growing, producing fruits that contribute to the health and happiness, and morality, too, of tens of thousands less favored than we of Missouri, with our soil and climate so well adapted to growing the best things that come from the earth. Within a few years Missouri has become one of the first fruit-growing states, and she is to be the first if those who have the most experience in fruit-growing are not over sanguine in their hopes.

It can hardly be otherwise, friends, as the 70,000 square miles of Missouri are adapted to fruit-growing. In the northwest corner of the State our worthy Vice-President makes $100 an acre clear from his orchard, and in Newton county apples pay as well. All along our lines of railway, clear down into Arkansas, apple and peach orchards are being planted from a few acres to a thousand acres. With the best soil in America, and enough area to supply the country, Missouri is sure to lead in small fruits. We must not forget another fruit, one of the best good old earth has ever brought forth; let us add the grape to the list of fruits that will be grown most extensively in Missouri. Have we not the testimony of New York's most eminent horticulturist, Hon. Geo. T. Powell, that the soil of the Ozarks is unexcelled in America for growing grapes. There is abundant reason to form this opinion, for to what better purpose could the cheap mountain slopes be devoted? Grape growing has passed beyond the experimental stage. Vineyards of 10,000 and 20,000 vines have amply demonstrated the fact that Missouri will lead in grape growing.

Now, Mr. President, if this was a purely agricultural meeting, we should make other claims for Missouri's leadership in industrial resources. She is this year first in corn, is first in poultry, first in zinc, and so near first in hogs that she soon will be in the lead, for this State is rapidly gaining in farmer population, but her closest competitors in porcine products have all they can do to hold their population up to the census of 1890. One of these states actually lost last year in the total number of her inhabitants. Missouri cattle are not outranked by those in any other state, as was proven at the World's Fair.

In short, Missouri is at the very front in the products of the soil. Success and permanent pre-eminence, is, however, largely dependent

upon the manner our citizens conduct their enterprises. Having our orchards and berry fields, our vineyards with abundant crops, we must have a market. The surplus must be converted into cash.

This is the great question, and it is an overshadowing one. How can this immense crop of apples, of peaches and the small fruits be disposed of? Co-operation will do it—and this alone, unless we are willing to work for nothing, as some of our friends are doing in California and Florida. It ought not to be hard to do the sensible, the right, the practicable thing, but it does take long and earnest effort to secure justice. This is not work for the State; the Legislature cannot help us; we must simply act for ourselves in a sensible, practical way. In very truth, co-operation is another word for salvation, so far as success in fruit-growing is concerned. We must organize in a brotherly, human way in every county where there is fruit to ship. In counties where fruit-growing is conducted on an extensive scale more than one society will be required—in Howell, Wright, Webster, Greene, Jasper, Lawrence, Newton and other counties, some of which actually have two societies each, officered by men of untiring push and of unswerving integrity.

What will be the work of these societies?

To find a market for our products is the most important. If each man is to act by and for himself, fruit-growing will be a losing business, except to the few individuals or firms that have extensive orchards, but we are happy to know that the men who grow apples by the train load are working heartily and unselfishly for the grand principle. Mr. President, there is, we believe, such a thing as brotherhood on earth, and if there is, it must exist among horticulturists. To prove this, let us organize. Co-operation, of course, is especially required by the average man; it will enable him to get as cheap rates in freights and as high prices for his fruit as the thousand acre-grower gets, if his fruit grades as high. Now, it ought not to be necessary to urge men to make the most from their investment, but it is, and it frequently happens that services that are freely and unselfishly rendered are not appreciated, but real philanthropists do not consider the matter of compensation, even if it is to consist only of thanks. We know men who have earned a large monthly salary, who have not received, nor have they asked, a cent. They ought to have a unanimous, hearty thank you. We know of men who, but for co-operation, would be doing odd jobs as they could pick them up, who have bank accounts—strawberry profits. Co-operation will increase the list of bank depositors and lessen the number who pay the bank interest. But, gentlemen, the more indifference there is in this matter, the more need of

work. The leaven of co-operation is working, and after a little the whole State will rise to the occasion, and adjoining states will act with us.

By co-operation we can send agents into the great Northwest and into the far South, where apples are not grown. Practically this will cost us nothing, as the saving in commission will pay the agents' expenses. Commission men who can handle fruit in car-load lots, will charge less than if doing business with a hundred men. There are millions of Americans who have never tasted our Ben Davis, or our berries, who would buy them if they were for sale in their town. There are millions in other countries who want American apples. With organization the demand can be increased ten-fold; yes, twenty-fold. A good, strong society can do wonders; with a hundred or more of such societies, the full measure of our hopes could be realized.

Reasonable transportation rates can be secured by the co-operation of fruit-growers. The railroads will listen to the petition of a strong society, when it would not hear an individual.

Boxes, barrels and fertilizers should be bought by wholesale by each association. Sarcoxie growers have purchased their crates—150,000 of them—for next season's use—$8000 worth. When their berries are ripening at the rate of ten car-loads a day, they will not have to be bothered about getting boxes. They are ready for taking care of the 100 car loads they are sure to pick. Thanks to co-operation. There is much more that might be affected by co-operation. Neighbors can unite in building cold storage houses, in buying spraying outfits and in procuring many other supplies.

Every horticulturist should co-operate to secure horticultural education for our youth, to work in every way to elevate the delightful, the noble calling of producing the best, the most beautiful products of the orchard, field and garden. Another thing co-operation will do—it will elevate the profession of horticulture and of agriculture, the noblest calling, as Washington declared; it will bring men to have a greater respect for themselves and for their work.

This winter is the time to organize, and this society should encourage this movement. G. A. ATWOOD, Springfield, Mo.

THURSDAY, December 5—2 p. m.

After considerable discussion on the subject of co-operation in transportation, Mr. Rice proposed the following resolution, which was adopted :

Resolved, By State Society of Horticulture of Missouri, in Thirty-seventh session assembled, that as the apple acreage of the State has reached such immense proportions in Missouri, and prospective annual yield of such magnitude that it is necessary to protect the orchardists in selling their crop to have reliable data of conditions of crops, from blooming to maturity, acreage and variety that each producer of apples may know, the supply, and anticipate the demand, so as to realize a fair market value upon sales;

2nd, That the General Assembly of Missouri be petitioned to enact a law requiring and compelling each county or township assessor to list accurately every orchard in the State above 100 trees, noting variety, age, condition, time of ripening of each variety, grown on prairie or timbered land, and file such lists in duplicate, one copy of which to be filed with the Secretary of the State Board of Agriculture, who shall calculate the acreage of apples, vatieties, age, etc., and issue annually a bulletin, not less than 10,000 copies, for the use of the members of the Horticultural Society of Missouri.

3rd, That sufficient appropriation for publishing these bulletins be annually appropriated for the above use.

A motion made by G. B. Lamm to amend the constitution, by making the committee on horticultural education a standing committee, was adopted.

Land Ownership.

While this subject may not be considered really a horticultural one, yet land is the foundation of all horticulture, for it is the storehouse from which nearly all human wealth is drawn, since it nourishes the animals and plants which supply mankind with food and clothing. Besides the love of home and country and native land it is one of the finest atributes of the human heart, for civil pride is and always has been a great and controlling force among the affairs of men.

Patriotism is grand and ennobling, and we need it to keep green the memory of the fathers who gave us our free institutions, and to preserve them from the hand of the spoiler.

It was more than two thousand years after the first appearance of man upon the earth, before there was any record of individual land ownership, and the first we have was when Abraham bought the field containing the cave of Machpelah of the Sons of Heath. In all countries the law of might prevailed, and people lived in large families, or tribes, and cultivated as much land as they needed to supply their wants, or the neighboring tribes would allow.

About 1700 B. C., Jesoph bought the land of the Egyptians for the king, paying for it in coin. I suppose by this they must have owned it individually, but I find no record of it in any history.

The world was in such an unsettled condition that to own and hold possession of land for any length of time was simply impossible; so much so that the promise to Abraham to give him or his descendants the land of Canaan for a permanent possession, even after the lapse of 400 years, was considered a great blessing—a promise that

was abundantly realized—and the land of Canaan, that good land, flowing with milk and honey, was divided equally between the eleven tribes, two portions being given to Joseph, as the tribe of Levi could not receive any inheritance.

As to the division of the land, Josephus says in his quaint way: "Joshua sent one man out of every tribe, such as had the testimony of extraordinary virtue, who should measure the land faithfully, without any fallacy or deceit, and sent with them some geometricians who could not easily fail of knowing the truth on account of their skill in that art. He also gave them a charge to estimate the measure of that part of the land that was most fruitful, and what was not so good. For such is the nature of the land of Canaan that one may see large plains and such as are exceeding fit to produce fruit, which yet if they were compared to other parts of the country might be reckoned exceedingly fruitful; yet, if it be compared with the fields about Jericho and those that belong to Jerusalem will appear to be of no account at all."

At one time in Sparta, the land having been absorbed or taken possession of by the rich, leaving the masses of the people in poverty and distress, there was a redistribution of the land made, giving an equal portion to each citizen. This act of tyrany is a fair sample of the state of the common people in all of those ancient countries. The land was held by the kings and given to their favorites. When our Aryan ancestors first took possession of Briton, and founded the English nation, the land was divided among the freemen only, no laet or slave being permitted to hold land or real estate of any kind. For land with the German race seems, at a very early time, to have become everywhere the accompanyment of full freedom.

The freeman was strictly the freeholder, and the exercise of his full rights as a free member of the community to which he belonged became inseparable from the possession of his holding in it.

For a long time the plow land alone was permanently allotted in equal shares to the families of the freeman, though it was subject to fresh divisions as the number of claimants become greater. But the pasture and meadow land was common property among all freemen. But no laet or slave was permitted to have part or lot in the common land of the village. The ground which he tilled he held of some freeman of the tribe to whom he paid rent.

Land surveys were formerally constructed on a basis of points, whose positions were fixed astronomically. And in some countries this method of operation is still adopted, but as all astronomical observations are liable to more or less error arising from uncertainties

in the catalogued places of the moon and stars this system was finally discarded, and the trigonomical basis adopted.

The French Jesuits, who made a survey of China for the Emperor about 1730, being the first to discard the astronomical and adopt the trigonomical basis. The record of land surveys in the early settlement of this country are very obscure, historians taking up the political aspect of the country more than the agricultural and economic. I have found more on the subject of war in my researches than any other one branch. While war may have been an important thing in the settlement of a new country, yet its frequent occurrance speaks little for the civilization of the founder of this professedly Christian government.

And the unnecessary and prolix recital of all the details by the different historians, through whose profuse and wearisome tomes I have toiled in search of the few and meager facts I have been able to find on the subject of land surveys, are tiresome to say the least.

While war may be a necessary evil, yet land and its survey and proper distribution, to each citizen, is of much greater importance ; for land is the foundation of all prosperity, both national and individual. The fact is, without land, the agricultural interests of the country would be very much at sea.

The land, in the old original state, was surveyed in grants of almost any shape except squares.

The Spanish grants, being in many uncouth and odd shapes, the hatchet and cross prevailing, but they mostly bordered on some watercourse.

In Virginia and Kentucky the land was surveyed by individuals, and not by public authority, resulting in much distress and entailing a perfect labyrinth of judicial perplexities, through which it became necessary to pursue the landed property of the country to place it in a state of security. Surely in this case the sins of the fathers were visited on the children.

The present system of survey of the public lands in this country was inaugurated by Congress in 1785, passing an ordinance for ascertaining the mode of locating and disposing of land in the western territories. This ordinance required the surveyor to divide the said territory into townships of seven miles square by lines running due north and south and others crossing them at right angles. The plats of the townships respectively shall be marked by subdivisions into sections of one mile square, or 640 acres in the same direction, as the external lines, and numbered from 1 to 49, and these sections shall be subdivided into lots of 320 acres. This is the first record of the use of the

terms township snd section. Afterward the ordinance respecting the extent of townships was amended by striking out the words seven miles square and substituting the words six miles square. It was quite a while after the passage of this law before it occurred to those able, learned and wise law-makers that a township six miles square could not contain 49 sections one mile square.

The ordinance, as finally amended and passed, provided for townships six miles square, containing 36 sections of one mile square. The first public surveys were made under this ordinance. The townships, six miles square, were laid out in ranges, the townships being numbered from south to north and the ranges from east to west. The sections were numbered from 1 to 36, commencing with one in the southeast corner of the township and running from south to north in each tier.

In 1796 a new law was passed providing for the appointment of a surveyor-general, and further providing that the sections shall be numbered, respectively, beginning with the number 1 in the northeast section, and proceeding west and east alternately through the township, with progressive numbers, till the thirty-six be accomplished.

This method of numbering sections is still in use. The same law also provided that the land shall be divided by north and south lines run according to the true meridian, and by others crossing them at right angles, so as to form townships six miles square ; also, that the townships be subdivided into thirty-six sections, each of which contain 640 acres.

But in the execution of this law, it was found that the requirement that the lines of survey shall conform to true meridians, and that the townships shall be six miles square, taken together, involved a mathematical impossibility, due to the convergence of the meridians. So the law was again amended, and the words as nearly as may be inserted ; and now reads each section shall contain 640 acres, as nearly as may be. And the incompatibilities of the requirements of the law and practice were harmonized by the adoption of the following provisions :

First, the establishment of a principal meridian, conforming to the true meridian, and at right angles to it a base line, conforming to parallels of latitude.

Second, the establishment of standard parallels, conforming to parallels of latitude, initiated from the principle meridians at intervals of twenty-four miles, and extended east and west of the same.

Third, the establishment of guide meridians, conforming to true meridians, initiated upon the base line and successive standard parallels at intervals of twenty-four miles, resulting in tracts of land twenty-

four miles square, as nearly as may be, which shall be subdivided into tracts of land six miles square by two sets of lines, one conforming to true meridians, crossed by others conforming to parallels of latitude at intervals of six miles, containing 23,040 acres, as nearly as may be, and designated townships. Such townships shall be subdivided into thirty-six tracts, called sections, each of which shall contain 640 acres, as nearly as may be, by two sets of parallel lines—one set parallel to a true meridian, and the other conforming to parallels of latitude, mutually intersecting at intervals of one mile, and at right angles as nearly as may be. Any series of contiguous townships situated north and south of each other constitutes a range, while such a series situated in an east and west direction constitutes a tier.

The section lines are surveyed from south to north, and from east to west, in order to throw the excess or deficiency in measurement on the north and west sides of the townships.

Standard parallels shall be established at intervals of every twenty-four miles north and south of the base line, and guide meridians at intervals of every twenty-four miles east and west of the principle meridian, thus confining the errors resulting from conveyance of meridians and inaccuracies in measurement within comparatively small areas.

There is a growing restiveness at the inherited defects in our land laws which make a transfer of real estate so costly without insuring a perfect title. This evil does not affect the Western states, where land has been recently purchased from the Government; but in the older states it is a very serious matter. A person who has thousands of dollars to invest can purchase bonds or stocks, as well as any other movable property for a trifling commission and with absolute certainty as to title. But acquiring title to houses or farms is quite a different matter. It takes at least a month to examine the title. The lawyers and officials' bills are very costly, and there is really no assurance that your title is secure.

At the end of long years of possession it may be found that some dower right or party in interest had not given consent to a sale that took place some twenty years ago. And there are all manner of liens against real estate. Every time a title is transferred the work has to be done over again, and the purchaser has to pay needless and exasperating charges.

That this is not necessary is shown by the fact that in New Zealand, Australia and Prussia the acquiring of title to real estate is easy, inexpensive and certain. In those countries the government insures

the title, and all the absurd charges and complications affecting real estate have been abolished or were never in existence.

Efforts have been made to correct these anomalies, but there are lawyers and officials interested in the absurd system, so the patient people endure it and pay the bills.

To every one, old or young, man or woman, I would say, buy land and build a home, if you have none. It is good to own your own home, be it ever so small, and to own it free of any incumbrance. The ownership of land adds a dignity to character that nothing else does.

Besides, the pleasure of seeing things grow and to reflect that they belong to us, we plant a tree, and before we are aware it has budded and bloomed and borne fruit, and we are invited to a feast. It is our own tree. How proud we are of it, and how the children love to play beneath its shade and partake of its fruit, conscious of a joint ownership in it.

There is nothing in the universe so substantial as the earth upon which we walk. Change and uncertainty are all around. The heavens are bright or dark as the clouds come and go. The great sea is calm and anon tossed with tempest, but the land is at rest from age to age.

My friend, if you are anchored on to the soil upon which you dwell, you will be much better prepared to sing that grand old American anthem,

My country, 'tis of thee;
My own, my native land.

Miss E. Lindsay, Springfield, Mo.

Best Varieties and Plan of Growing Strawberries for Market.

The subject assigned me is one on which I have written papers so often that I feel a reluctance in again attempting to say anything that will be of interest to this experienced body of horticulturists.

On what I shall say I shall not attempt to dictate, or even advise, as to what varieties one shall plant, knowing as I do by experience that this is something which is governed by location, soil and climatic conditions.

As to the proper plans of growing strawberries, this is not a matter which is determined so much by the above conditions, but a plan may be adopted which will be successful everywhere.

Now, I am going to give my plan of growing strawberries, and the varieties which do best with me, and if anyone has something better, why, that is just what I am here to find out.

VARIETIES.

After an experience of more than 20 years in growing berries, I will say, without hesitation, that Bubach No. 5 has given me better satisfaction than any berry I have ever tested.

While it is not perfection (what berry is?), taking everything into consideration, one year with another, I would not exchange it for any of the newer varieties introduced of late years.

The plant is almost perfection. I do not believe it can be improved upon. Strong and vigorous, almost free from rust, and if properly fertilized, it never fails to bring up the entire crop of berries to perfection.

Some object to it on account of being too soft for long shipments. This is one of its faults, for, of course, it will not hold so long as the Capt. Jack and some others of the firmer varieties.

For two years in succession I have shipped a crate on order to private parties in New Orleans, and they have arrrived each time in perfect condition, after being 36 hours in transit. I am one who believes that there is more in the manner of picking and handling berries for shipment than in the variety itself. There have been seasons if I had not been growing the Bubach I would have had no berries at all. While, of course, it does better some seasons than others, anything like a failure with it I have never known. This year the Crescent in the vicinity of Springfield was almost a complete failure. There was scarcely any fruit, and what there was could not be sold except to hucksters. On the other hand, the Bubach produced the largest and nicest crop of berries it has ever done before.

Now, I am situated a little different from many growers.

Living one and a half miles from the city of Springfield, which I consider the best local market of any place of its size in the Western country, the bulk of my berries are sold at home. I have built up a good trade on fancy berries. Bubach they want, and Bubach I intend to let them have so long as they continue to do so well with me as they have in the past. If I were growing large crops, like some, and compelled to ship to distant markets, I might perhaps choose some other varieties.

For fertilizing purposes I use Bederwood, Capt. Jack and Robinson. I consider the Captain Jack the best fertilizer for any pistilate variety I have ever tried. Now, I am well aware that there are many localities where the Bubach does not succeed.

If I were living in such places I certainly should not plant it.

When you get hold of a berry that succeeds well year after year with you, hold on to it, and don't switch off after every new variety that may be introduced to the public. For fear you may think I have Bubach on the brain, "and perhaps I have," I will now proceed to the other branch of my subject.

BEST PLAN OF GROWING STRAWBERRIES FOR MARKET.

The first thing to be considered is the preparation of the soil.

If the ground is new, good plowing and thorough harrowing is all that is necessary to prepare for the reception of plants. If old and worn, and exhausted by repeated raising of grain crops, the best plan is to let it rest one season. Plow late in the fall (if subsoiled, 16 inches deep); it will be that much the better. During the winter haul out fresh manure from the stable and scatter over the ground, which by the aid of rain and snow will be leached and washed into the soil. In the spring, as soon as the ground is fit to work, scatter broadcast some unleached ashes. Plow shallow, pulverize the soil thoroughly, and you are ready for setting, with all the essential elements in the ground for successful plant growth. We should guard against the excessive use of strong fertilizers, for if we induce too much plant growth we shall find the crop of berries greatly diminished. Berries that are grown on highly stimulated soil, with a superabundance of foliage, are generally soft and often unfit for shipment.

Dried blood is a good fertilizer. It should be scattered over the rows in the spring about the time the plants begin to bloom. Dried blood contains a large amount of phosphoric acid, which, together with potash, form the essential elements which are necessary to the successful growth of the strawberry.

Strawberry plants should be set in the spring as soon as the ground is in proper condition to work. There are many plans for setting strawberries. The one which I have practiced for a long series of years is as follows:

Take the medium sized shovel that is used on the one-horse Planet Junior cultivator, and lay off your rows with a horse, just like the old-fashioned way of marking corn rows. I generally use stakes in order to keep the rows straight. Then have one hand to drop and two to set, and the work will be done speedily.

This plan is more speedy, easier and just as reliable as any other in practice. And now comes the most important part of the whole business. This is cultivation. Cultivation should be commenced within one week from time of setting, and kept up until the first of October. Cultivate; cultivate; repeatedly and often. The dryer it is, the more

frequently the cultivator should be used, and unless the ground should become as parched as the desert, you can always expect some fruit. Of course there are some seasons when it rains just at the right time. You can raise a fair crop of berries without any cultivation; but the safest plan is always the best. The only tools I use in the strawberry patch are the hoe and one-horse cultivator, with very small shovels made on purpose for the business. Just as soon as the ground freezes in the early winter, cover the vines with clean wheat straw, which in the spring, if too thick on the rows, should be raked in between.

This covering serves three purposes: It prevents the plants from heaving out, by freezing and thawing during the winter and early spring; retains moisture during the fruiting season, and keeps the berries clean.

The second season, after picking is through with, run over the patch with a mowing machine; cut everything there may be as close to the ground as possible. If a dry time, in two days you can apply the match and let it burn. Now, gentlemen, you that have never tried this need not be alarmed; although it may look like desolation, there is absolutely no danger. I have practiced this for three years, and I consider it one of the greatest discoveries that has been made in the successful growing of strawberries.

By this method nearly all seed of whatever character are scorched so they will not germinate, and the ashes left on the ground is just the thing to start a vigorous growth of new plants. If not too dry, in a short time the new plants will begin to show up. Take a turning plow, cut down the old rows to whatever width may be desired, and cultivate the rest of the season the same as a new patch. There are a great many other facts that might be stated in this connection, but as this paper is already long enough, we hope these points may be brought out in the discussion which may follow.

G. W. HOPKINS, Springfield, Mo.

DISCUSSION.

Mr. Goodman—What are your three best strawberries?

Mr. Smith—The best were the Captain Jack and the Warfield, and the Downing never fails with me. I am speaking from my soil in Kansas.

Question. What kind of soil is it?

Answer. A black soil.

Mr. Goodman—Hopkins of Springfield liked Bubach No. 5.

Mr. Smith—It does better on timber soil.

Question. Which is the best raspberry?

Mr. Smith—Kansas is considered among our people to be the best. This year we have an early variety called "Progress," that paid better than the Kansas. It is the longest berry ripening that I have ever grown.

Question. What is its size?

Answer. It is not quite so large as Kansas.

Maj. Holsinger—What has been your experience in irrigating the strawberry?

Mr. Smith—It is only a two-acre patch near town, within reach of the city water-works. I connected a small pipe with one of the mains which passes my place. It was laid on top of the ground with a faucet every 100 feet, and I got 100 feet of hose so that I could water the ground, beginning with the first faucet, then the second, third, fourth, and so on. We begin watering at about 4 o'clock and keep it up all night. I do not think it would do to water in mid-day, and I think right cold water would injure the fruit.

Question. Did it pay you?

Answer. Yes, sir; it did. I have great faith in irrigation. I understand that in this country you do not want much water. With regard to raspberries I would say that I have discarded the Souhegan. It has simply fallen a prey to the anthracnose, and Gregby is going the same way. We have got to follow up new varities as with strawberries. We are not at all satisfied. The Olden raspberry is better than the Kansas.

Mr. Gilbert—I would like to say that the Captain Jack is a flat failure with me. I have had it for five years and have clung to it upon the recommendation of those who say that if you give it rich ground it will produce an abundance. I have tried it in our virgin soil, and have fertilized it up to as much as the plant would bear, and find that I have killed some plants with too much, but I find that I cannot make it bear at all so that it will pay. I can grow other varieties at $1 a crate and make more money than with Captain Jack at $5. We don't get enough perfect flowers to make the imperfect flowers fruit. I shall not plant any more, and shall take out what I have.

Maj. Holsinger—What are the three best varieties in your section?

Answer. It is a question which is the best, Schuster's Gem or Warfield, fertilized with the Comet, which is new. It resists the drouth, and is a healthy bearer and a good shipper. I believe that the old varieties with better cultivation will, at least some of them, give much better results than trying to introduce the newer varieties without being thoroughly tested.

We, your Committee, would respectfully report the collection of fruit one of the best we have ever seen at a meeting of any horticultural exhibits. The apples numbered about 1000 plates, gathered from nearly every section of the State.

In the selection great care has been taken to choose only the best. The fruit was generally uniform in size, very large and of unusual color and free of insects, the result of education in horticulture or of care and attention to the rules governing exhibits. Speaking the influence exerted by horticulturists, it is due to the education received from the highest horticultural authority, *i. e.*, the Missouri State Horticultural Society, in its endeavor to make the State the best and grandest horticultural State in the Union.

Too much care cannot be taken in teaching the hows and whys of a first-class exhibit, and we hope that if any are disappointed in not getting as much as they expected to it will stimulate them in the future to show only the very best, as it is only the best that in the future can expect to win.

In the nomenclature we find considerable fault, and hope a closer attention will be given, so that all shall learn the correct names of at least all of the leading varieties so common to their sections.

In addition to the apples, your Committee would respectfully report as worthy of special mention the collection of grain, Japanese persimmons, raisins and Cannageria, from Messilla, New Mexico, shown by Dr. Jas. H. Bailey.

James R. Wolfender, of Newton county, shows a fine sample of celery.

An orange tree, 17 years old, full of oranges, by Mrs. Charles Lewis.

A pepper, by Dr. Yates.

A foliage plant, Poenisetta, by Mrs. Speakman.

A splendid collection of Michigan rose, by A. M. Banks, of Newtonia, Mo.

The collection of fish, by the United States Fish Commission, Mr. Page, Superintendent, was a most attractive feature and gave pleasure to all.

The vinegar, by John Recher.

F. HOLSINGER,
W. G. GANO.

PREMIUMS AWARDED.

F. H. Conner, Granby, Mo., 16 varieties	$4 25
Samuel Reynolds, Ritchie, Mo., 6 varieties	1 50
S. M. Powell, Neosho, Mo., 3 varieties	75
John Jaeger, Neosho, Mo., 11 varieties	2 50
Wm. Kruse, Neosho, Mo., 5 varieties	1 00
J. H. Carmichel, Neosho, Mo., 12 varieties	2 50
F. M. Wyatt, Neosho, 4 varieties	50
F. H. Speakman, Neosho, 3 varieties	25
Olden Fruit Co., Olden, Mo., 18 varieties	5 00
A. Nelson, Lebanon, 32 varieties	9 00
John Hollway, Richland, 16 varieties	5 00
Mathew Long, Marshfield, 20 varieties	5 00
G. G. Jones, Exeter, 13 varieties	3 00
J. H. Monsess, Beaman, 17 varieties	3 50
G. B. Lamm, Sedalia, 8 varieties	2 00
H. B. Francis, Mulberry, 10 varieties	2 50
G. T. Tippin, Springfield, seedlings	1 50
J. M. Bailey, Messilla, N. M., 13 varities apples, collection grains, very fine raisins, persimmons, with new tanning plant Cannageria	6 00
J. A. Dickson, Bentonville, 11 varieties	3 25
A. J. Davis, Jefferson City, 15 varieties	5 00
John Harlan, Sarcoxie, 1 barrel Ben Davis	1 00
S. W. Gilbert, Thayer, collection	1 00
Henry Adkins, Sarcoxie, 21 varieties	6 50
J. T. Snodgrass, West Plains, 23 varieties	5 00
D. A. Robnett	1 00
A. Nelson, Lebanon, 7 varities seedlings	1 50
J. T. Snodgrass, West Plains, 1 variety seedling	25
H. Adkins, 2 varieties	50
N. F. Murray, Oregon, 2 varieties	1 00

Jacob Schlaefli, Rhea, Ark., 8 varieties 2 00
C. H. Smith, Neosho, 11 varities..... 2 00
S. Hilfells, seedlings..... 50
Gilkerson, Warrensburg, 1 variety..... 50
Hammon, Amoret, 1 variety..... 25
Wm. Williams, 1 peck M. B. Twig..... 50
Z. T. Russel, Carthage, Tiger Lily 50
John Roesche, 2 apples 50
W. G. Gano 8 00

Blackberry Culture.

I will endeavor to give my method of blackberry culture. I commenced the work eight years ago. After preparing the ground about the same as you would for corn or potatoes, I laid out the rows eight feet apart with a ten-inch plow, set the plants about two and one-half feet apart in the row, then with a hoe I drew the dirt around the plant and pressed it tightly until it was filled up to the level of the ground. I set out a half acre of Kittatinny sucker plants. I planted a row of potatoes between, gave the same cultivation as I generally give potatoes, cultivated and hoed them. Apple trees had been set out on the same ground for two years. The plants made an excellent growth, and the next year produced what we might call a one-third crop; the second season the patch received about the same care, and when the new growth was about three feet high, I cut off the tops, which should always be done. The field should be gone over every few days, and the new growth cut back at about that heighth. This makes a strong stalk, and causes laterals to come on for the producing of a good crop the following season.

The second crop yielded about eighty twenty-four-quart crates, which sold for an average of $1.50 per crate, above expenses and commission. Since that time I have kept on planting, from year to year, but during the last three years I have discarded the Kittatinny on account of the rust, although it is the best berry I have ever seen; yet, five years ago I set out five acres of Snyder. I planted most of this field with piece roots. Cut the roots about four to six inches long and dropped about fifteen inches apart in the row, and covered about four inches deep. After planting these, I decided that planting piece roots was the better way, much faster, costs over fifty per cent less than the whole plants, and, I think, produces a better and longer lived plant. In planting this way the piece roots may be dropped close, if you may wish them to stand, and if all come up they can be transplanted in an-

other row. R. M. Kellogg says in his work, "Great Crops of Small Fruit, and How to grow them," that blackberry plants grown from piece roots produce a healthier plant, and will live twice as long.

Three years ago last spring I set out two acres of Early Harvest blackberries, planting root cuttings. Last season commenced picking this patch on June 8, and they kept ripening, and were picked daily for over six weeks. Two hundred and eighty-five twenty-four-quart crates were shipped. I presume the entire yield would have been at least 150 crates per acre. The Snyder began ripening about ten days later. They generally ripen a few days ahead of Kittatinny. Gathered blackberries from June 8 to August 20—seventy-three days in the blackberry field.

I think it pays to cultivate at least two or three varieties. I can hardly decide to discard the Kittatinny for these reasons may change. The Snyder is a very prolific berry, not so large, but generally produced a full crop. They should be pruned very heavily or else there may be more berries than will mature, especially should the weather be dry. My blackberries are all grown in the young orchard. I would not recommend planting them in the orchard if one has plenty of room. It affords a harbor for the rabbits. The only apple trees barked on my place is in the blackberry field, and, besides, the trees are not so apt to receive the same care as they would otherwise get.

Three years ago I mulched nearly seven acres of the nine-acre field with hay, flax, and straw, whatever I could get, and found this to be of great benefit for that and the next season. These bushes made a larger growth and produced more and finer fruit. No culture was given for two seasons, but I have noticed the growth the last season was not so large as in former years. The last season I have had the straw moved into the rows and given the field two good cultivations. This culture should be very shallow; never plow deep in the blackberries.

My experience in growing blackberries has been profitable. It is a crop easily grown, and the fruit will always be in demand for canning purposes. Nearly everybody wants a crate or more to can up. In fact, I think all of the small fruits are profitable when properly managed. I have about fifty acres in small fruits, strawberries, raspberries and blackberries, and also, 1000 Wild Goose plums now in bearing. Will further say to this fruit-growing fraternity, I am in this work with all my mind and might to make a success. It requires about all there is in us.

J. H. LOGAN, Nevada, Mo.

Grape Growing.

In growing grapes I prefer to have the land plowed in the fall or early winter. Secure the plants in the fall and heel them in unless sufficiently close to a nursery so that they can readily be secured at any time they may be needed in the spring. The principal advantage of securing in the fall and heeling in is that the planting can be done much earlier in the spring. So far as is possible, early setting is best. It is best for the grape plants to give them plenty of room so that the cultivation and harvesting can be done most conveniently.

Eight feet each way is sufficiently close to plant. Make the place for the vine three feet square. If considered necessary to mature, work whatever fertilizer is used thoroughly in with the soil. I bury bones and old boots and shoes beneath the grape vines, as they furnish, to some extent, at least, materials needed for growth and maturing of fruit.

Give sufficient cultivation to keep the ground in good tilth, and keep clear of weeds.

Prune during the fall after the leaves drop off or any time during the winter when the vines are not frozen. When the vines are set out, trim back to two good buds, and with these start the vines, and then prune severely each season in order to promote the growth of new wood, and yet preserve a sufficient supply of the old. I do not like to prune in the spring or summer. Do all this pruning while the plants are dormant and before the sap starts in the spring.

Train on wires; three are better than two. Have the end posts well braced so that the wires can be drawn tight.

I have the Concord, Martha, Niagara, Moore's Early and Delaware. The latter rots but little, if any, here.

I find it to be a decided advantage to spray at least three times during the growing season. I am satisfied, from trying it the last three years, that spraying is sufficiently beneficial to pay well for the cost and trouble of using the Bordeaux mixture and spray pump to apply.

Of all the different varieties of fruit that can be grown on the farm, none can be grown more cheaply or as easily as the grape; but they must have care and attention at the proper time if the most is made out of them.

N. J. SHEPHERD, Eldon, Mo.

Raising Nut-Bearing Trees.

In the first place, I advise those who clear land to let the walnut, hickory and pecan trees stand; and if they bear good fruit, let them remain; if worthless, they can then be cut down.

There was a hickory tree near here on land owned by the Bluffton Wine Co., that was cut down by one of the tenants that I would give fifty dollars for if I had it on my land.

It was the largest nut I ever saw, and was full of rich meat. There are others in the vicinity as large, but they are nearly all shell. Pecan trees are now left standing where timber is cut off land around here, and in time will be valuable. One man, six miles from here, has about 80 trees on a piece of land of perhaps six acres, from which he got more for the crop of pecans than from the crop of wheat on the same ground with which the trees did not interfere much.

The common shell-bark hickory nut is the most valuable of its class in these parts. The Meyer pecan is the largest of the northern family that I have met with, and which I distributed all over the country, and some of them may now bearing nuts.

I also furnished the Agricultural Department at Washington nearly 800 one-year trees of the same variety that were sent out to the four winds.

That the hickory and pecan will cross is an established fact, as I have had the nuts sent me that showed the characteristics of both and now have trees grafted with it in hickory large enough to bear, but as yet have not done so. When I show these trees to strangers, some call it a hickory and others say pecan. I can easily see both in it. Not over a mile from here is, or rather was (as it is now gone into the Missouri river), a tree that bore nuts showing plainly that it originated from a cross, and that from the hog or bitter nut. The nut resembled a pecan more than a hickory, but the meat was so bitter that it was not fit to eat.

While on the subject, will advise no one to invest in those large valuable ones from the Gulf coast to any great extent. They have been tried here and failed. Plant of the best you can find here.

That the pecan and hickory are difficult to grow when transplanting is a mistake, as if carefully done its pretty sure to succeed. The idea that the whole tap root must be kept intact is also an error, as they can be cut back several inches and not hurt, as they soon run down new tap roots.

This seems to be a natural gift, as the trees grow very tall and heavy, and therefore need a good foundation, as they usually grow in loose ground, where the water often keeps the ground so wet that they would blow down if not well anchored. I have known trees 100 feet high and three feet in diameter at the base. Have seen such trees undermined by the waters of the Missouri river, that toppled over, and in striking the water, cause a report like a cannon fired.

Now, as to growing these trees, there is but one way, and that is easy and sure.

Gather the nuts as soon as matured, put them in the ground an inch deep, and in the spring put them in nursery rows, or where they are to remain. The latter will give about one year's advantage in coming into bearing.

In autumn I put about 1000 pecan nuts in a box mixed with sand, left the box exposed to all kind of weather, and in the spring, just as they commenced to sprout, planted them one inch deep. The result was that 90 per cent grew.

Whether the pecan will germinate after it has become dry I cannot say, but do know that hickory nuts will. I had a few of the paper-shell variety that a friend sent me years ago. They were kept as a curiosity. I took a few of these, planted them in the fall, as before told here, and in the spring every one grew. They had lain in my collection three or four years.

The chestnut also deserves attention. They must, however, not be allowed to get dry, or they will fail. Put them in the ground in the fall in the same manner as the other nuts. I have a Paragon chestnut tree that bears enormous burrs, and three and four nuts in each, quite large, but not a particle of flesh in them. It is undoubtedly a female and needs impregnation, which I am in hopes it will soon get, as I have natives all around it large enough to bloom next season. An amusing little thing occurred with this tree: A young man who had never seen a tree, came to me and asked what that queer flower on a tree was in my orchard. I asked him whether he smelled of it to know whether it was fragrant. Only one time, was the answer; said it was full of points sharp as needles, that stuck his nose. The grafting and budding of the chestnut tree have been failures in all but one instance, which was the Paragon tree alluded to. Out of hundreds of hickory and pecan on hickory, there are but three trees to show for it. If done under ground, it is more successful.

If spared until next spring, the chestnut will get another trial, as one tree of the Japan Giant has wood to spare that will be used on some of my seedlings old enough to bear.

My intention is to experiment on this line as long as able, and if any success attends the efforts, the public shall be told of it.

The long trip and the fatigue attending it, will most likely prevent my being present at the Neosho meeting, but you all have my best wishes for a good, pleasant and useful meeting.

SAMUEL MILLER.

Importance of Mulching.

Mulching forms a very important part in horticulture. It is next to impossible to grow good and clean strawberries without it, and by using straw for the mulch, this queen of berries receives its name "strawberry."

Mulching does not only keep the berries from being spattered with dirt, but it keeps the soil moist and cool—two very essential points in strawberry culture.

For currants, mulching is much better suited than cultivation, on account of their roots being shallow and coarse. Manure is the best material used for this fruit, as it gives the plant great thriftiness, at the same time keeping the soil moist and cool, which the currant craves so much. All that can be said in favor of mulching currants may be applied to gooseberries, though the American varieties can be grown by cultivation alone.

When it comes to raspberries and blackberries, the mulching of the row and cultivating the middle is about the most profitable, and the cheapest; but nature always depends on mulching alone, and is generally very successful.

In all kinds of orcharding mulching is very beneficial, especially in plum culture; much of this fruit is gathered from the ground as it falls, and if gathered from the mulched ground it is scarcely ever bruised by the fall, and is nice and clean.

For apple culture I am more than ever convinced that a well-mulched orchard, "though this may be done by cutting the clover, grass or weeds," and leaving then on the ground for a mulch and to form a mould, will hold its fruit better during August and September, than one that is cultivated. I am not prepared to explain why this is so, but it may be because the mulched orchard has all its feeding roots left entire, whereas the cultivated one loses many by being cut in cultivation. With sufficient mulching steep hillsides can be successfully managed in fruits, including grapes, that would ruin the ground by heavy washings.

G. F. ESPENLAUB, Rosedale, Kansas.

The Obituary Committee drafted the following resolutions:

H. T. KELSEY.

In the recent death of H. T. Kelsey, of St. Joseph, this Society has lost an earnest member and the State an enterprising, honorable citizen. Mr. Kelsey was largely engaged in growing and setting nursery stock, and by fair dealing and by intelligent investigating, he established a reputation that made his name honored throughout the State.

Be it resolved, therefore, by this Society, that in the death of Mr. Kelsey the Missouri State Horticultural Society has lost an efficient member, and we deplore his loss. Be it also

Resolved, That we extend sympathy to the family of the departed brother, and that these resolutions be entered upon the Secretary's report.

G. A. ATWOOD,
W. A. GARDNER,
LEE D. BELL,
Committee

PROF. C. V. RILEY.

Prof. Charles Valentine Riley was born in England and was educated in London and in the best schools of Germany. At the age of 17 he came to this country. He early exhibited a love for science and for the languages. He was 17 when he became a citizen of the United States, and for three years worked on a farm near Chicago, unusual labor for him, but an experience that was needed to help fit him for the grand work before him. In 1863 he engaged in newspaper work in Chicago, having a position in the Prairie Farmer, pursuing all along his studies in entomology, making a specialty of studying the insects that prey upon the farmers' crops. In 1868 he accepted a position on the Rural World. The same year he was appointed State Etomologist, a position which he filled with great honor to the State and station. During the nine years he held this position, he built a monument through his matchless reports, which stimulated scientific investigation in other states, inaugurating the movement that will rid, as nearly as possible, all the enemies that contend against the interest of the horticulturist and the farmer.

In 1877 Prof. Riley accepted the position of entomologist to the United States Department of Agriculture, which he held until 1894, when failing health influenced him to resign. His death, while still in the prime of life, carried sorrow to the people of all Missouri and to the whole nation.

The State Horticultural Society of Missouri especially feels the loss of this efficient worker, and extends sincerest sympathy to the devoted wife and children whose loss is irreparable.

G. A. ATWOOD,
W. A. GARDNER,
LEE D. BELL,
Committee.

THURSDAY, December 5—7:30 p. m.

The last session of the meeting was opened with a piano solo by Miss Wood.

Prof. Page then delivered his paper on "Fish Culture."

Fish Culture.

I have been asked to give to the Society this evening an address on "Fish Farming." The term is so indefinite that I have taken the liberty of changing the title to "Fish Culture," and, yet, that title is so broad that scant justice can be done to the subject in the limited time allowed. Fish culture is almost synonomous with that branch of the Government service with which I have been identified for more than twenty years. In fact, so close is the synonomy that fish culture is scarcely named in any part of the world without mention of the U. S. Fish Commission. It will not be surprising, then, if my remarks are to some extent a running glance at what the United States Fish Commission has attempted, what it has done, what it has failed in, and what it is now trying to do.

The fundamental act of Congress declared the duties of the Commissioner to be: "To prosecute investigations on the subject of the diminution of valuable food fishes with the view of ascertaining whether any and what diminution in the number of the food fishes of of the United States has taken place; and, if so, to what cause the same is due; and also whether any and what protection * * should be adopted in the premises. * * *

The principal activity of the U. S. Fish Commission has been directed to the wholesale replenishment of our depleted waters, though its work is lawfully and properly divided under three heads:

1. The systematic investigation of the waters of the United States and the biological and physicical problems which they present. The scientific studies of the Commission are based upon a liberal and philosophical interpretration of the law. In laying down the original plans the Commissioner insisted that to study only to food-fishes would be of little importance, and that useful conclusion must need rest upon a broad foundation of investigations purely scientific in character. The life history of species of economic value should be understood from beginning to end, bnt no less requisite is it to know the histories of the animals and plants upon which they feed or upon which their food is nourished; the histories of their enemies and friends, and the friends and foes of their enemies and friends, as well as the currents, temperatures and other physical phenomena of the waters in relation to migration, reproduction and growth.

2. The investigation of the methods of fisheries, past and present, and the statistics of production and commerce in fishery products.

Man being one of the chief destroyers of fish, his influence upon their abundance must be studied. Fishery methods and apparatus must be examined and compared with those of other lands, that the use of those which threaten the destruction of useful fishes may be discouraged, and that those which are inefficient may be replaced by others more serviceable. Statistics of industry and trade must be secured for the use of Congress in making treaties or imposing tariffs, to show to producers the best markets, and to consumers where and with what their needs may be supplied.

3. The introduction and multiplication of useful food-fishes throughout the country, especially in waters under the jurisdiction of the General Government, or those common to several states, none of which might feel willing to make expenditures for the benefit of the others. This work was not contemplated when the Commission was established, though the appropriations for this purpose have since been renewed every year on an increasingly bountiful scale, and the propagation of fishes is at present by far the most extensive branch of the work of the Commission.

The origin of the Commission, its purposes and methods of organization, having been described, it now remains to review the accomplished results of its work. Although most valuable results have been attained in each department, the limits of this paper and the fitness of the occasion will not allow me to more than touch upon the salient points of the division of fish culture.

The most pronounced question fronting the advanced fish-culturalist is, what can be done to neutralize the various destructive influences which man brings to bear upon the inhabitants of the waters. There are evidently three things to do. (1) To preserve fish waters, especially those inland, as nearly as it may be possible in their normal condition. (2) To prevent wasteful or immoderate fishing. (3) To put into practice the art of fish breeding. In other woods, to aid in maintaining a natural supply ; to repair the effects of past improvidences, and to increase the supply beyond its natural limits rapidly enough to meet the necessities of a population constantly increasing in number and requirements.

The preservation of normal conditions in inland waters is comparatively simple. A reasonable system of forestry and water purification is all that is required ; and this is indeed not only by the fish in the streams, but by the people living on the banks. It has been shown that a river which is too foul for fish to live in is not fit to flow near the habitations of man. Obstructions, such as dams erected for power purposes, and proving barriers to the free movements of the fish, may

be overcome by the construction of fish-ladders designed to meet the requirements of the laws of physics and the possibilities of fishes.

The protection of fish by law is what governments have been trying to effect for many years, centuries, and it must be admitted that the success of their efforts have been very slight indeed. In the United States public opinion is generally antagonistic to fishery legislation, and the Commission, after twenty-five years of investigation, has not yet recommended to Congress enactment of any description. Even a running mention of the celebrated cases of fishery controversy, not to mention those of international importance, would be wearisome to you. The Halifax Commission and the late Paris Tribunal are the most important of latter years.

Just here we meet the test problem in fish culture. Many of the most important commercial fisheries of the world—the cod, herring, shad and ale-wife, mullet, salmon, whitefish, smelt, and many other fisheries—owe their existence to the fact that once a year these fishes gather closely together in swimming schools to spawn in shallow water. There is a large school of so-called economists who clamor for the complete prohibition of fishing during spawning time. Their demand demonstrates their ignorance. Deer, game, birds and other land animals may easily be protected during the breeding season; so may trout, bass and other fish of strictly local habits. Not so the anadromous and sea fishes. If they are not caught in the spawning season they cannot be caught at all. The fallacy in the argument of these men lies in part in supposing that it is more destructive to the progeny of a given fish to kill it when its eggs are nearly ripe than to kill the same fish eight or ten months earlier.

The counter-argument, however, is not to be ignored. Such is the mortality among fish that only an infinitesimal percentage attain to maturity. Professor Mobius has shown that for every grown oyster on the beds 1,045,000 have died. It is probable that a not larger percentage of very many of our fishes come on the spawning grounds Some consideration then, ought to be shown to these individuals who have escaped from their enemies and who have come to deposit the precious burden of eggs. As I before stated, here is one of the test problems: How much must they be protected? It is here that the fish-culturist—men of my calling—step in with the proposition "that it is cheaper to make fish so plenty by artificial means, that every fisherman may take all he can catch, than to enforce a code of protection laws."

The salmon rivers of the Pacific slope and the shad rivers of the East and the white fish fisheries of the Great Lakes, are now so thoroughly under control by the fish culturist, that it is doubtful if any one will venture to contradict his assertion. The question is now whether he can extend his domain to other species.

Fish culture in its more restricted sense, or fish-breeding, must sooner or later be resorted to in all densely populated countries, for with the utmost protection nature, unaided, can do but little to meet the natural demand for fish to eat. This necessity has been felt by many people from earliest times.

The discovery of the art of artificially fecundating the ova of fish must apparently be credited to Stephen Ludwig Jacobi, of Hohenhausen, in Westphalia, who successfully conducted experiments in breeding salmon and trout as early as 1748. The importance of this discovery was thoroughly appreciated at the time, and until 1800 was a fruitful subject of discussion in England, France and Germany. It was nearly one hundred years after the discovery before public opinion was ripe for general acceptance of its usefulness, a period during which its practice was never entirely adandoned by the Germans.

The fertilization of fish eggs is the simplest of processes, consisting, as every one knows, in simply pressing the ripe ova from female fish into a shallow receptacle and then squeezing out the milt of the male upon them. The eggs having been fertilized, the most difficult part of the task remains, viz: the care of the eggs until they are hatched, and the care of the young fry until they are able to care for themselves.

The apparatus employed is various in principles, to correspond to the physical peculiarities of the eggs. Fish culturists divide eggs into four classes, viz.: (1) Heavy eggs, non-adhesivse, whose specific gravity is so great that they will not float, such as the eggs of the salmon and trout; (2) heavy, adhesive eggs, such as those of the herring, smelt and perch; (3) semi-buoyant eggs, like those of shad and white fish; and (4) buoyant eggs, like those of cod and mackerel.

Heavy, non adhesive eggs, are placed in thin layers, either upon gravel, grilles of glass, sheets of wire cloth, or perforated metal. Through the receptacles containing the eggs a current of water is constantly passing. Any description of the numerous forms of apparatus of this class would occupy more than the extent of this paper.

The heavy, adhesive eggs were formerly received upon bunches of twigs or frames of glass plates, to which they adhered and which were placed in receptacles through which water was passed. Within the last two years a scientist, Prof. Reighard, of the University of Mich-

igan, working upon purely scientific lines, discovered that the presence of corn starch in the spawning pan would neutralize the adhesive tendency of eggs of this class without in the least damaging their vitality. A fish-culturist, following the hint of Reigard, discovered that common muck from the river banks would replace the corn starch with even better results. At once the possibilities with the heavy, adhesive eggs (to which class your jack salmon belongs) rose from a problematical thirty to a positive eighty per cent.

The semi-buoyant eggs, or those whose specific gravity is but slightly greater than that of water, require altogether other treatment. They are necessarily placed together in large numbers, and it was soon discovered that to prevent their settling on the bottom of the receptacle it was necessary to introduce a gentle current from below. It would be tiresome to you to attempt any description of the gradual evolution of the apparatus which has come into general use, and yet more so any description of its management.

For many years the introduction of fresh and withdrawal of stale water from the apparatus containing floating eggs seemed an insurmountable problem. Like many other problems in practical fish culture it was solved by the late Commissioner, and like most of his solutions the apparatus offered was so simple and the governing principle so well known that men marveled the discovery had been so long delayed.

Here are a few notes on what has been accomplished in the domain of public fish culture:

In the Sacramento river and its tributaries about 15,000,000 young salmon have been hatched and planted. So great has been the benefit of this restocking of the Sacramento that the statistics of the salmon fisheries show that the annual catch from that river has increased 5,000,000 pounds each year during the last few years. For three-quarters of a century the sea-going salmon had disappeared from the Connecticut river. The U. S. Commission succeeded in reintroducing it, bringing the eggs from Maine. Going a step further, they introduced the same fish into the Hudson river, so that appreciable quantities have been taken in the neighborhood of Albany and Troy.

The Government hatcheries at Alpena, Mich., Duluth, Minn., and Sandusky, O., are annually returning to the great lakes from 300,000,000 to 500,000,000 young white fish. Some years since, the fishermen of the great lakes admitted that but for public fish culture half of them would be obliged to abandon their calling.

Instances of great improvement might be cited in connection with nearly every shad river in the United States. In the Potomac river

alone the catch was brought up from 668,000 pounds to 1,600,000 within a period of five years. To the skeptic who intimates that possibly this increase might have occurred without the intervention of the fish culturist he is pointed to the fact that the rivers of the Pacific coast which contained no shad (nor any within three thousand miles) were successfully stocked with those fish by transferring the young from the East coast. They are now so plentiful that it is not uncommon to see them on the slabs of the San Francisco market at three cents per pound.

Much of the prejudice existing against the carp is unwarranted and based upon a want of knowledge how to rear and prepare it for food. I have it upon the best authority that the carp is so rapidly gaining in favor in the East that but three varieties of fresh water fish bring a higher price in the New York markets. Within the last week I am informed by the statistician of the U. S. Fish Commission that the wholesale fish dealers in the United States report an annual sale of German carp amounting to $100,000. It is exceedingly doubtful if we receive reports of one-half the sales. The total cost of introduction, propagation and distribution of this valuable addition to our food supply was $218,000.

Examples might be multiplied almost indefinitely of the beneficial results which have followed fish cultural work in Great Britain, France, Germany, and away in the Antipodes, in New Zealand and Tasmania, magnificent returns have crowned the efforts.

So far, I have been talking to you from the standpoint of the economist: that is to say, of the possibilities of fish culture in increasing the quantity of a necessary and desirable food product. It may readily occur to some of you to question "how can these things having reference in the main to our tidal waters and ocean boundaries be applicable to us?" Sufficient answer to such a question might be that you are citizens of the United States and what interests one section must interest all; but it may be of more satisfaction if I touch briefly on what the Federal Commission is trying to do for the inland waters of the Southwest.

The Neosho station of the United States Fish Commission is the first of a class of hatcheries designed to meet the peculiar wants of this large section. A similar though larger and much more extensive station is now under course of construction in Texas. It is the intention that these two hatcheries, until Congress instructs the establishment of others, shall have for their peculiar functions the propagation of the basses, their allies, and such other fishes as are found best adapted to the waters of the Southwest. It is true that for several years the demands of the people have to some extent diverted the

work of the Neosho station from the original intention, but the Commission is making strenuous efforts to educate the people of the Southwest to a knowledge of their true need. The work of the coming year is planned largely upon the original intention.

Now, it is exceedingly doubtful if within a near-by region it be found possible to establish and maintain a fishery in the sense the term is used in the tidal countries. Such being the case it would be natural for you to ask "what good to us is this expenditure by the Government for fish culture work?" Are you aware that at least twenty states, scarcely any one of which possess a fraction of the magnificent water possibilities which the State of Missouri holds in trust for her people, are spending over $100,000 a year in the maintenance of their inland fisheries? Some may put their judgments against the conclusions of Congress and twenty Legislatures. You have the possibilities here in the Ozarks not possessed to my knowledge by any state south of Northern Iowa lying between the Mississippi river and Colorado. What if you cannot establish in your streams fisheries on a commercial basis? So long as you have these splendid water courses running through your State and draining out as much of the strength of your lands as enter into your cereal products it is your imperative duty that a suitable use be made of them. It is a sweet savored saying that he is a benefactor who makes two blades of grass to grow where but one grew. I do not think it possible to make two fishes in our streams where there was one fifty or a hundred years ago, for the conditions have most materially altered; but with all the conviction of twenty years of experience, study and observation I have no hesitancy in saying that ten pounds of fish can be maintained in our waters where but one pound now exists.

What good is a mere ten-fold of fish among the crowded population of our State? I grant you that as an item of food supply it would not be considerable. And yet it is by the rapaciousness of the present generation that it could not be ten times ten, and it is by the wanton destruction of the past generation that consideration of these subjects is now necessary.

Putting the possible increase at the conservative ten-fold, there is abundant need for the work and abundant congratulation if it be carried to a successful issue. And the repayment, though it may not come directly to the people in dollars and cents, will be none the less sure and certain. How? Some of you are anglers. Can any of you forget the keen sense of enjoyment, the bounding of the blood and the rapid beat of the heart, the distension of the nostrils to drink into the tired lungs the pure air of the woods, the quicker flashing of the eye,

the tingling of every nerve, and the awakening of the dormant will to "do" when first you saw a game fish rise to your cast? A day so spent gives one a renewed lease for another year of the fetid-sewer-poisened air of our crowded civilization. To those of you who go fishing once a year, I say go twice; and to those who go twice, go four times; and when you go, take your wives, your sisters and your children with you. Let them drink in the fresh air of the woods, rest their tired eyes on the green of the fields, catch the smaller and more exquisite beauties of the mosses, lichens and flowers, watch the perfect beauty of motion in the swelling wave and curling form, read "books in running brooks, sermons in stone and good in everything," and then go back home to be better men and women for having worshiped God in nature.

There is another view of the inland fisheries which can be presented to you in a very few words, and one, I think, worthy of some degree of consideration. It has been said that the native of Florida lives in summer on mosquitoes and in winter on the Yankee who comes to hunt and fish. This, like nearly all his brilliant tricks, was borrowed by the Cracker from the Yank. In more than one of the Eastern States it has been seriously urged that unless the fish and game supplies of the backwood be maintained, the natives of those regions would suffer for the want of the money scattered each year by the summer tourist—that man of fancy rods and reels, whose few ounces of fish we ridicule, and whose superabundance of health and energy we envy.

And there is yet another phase of fish culture which I feel justified in bringing to your attention; one which I am sure cannot be entirely without interest to men of your calling; that is the possibilities of fish culture, combined with irrigation. There are unquestionably large areas of even this well-watered State where the splendid benefits of irrigation would be most material. In the irrigation ditches of Colorado trout are grown at a merely nominal cost and sold in the markets of Denver at 50 cents a pound. Friends of mine in western Kansas have demonstrated the advantages and comforts of farm fish culture, when combined with irrigation. Common authorities have asserted that irrigation can be so managed that the profits from the side issue of fish culture would pay a handsome interest on the cost of the plant. The fishes take nothing from the water themselves; on the contrary, in very many instances, they act as purifying agents. I once heard a French gentlemen coin an apt term to describe his idea of the sturgeon. In his pigeon English he called them "return Providence." Looking below the surface we see that he meant the illy-contrived

sewerage system of our cities, in conjunction with rains, carry to the rivers and oceans a large proportion of the fatness of the land. The fishes gather up this wasted wealth and return it to us in the form of palatable, healthful food. I repeat that the time will come to us, as it has come to every other nation, when we must as individuals take up a careful study of the possibilities of the water for adding to our food supply. The American farmer has heretofore looked upon the water merely as a necessity for his stock. A more crowded and developed state of society will force upon his attention other and possibily superior uses.

[In the introductory part of the foregoing, I beg to acknowledge to have drawn upon an article by Prof. G. Brown Goode, who had covered the ground in such thoroughly concise form that no one could go over it again without stepping in his foot tracks.]

PROF. W. F. PAGE.
Supt. U S. Fish Hatchery Neosho.

The quartette sang "Italia," then followed the second paper of the evening.

The best Shrubs and Herbaceous Plants for Hardiness, Abundance and Succession of Bloom in a Farmer's Lawn.

Many urgent appeals have been made from time to time for a more general planting of ornamentals around our country homes. Who is not favorably impressed with the appearance of a place surrounded with a variety of choice plants artistically arranged? On the part of the owner it indicates a love for the beautiful, a desire to please, and a determination to have something more than a place in which to dwell—a home in all that the word implies. Do we realize how much refinement may be cultivated and how our thoughts may be rested from the usual strain of our business affairs or occupations by a little extra effort in looking after this portion of our home? Moreover, it is a profitable investment, in that the young people are educated to appreciate and enjoy this adjunct to the home and have less desire to secure necessary recreation in places that are not elevating or refining, but on the other hand, it will tend to purify the moral atmosphere by its loveliness. Some one has said, "that every country home, however humble, might be an ornamental garden." Therefore, let us give special attention to the planting of our lawns.

In making a selection, I have aimed to give a list within the reach of all that will supply an abundance of bloom the entire summer

season. There are few plants producing flowers suitable for bouquets or table decorations that are not equally desirable for lawn effect. Therefore, other things being equal, I have chosen those that would also be acceptable as cut flowers.

In regard to the periods of blossoming, no exact date can be given, as there is more or less variation, according to the season. Relatively it is possible to speak more definite as a cause that will produce a variation in one is very likely to produce a similar change in another.

With very few exceptions, the plants may be found growing at the Missouri Botanical Garden, where I have watched their habits to a considerable extent during the past summer, and a result of these observations is here given.

One of the first shrubs to put forth its beautiful array in early spring is the Golden Bell *(Forsythia verdissima)*, which, in early April, long before the appearance of leaves, produces myriads of deep yellow bell-like flowers along the whole length of the stem. It is a very bushy shrub and a rapid grower, frequently making shoots three to four feet long in a single season, and when full-grown is five or six feet high. The flowers are not valuable for cutting, but as they are the best at this season of the year, the plant merits a place.

From our common lilac *(Springa vulgaris)* many valuable varieties have been produced, a few of them, however, are so near alike that it is quite difficult to distinguish one from the other. At least two should have a place in every collection. The one catalogued as *flore pleno* is a typical representative of the double purple sorts and the White Persian cannot be too highly commended for one of its color. The flowers appear the last of April or about the time the Golden Bell ceases blooming. The varieties are much more beautiful than the common species and are very fragrant and valuable for cut flowers.

The Corchorus *(Kerria Japonica)* is not, I believe, universally planted throughout the State, and yet it is one worthy of a high recommendation. At the Missouri Botanical Garden this year it began to bloom April 23 and lasted until May 25. Again, about July 20, it began a second period, but with fewer blossoms, which lasted until after the first few frosts. There are three varieties, the single-flowered, double-flowered, and a single-flowered one with variegated foliage. For our purpose the double one is preferable, as it is the best for cutting. The flowers are yellow globular and from one to two inches in diameter. The plant has many slender, graceful branches, and attains a height of about five feet.

The Snowball *(uiburnum opulis sterilis)* is too well and favorably known to need any description.

Mock Orange *(Philadelphus coronarius)*, which blooms the latter part of May and early June, has several forms, of which the double-flowered is probably the best. The blossoms are pure white with strong orange-like perfume. This plant is larger than any of the preceeding, but may be kept to a moderate height by a little pruning, which should be done immediately after the flowering period, as the blossoms are borne on wood of the preceeding year's growth.

The Moss Locust *(Robinia hispida)* produces very charming oderless blossoms of rosy pink color. They are borne in long clusters and last from four to six weeks during May and June, and frequently a second crop is produced. It usually grows five or six feet high and never more than eleven or twelve feet. It is best to plant in a more or less protected situation as the branches are quite easily broken.

Roses—Granting that but three of the many desirable roses are to be given a place, I prefer *Rosa sulphuria, Clotilde Soupert and Baltimore Bell.*

Rosa sulphuria is a large double yellow or sulphur colored rose and with us was one of the earliest. While it does not bear all summer it more than makes up in richness of beauty. Moreover, it is a shrub with a graceful habit of growth and attains a height of from six to ten feet.

It succeeds best in an open situation, where it can get a maximum amount of light and air.

Clotilde Soupert is a low-grower, and begins flowering when very small. It is very prolific and bears without interruption the entire summer, and does not cease until cut by the autumn frosts. They vary in color from white to rosy pink, and are very double.

Baltimore Bell is one of the finest climbing roses, of a pale blush color, changing later in the season to pure white.

Spivœa Douglasii produces its crop of irregular reddish pink flowers in late summer upon a mass of upright shoots. The blossoms are spike-shape, and follow in succession for many days.

Hydrangeas are a class of plants universally admired. For this collection the sort catalogued as *Hydrangea paniculata grandiflora* is undoubtedly the best. The large, pure white flowers are at their best from late summer until late autumn. It grows from three to five feet high, and should be pruned back severely every spring, in order to increase the vitality of the plant and extend the flowering season.

The Rose of Sharon *(Hibiscus syriacus)*, is another valuable late blooming shrub. It has been said, "that we view it with less delight, as it is a pure indication of approaching winter." The fact that this is at the height of its glory at a season when many others are losing

their beauty well fits it for a place in this collection. Many varieties are in the market of which the double rose-colored one with variegated foliage is the equal of any.

HERBS.

Coming back to early spring, we find among the hardy herbaceous plants some species of the columbines, among the first to come into bloom. The peculiar form of its flower, together with a great variety of colors, render them very effective. There are two species especially worthy of our consideration.

The Canada Columbine *(Aquilegia Canadensis)* is an early spring bloomer, attaining a height of from eighteen inches to three feet, with red and yellow flowers, having medium-sized spurs. A bed five feet in diameter, which will hold about fifteen plants, will ordinarily give a profusion of bloom lasting from April until June.

The Golden Columbine *(Acquilegia chrysantha)* is a somewhat taller grower, with large yellow flowers, having long spurs. It comes into bearing about June 1, or a little before the Canada Columbine ceases, and lasts from six to eight weeks. They succeed best in a slightly sheltered position, and prefer a moist soil.

The Perennial Larkspur *(Delphinium formosum)* bears, through the late summer and autumn, indigo blue flowers, arranged as spikes. In form the individual blossoms resemble those of the columbine in that both are spurred, the columbine having five and the larkspur but one, the two furnishing an incessant bloom from April until November.

Phloxes are a justly popular plant, and at least two species require our attention:

Phlox sublata has a trailing habit of growth, never reaching more than a few inches in height, and soon forms a solid mat which is frequently hidden by the dense bloom of beautiful pink flowers which appear in and last into May. The narrow, moss-like leaves present a brilliant autumn display and perfume.

Phlox paniculata, with its numerous varieties and hybrids, ranging in color from pure white to dark rosy salmon, intermingled with a light crimson, form a pleasing combination of colors when properly arranged. The best effect can usually be secured by planting in clumps at the same time not so dense that each plant will lose its individuality. They bloom continually during the summer and autumn months. In spring the plants send up several shoots, of which all but one should be pinched off so that the plant may assume an upright growth.

The Bleeding Heart *(Dicentra Spectablis)* in very early spring produces its crop of pinkish heart-shaped flowers in drooping racemes. The plant grows to a height of from one to two feet, and in planting

a desirable method is to place them from one to two feet apart, so the grass can grow close up to them. In early autumn, when they begin to lose their beauty, cut them away and there is but little exposed earth to interrupt the surrounding stretch of grass.

Pœony alba pleno has very fragrant double white flowers, with a slight tinge of red, and blossoms for about two weeks, the latter part of April and early May. Along with this it is well to have one of the Chinese varieties to extend the flowering period.

Pœony Henri Laurent having fine, rosy pink blossoms, is one of the best. Plant them about eighteen inches apart in clumps after having worked the soil thoroughly to a depth of sixteen inches.

Iris Germanica is rich in abundance of bloom for two or three weeks during the latter part of May. Ordinarily a bed four or five feet in diameter, is adequate, requiring about fifteen plants to fill it. In a clump of this size select three varieties with the colors purple, blue and white predominating. In planting the best effect may be produced by intermingling the colors and avoiding rows.

The pheasant's eye *(Pleanthus plumarius)* is one of the most hardy belonging to this class of plants. It has medium sized purple or white flowers, having fringed margins. It bears for about six weeks in June and July, and grows from nine to twelve inches high.

The hollyhock *(Althea rosea)* is a plant familiar to all. There are many varieties, including as many variations in color, among which the white, rose, pink and deep red are good, and will probably give the best effect. The flowers are produced on the sides of stalks three to six feet in height, and the plants are therefore valuable as a background in a border, or terminating a low vista, or as a clump intermingled with shrubbery.

The *Coreopsis lanceolata* has a spreading habit of growth, averaging about two feet in height, with blossoms between one and two inches in diameter. Their wonderful brilliancy, together with the fact that they will last many days after being gathered, makes them doubly valuable as cut flowers.

The blanket flower *(Gaillardia grandiflora)* is quite similar in habit of growth to the *Coreopsis* with a little larger flowers, which are becoming more and more popular for bouquets. Both bear profusely from June to November, even in a poor soil.

Many others might be given, but the foregoing will be sufficient to make a very effective lawn, besides furnishing many flowers for bouquets and table decorations.

While it is not within the province of this paper to give methods of propagation, it seems wise at this point to call attention to a few

facts about starting these plants in a lawn. Generally it is not best for the average farmer to propagate the shrubs, as a nurseryman will furnish them for less than the trouble. Secure two or three-year-old plants in the autumn and heel in until spring, when they should be set in their permanent places. With the exception of the very small ones a single specimen of each is sufficient. Where more plants are desired secure other varieties. The list price will not exceed $5, and the chances are that they may be procured for very much less.

The herbaceous plant may be secured and cared for in the same manner as the shrubs, but at a little greater cost, as a larger number will be required. If the expense account is not too important and an immediate effect is desired, this is the best way. Otherwise, secure seeds or cuttings and plant in permanent beds in April, and if looked after a little during the summer and lightly covered the first winter, they will bear well the second summer.

The late blooming sorts can be made to bear the first season by starting the plants with artificial heat, as we do tomatoes or early cabbage in February, and then transplanted to the lawn in April or May.

When the plants have become well-established they require but little attention, and will last many years without being renewed. In any event, the best results may be secured by a little pruning and cultivation and the application of a limited amount of fertilizers. Any plant left entirely to itself will inevitably produce inferior flowers.

There are persons who have room and means for a larger number, and for such I desire to give a few additional ones, viz., Magnolia *lenni*, with its numerous large and brilliant flowers, the Sweet-scented shrub *(Calycanthus floridus)*, having an unusual and peculiar odor, the Japanese quince *(Cydonia Japonica)*, *Spiraea vanhouth*, *Clematis Jackamani*, the Prairie Queen and *Hermosa* roses and the Snowberry *(Symphorio carpus racernosus)* a desirable acquisition on account of its prominent pure white fruit, appearing during the fall and winter; and of the herbs *Iris kampferi* and the Sweet William *(Deanthus barbatus)*, all of which will add grace and beauty to any lawn.

Let us, then, cultivate to our fullest capacity a love for the care and cultivation of these beautiful plants, and the small amount of work will be that of a pleasant privilege and not a dreaded duty. Our labor will be rewarded, not only in increased pleasure to ourselves, but in the fact of having been the means of imparting joy and happiness to those around us by using the flowers as a token of our love, and thus having made the world a little better by having lived in it.

H. C. Irish, Shaw School of Bot.

Question: What is the best way of securing a plat of blue grass?

Prof. Irish—So far as my experience goes, the Kentucky is the best. Prepare the land by thorough cultivation, removing the lumps and rolling the land. Sow the sod very thickly and harrow in after sowing and roll it again, and if the season is wet it will not require any watering, otherwise it will be necessary to water, or only a part will grow, and after it has been planted, every week or two weeks it should be rolled again.

Mr. Goodman—Why did you omit the Madam Plantier June rose? It is beautiful, hardy, and is a pure white.

Prof. Irish—I presume the reason I left it out is because it has not come under my notice lately, and I have seen these others growing and have a good idea of them and can say they are good.

By request Miss Ames again favored the audience with a solo.

Small Fruit Paragraphs.

Looking backward over this year's experience, I see, in the beginning, an unusually dry spring season—so dry that to remove and set strawberry plants was a hazardous undertaking, and the few who did plant lost more than half their plants. Then, near the middle of May, I see a severe frost, with continued drouth, blasting many of our berry patches. The few strawberries that the frost did not get made a poor showing toward a profitable crop.

With the beginning of every season we have some new problems to study. Past experience does not always suffice as a guide in the beginning of a new year's work. Changes in program must be made to suit each season; and yet, the work must be done largely in darkness, trusting in the general outcome, whether it be a season of prosperity or one of adversity.

Every year brings new inquiries for advice about berry culture. The low prices of farm products cause a few of the "old line" farmers to fall into the ranks of small fruit-growers; but they rarely come to stay, as the low price of berry products drive them back to the cornfield and pig-yard. Hence, there is a continual tide of wavering cultivatiors of the soil ready for a change at every low tide in products or prices. I am often asked the question, "Will berry-growing pay?" I say, yes. To the patient, hold-fast fellow in seasons of adversity, as well as prosperity, there is a living promise as old as the hills. I believe the periods of adversity in our lives are educators—but they are rarely told. It is the successful actors whose stories more frequently

come to the surface, while great clouds of adversity may be just behind them. So I see today as great opportunities in fruit-culture to the hold-fast young man as there was 30 years ago, when I left a $1500 a year situation to become a fruit-grower.

The berries that gave me the greatest satisfaction in product and profit this year were: First, Capt. Jack and Warfield, equally matched; second, Robinson, Parker Earl, Windsor Chief, Crescent, Grandy, all about equal in product, but varying in size. The third in product and profit were Bubach, Glendale, Parry, Haverlane, Miner, Jesse, Bederwood. The weather next season may reverse the value of some of the above sorts, or advance the product in size and quantity.

Of the new varieties fruited my first choice is Paris, King, Muskingum, Saunders; second choice, Splendid, Princeton, Princes, No Name or Grandy, Bell Rio. The novelties that will bear first crop next season most promising in plant growth are Bissell, Brandy Wine, Cyclone and Aroma.

Our earliest berries are Michel, Beiderwood, Van Deman, Barton; largest sorts are Bubach, Muskingum, Gandy, Paris, King, Jessie. The latest sorts are Windsor Chief, Gandy, Glendale, Mt. Vernon and Robinson, the latest from which I gather the last dish of the season.

I hope to see some good results from the novelties that will fruit next year. All progressive berry-growers are eagerly looking forward for a new strawberry that will supplant all others in size; then for a medium size, firm sort, that will stand long trips to distant markets.

A few old, hardshell, bourbon fruit-growers cry out against so many new fruits being introduced; but their cries will avail nothing. New fruits will out. So long as consumers seek for best kinds, fruit-growers will try for perfection. Testing new fruits is a part of the fruit-growers' education, and it adds some life to the Experiment Station. The aim of the enterprising fruit-grower should be upward into light, and not backward into darkness.

Raspberries were a better paying crop this year on uplands than last year, as the needed rain came in time to save them. On low bottom lands, away from the river, they were about all killed with frost.

The black sorts that gave the best satisfaction were Progress, Kansas and Queen of the West. On account of the earliness of Progress and Kansas, better prices were obtained for them. The later sorts brought lower prices. Our city and near-by markets were not well supplied with red sorts. Prices of reds ranged from $3.50 to $4 per crate.

Blackberries ranged lower this year than for several years. I attribute the low prices of blackberries to the largeness of the crop

and low prices of peaches. Our best blackberries are Taylor and Snyder. Early Harvest is a profitable sort to grow for distant markets when not caught in cold winters.

The plum crop this year was immense, but prices were so low that they barely paid the express charges.

Taking in the whole field, the season of 1895, as I estimate it, was not what might be called a very successful year in Kansas with small fruits. There were three "ifs" in the way: Drouth and frost reducing the product, and the ten days that Northwest Arkansas continued to ship berries after our berries were ready to market.

Now, Mr. President, considering all the ups and downs in a fruit-grower's life, are we not the most patient people on the earth? St. James, in his epistle, 5 and 7, holds the fruit-growers up for an example to the young disciples of his time in the following language: "Behold the husbandman waiteth for the precious fruit of the earth, and hath long patience for it, until he receive the early and latter rain." Mr. President: We bow in submission to the hoary frost and drouth; are patient with Kansas windstorms and destructive insects; are patient with dealers and consumers for bearing down the values of our products. We are patient with the careless handling of railway and express carriers; and patient even with the dishonesty of commission merchants; in fact, we are patient under all sorts of hard trials and tribulations.

B. F. SMITH, Lawrence, Kansas.

Music, piano and violin, by Miss Grace and Miss Clara Hubbert.

Recitation, "Tommy," Miss Ethel Harvey.

Prof. Walters delivered his article with illustrations of his figures and tools.

Farm and Orchard Engineering.

Farm and orchard engineering is that branch of applied mathematics that treats of surveys for and the building of roads, drives, walks, terraces, sewers, drain-tiles, water services, foundations, tree planting and the measurement of surfaces and also the estimation of the contents of bins, boxes, etc., etc.

The subject does not necessarily involve more than the elements of arithmetic.

In the Annual Report of this Society for 1894, commencing about page 69, will be found some hints and helps on making levelings. There is also a description of a cheap home-made level.

Another kind consists of a tin tube with its ends turned at right angles to its axis in such a manner as to form a cup at each end. Inserted into each cup is a small bottle. The bottles are secured to the cups by means of putty. In the center of the main tube, and on the opposite side from the cups, is a third cup or socket to receive a staff or tripod. The bottom of the the bottles must be removed before they are inserted into the cups. Now remove the stopper of one of the bottles and pour in water that has been colored red or some bright color by analine or other coloring matter. Now set the tube on a staff or tripod by inserting the top of the staff into the center socket. Remove both corks and the top of the colored water will describe a level, no matter whether it stands at the the same level or height in each bottle or not. The water should be poured in until the tube is full, and it stands one-half to two-thirds to the tops of the bottles.

Colored water will give a much better definition than will uncolored.

In laying out and building roads and drives, as well as walks, it is sometimes necessary to define, produce or extend an incline or horizontal plane. Get three pieces of lath and cut them exactly the same length. Set one piece at one point on grade and another piece at another. Set up the third piece, either between or outside the first two. Sight over the tops of all three pieces. The surface on which the third piece stands will be as much below or above grade as its top is below or above the plane described by the tops of the first two. Keep all three pieces vertical while in use.

It is often necessary in tree-planting and in making surveys for foundations to stake off a right angle. Establish the corner point "A." Along one line measure 40 feet and set stake "B," go back to "A" and measure at right angles 30 feet and set "C." Now make 50 feet the distance from "B" to "C" and you will have described a right or 90° angle at "A."

To describe a 45° angle, measure out on each of the two lines that describe the 90° angle the same distance, say 20 feet. Connect these two 20-foot points. Find the center of the connecting line. From this center point draw a line back to the corner. This last line and either of the first two will describe a 45° angle.

A square may be staked off by making each of its diagonals 1.414 times one of its equal sides. Suppose we wish to stake off a square whose sides shall each be 50 feet. Establish two points, "A" and "B," 50 feet apart. At right angles, 50 feet distant, set "C," and at right angles to the last line set "D", distant 50 feet from "C" and "A." Now move both "C" and "D" until "C" shall be 1.414 times 50 feet

or 70 feet 8½ inches from "A" and "D" shall be the same distance from "B." Now we have a perfect square—each corner describing a right angle, and the diagonals are 45° from the boundary lines.

Having established a point for a tree, corner-stone or other object requiring an excavation to set it, the point may be held as follows:

Take a strip board with one straight edge. Bore a hole through each end. Cut a notch near the middle of the straight edge. Put the notch at the point. Drive a stake through each hole and into the ground.

Now lift the board off of stakes and make the excavation. Now set the board again with the stakes through the holes. The notch will still indicate the point. Should the tree or other object be large, the board may be staked so that the notch is to one side of the point any given distance, say four or five inches.

It is occasionally desirable to know how to measure the distance across a stream or from one hill top to another.

Set point "A" on one bank. On opposite bank set point "B." From "A" lay off a line 45° from line "A" "B." Produce this line by sighting across the stream and setting point "C." Now the line "A" "C" and "A" "B" describe a 45° angle at "A." Now cross over to "B" and stake off a line at right angles to "A" "B." Produce this line until it intersects "A" "C." From this point of intersection to "B" the distance is the same as the line "A" "B," because "A" "B" and "B" "C" describe two sides of a square.

Here is another method: Set point "A." Let "B" represent point on opposite side of stream, or on a distant hill or mountain, and it is required to know the length of the line "A" "B." From "A" lay off a line any distance at right angles to "A" "B," and set "C." Come back to "A" and measure in opposite direction from "B" any distance and set "D" in line with "A" "B." Now lay off a line parallel with "A" "C" and, of course, at right angles to "D," "A," "B." Produce this parallel line until a point is reached on a line with "B" "C," and set "E." Measure from "D" in the direction of "E" the same distance as "C" is from "A" and set "F" on the line "D" "E."

Of course, the distance from "C" to "F" is the same as from "A" to "D" and from "E" to "F" is the difference between "D" "E" and "A" "C."

Then "E" F" is to "C" "F" as "A" C" is to "A" B." Suppose the distance from "A" to "C" is 40 and from "D" to "E" 70 and from "A" to "D" 60. Then "E" "F" would be the difference between "D" "E" and

"A" "C" or 30. Then 30 is to 60 as 40 is to 40 times 60 equal 240. Divide by 30 and the quotient is 80. The line "A" "B" is then 80.

In all cases, multiply the line "A" "C" by the line "C" "F," which is the same as "A" "D," and divide by "E" "F." The result will be the line "A" "B" or the distance from "A" to "B."

To measure the height of an object, say a tree, proceed as follows: Take a light packing box, say 20 by 36 inches in width and length. The depth is immaterial. Stand the box on end and drive a small wire nail into one corner. Measure down the side of the box a distance equal to the width of the box, say 20 inches, and set another wire nail. The line described by these two nails is 45° from either a vertical or horizontal. Set the box as far, approximately, from the tree as the tree is high. Level the box, keeping the end with the nail in the corner up. Sight over the two nails and to the tree. Move the box until the two nails and the top of the tree are on the same line. Now the distance from the lower nail to the tree is the same as from that point to top of tree. While the box is yet level on top, sight over the top and see where the line described by the top of the box will strike the tree. The height of the tree, as just determined, is the distance above this line. If it strikes five feet from the ground on side of the tree, that much must be added. If it strikes into the ground before reaching the tree, the distance below the surface must be estimated and subtracted in order to determine the true height of the tree.

It is surprising how many important things are omitted from the arithmetics in common use. I will discuss a few of them.

A gallon contains 231 cubic inches, and a bushel 2150.4 cubic inches. It would take, then, 9.31 or about $9\frac{1}{3}$ gallons to fill a bushel measure, and not 8 gallons as many suppose.

A liquid quart is one-fourth of 231 cubic inches. A dry quart is one thirty-second of 2150.4 cubic inches. The first contains, then, $57\frac{3}{4}$ and the latter 67 1-5 cubic inches.

The dealer should remember that a quart of berries, if measured in a liquid quart, will be about 10 cubic inches short.

A cubic foot contains 1728 and a bushel 2150.4 cubic inches. These numbers are to each other almost exactly as 8 is to 10. To change cubic feet to bushels multiply by 8-10. To change bushels to cubic feet divide by that fraction. The error is about 15 quarts in 100 bushels. If perfect accuracy is required, use the decimal .8036 instead of 8-10.

There are 231 cubic inches in one gallon and 1728 cubic inches in one cubic foot. There are, then, 7.48 gallons in one cubic foot—$7\frac{1}{2}$ gallons would be near enough for making an estimate.

To change cubic feet to gallons multiply by 7.48—approximately by 7½. To change gallons to cubic feet divide by the same number.

An avoirdupois pound is 7000 grains and a troy pound 5760 grains. An avoirdupois ounce is 437½ grains while a troy ounce is 480 grains. A pound of sugar weighs 1240 grains more than a pound of gold, but an ounce of sugar weighs 42½ grains less than does an ounce of gold.

So much for laying out and estimating and calculating work. Now a few words on construction.

On account of limited time on this occasion, remarks will be confined to road making.

Roads are usually ditched in such a manner as to cause them to soon wear away by erosion. In most parts of our State the topography is such that one side of roads is higher than the other. In such cases the roadway or track should be made as close to the upper side as possible—leaving space on that side for only a small ditch. The main ditch should be on the lower side and as far away from the road as possible. At short intervals there should be cross drains from the ditch on the upper side to the ditch on the lower side of the road. This would reduce the drain area of each section of the upper ditch to the minimum.

If managed in this manner common dirt will make a good road for use during most of the year.

Wherever the topography will allow, the ditch on the lower side should be turned into lateral drains on the side of the road—into such brooks and ravines as nearly every hillside affords.

Erosion ruins more roads than does any other agency.

I have never seen repairs on macadam or "pike" roads properly made anywhere in our State—Kansas City not excepted.

The usual plan is to dump into a depression some crushed or broken rock and call the defect repaired.

Take a pick and dig a square shoulder around the depression. Throw in large pieces of rock of suitable quality. Break these pieces with a heavy hammer. Hammer down until all the new material is thoroughly wedged against the shoulder around the sides of the depression. Now top dress with suitable material and the repair is properly made.

Many different methods of procedure could have been given in discussing the foregoing topics, but, under the present circumstances, only what experience has shown to be best adopted to the use of the non-professional have been explained and recommended.

EDWIN WALTERS,
Geologist and Civil Engineer.

Final resolutions adopted :

Resolved, That we tender our thanks to the musicians of Neosho, who entertained us with music that enlivened our evening exercises, and to the band for their daily serenades; to the citizens, hotels and Commercial Club for their hospitality in making our stay so pleasant, and to the press of Missouri for their valuable assistance in carrying on the work. We also appreciate the rates given us by the different railroads, especially the K. C., P & G., and recognize that friendly relations and co-operation are necessary to our success. Thanks also to the Newton County Horticultural Society for its efficient work in the successful display and the preparation for the Society's entertainment.

G. B LAMM,
S. W GILBERT,
J. AMES.

The Gladiolus.

The gladiolus is the brightest gem in the galaxy of summer flowers. In popularity it ranks with the rose and the chrysanthemum. From its great richness and brilliancy of color, of almost every shade, it is one of the most beautiful and striking flowers in cultivation. No other plant is at once so magnificent in effect, so easy to grow and so certain to bloom.

It is admirably adapted for grouping among shrubbery, or in mass, or for planting in border, and is said to make fine plants for the conservatory.

In its improved condition the gladiolus is comparatively new, and not nearly so well known as its merits deserve. Untily recently the best varieties came from Europe, and prices were so high that the majority of the people could not afford to buy them. Now the best varieties in the world are produced in this country, and in such quantities that the prices are within the reach of all.

The flowering season extends from June to November, or even later. They are most valuable for cutting for bouquets and vases, and for these purposes are of great importance, as a home may be magnificiently decorated during a whole summer by means of an inconsiderable outlay for a few dozen bulbs. The spike may be cut as soon as the first flower expands, and, if put in water (which should be renewed every day) every blossom will open to the last bulb as well as it would have done on the plant, and the flowers will be even more perfect, if possible, and more delicately beautiful than if left uncut. The flowers on a single spike will last from ten days to three weeks. Each day when the water is changed the faded flowers from the lower portion of the spikes should be removed.

The bulbs may be planted at any time from early spring to the first of August, and successive plantings (two or three weeks apart) will give a succession of flowers from midsummer to the time of heavy

frost, when the unblossomed spikes may be cut and put in water in the cellar and brought out when wanted. A succession of bloom may also be obtained by planting all sizes of bulbs early in the spring, the smallest being the latest in coming into bloom. A small bulb produces as fine flowers as a large one, but yields only one spike, while a large one sends up from two to six, and many of them also produce from one to four side shoots, or secondary spikes, nearly as the first ones, and these, too, aid in prolonging the blooming season.

Any good soil is suitable for the gladiolus. It is easy of cultivation, and will stand as much manure as the onion or the cabbage. It is important that it be given a place that is rich enough. When blooming bulbs are planted they should be covered with three or four inches of earth to keep the stalks in an upright position, and even then it is safer when one has but few to tie the spikes to stakes, lest they be blown over and be broken off from the bulb. If any become so broken they may be taken up at once and dried, for although it is their nature to continue growing until frost comes, they may be dug as soon as they come into bloom, when not half grown, and still retain their vitality. A bulb grows but once. As soon as a sprout commences to unfurl its leaves it enlarges at the base, sends out roots and forms a new bulb on top of the old one. This continues to increase in size throughout the season, and also produces a number of bulblets on the under side. If allowed to bloom and ripen seed, the bulb will be smaller than it would have been if the spike had been cut when it first came out. The bulblets may be sown in the spring like peas, and under favorable conditions will produce blooming bulbs in one season. I now have nearly a bushel of these for next spring's planting.

I plant my bulbs in the garden in rows two feet apart, and give them clean cultivation with a Plant, Jr., cultivator, until they are nearly ready to bloom, then I cover the ground heavily with old mulching taken from the strawberry beds. This keeps the soil cool and moist, and induces a strong, healthy, vigorous growth. During the three years I have tried it, it has been very successful, and has given great satisfaction. I have also obtained good results by continuous, clean cultivation throughout the entire season, but I prefer to use the mulch, believing that it is less work and more satisfactory in the end.

Bulbs should be dug in October or first part of November and the stalks cut off close. They should then be dried, put in baskets, labeled and hung in the cellar, where potatoes will not freeze during the winter, and they will take care of themselves until planting time comes. Rats and mice do not molest them.

Every lover of flowers (and who is not?) and every lover of colors, which are at once the most brilliant, the most delicate and the most beautiful, should possess a good collection of gladioli. When cost, ease of cultivation and sure and magnificent results accomplished are considered, there is no flower that equals the gladiolus, and it is with the utmost confidence, therefore, that I recommend it to all.

Z. T. RUSSELL, Carthage.

Apple Market Future.

All speculations in the future must necessarily be more or less uncertain. Everything seems to be subject to changes on account of existing conditions, demands, supplies and competition.

In this progressive and inventive age changes come fast, and improvements of methods and quality of goods compete for supremacy in all markets of the world. While this is especially true in everything directly affected by the inventive genius, it is less noticeable in the staple food products.

Corn, wheat and rye were used for bread thousands of years ago, and are still used. Fruits of all sorts have also been, and are now, and will for all time to come be used. Centuries will come and go, and the same demand will exist, only in a greater degree, according to the advancement of civilization.

Orchards must, therefore, be planted, and wholesome fruit gathered and sold with much pleasure and profit; and the apple, "the king of all fruit," will continue, as it has in the past, to occupy the front rank on the markets as the most important of all fruits.

This is no fancy sketch or a theory, but a well settled fact. It is, therefore, not a question of "will there be a market and demand for apples in the future," but how we will reach and supply this market and ever growing demand in the most practical and economical way.

But it will be said that we are now overproducing apples, as proven by the low prices and glutted market of the past season, and with all the thousands of acres of new orchards coming in yearly "what will the future be?"

It is true that the apple crop of '95, when viewed all over the land, was a very large one, and for low prices and glutted markets, had no equal for many years. And yet what are the facts as we find them today? Good apples are in demand (not at fancy), but at fair prices, and thousands of families, even in apple-growing sections of this and other states, have not an apple laid in for winter.

Yes, the year 1895 had a very large apple crop, but it came—it was here—and it went, and thousands of bushels went to waste for want of proper care and attention, while thousands of families had to do without apples.

When the National Apple Shippers' Association met in convention last August in the city of Chicago, it was not a question with them "Will there be a demand for apples?" but the main question, "How best and in what way this, then unusually large, apple crop could be economically and properly distributed and sold." And this, in my opinion, will be the great question we will have to settle in the future.

That the demand has increased much faster than the natural increase of population, is also a fact that all who have handled fruit largely agree upon. When I commenced shipping apples, twenty-six years ago, in July, 1869, a car-load of apples to any town west of the Mississippi, (excepting a few large cities) was equal to glutting the market; today there is room for car-loads even in small towns. I remember in the early part of the seventies, the greater portion of Texas was supplied by apples brought in wagons from Arkansas, and a few wagon loads would supply and often overstock towns, which now receive so many car-loads. It is true the population has increased since, but not in the proportion to the present demand for apples, and in my opinion this demand will grow at a greater ratio in the next twenty years. It is largely a matter of education, and so long as civilization and education progress, we may look for an increased demand for fruit. But the chief question confronting us now, and which under existing conditions may not be easy to solve, is "how, when, and by what method will we reach and supply the entire year this ever existing and growing demand." From my twenty-five years' active experience in packing and shipping apples, I would recommend:

1. Education.
2. Distribution.
3. Specialties of occupation.

By education, I mean that the fruit-grower should know what varieties to plant, how to plant, cultivate and gather at the right time, and in the best possible manner. The dealer must be well informed in his business so he may properly pack and distribute. There is so much to say and advice in detail, in this connection, that space and time will not permit.

The main idea, however, that I wish to convey to both the grower and the dealer is "honest and fair dealing." Deception practiced by either the dealer or the farmer, has in the past worked great injury

to the apple trade, and has decreased the demand for apples, and glutted markets more than any other one thing.

The grower should learn and understand that he cannot get and must not expect the higher prices of years ago, when wheat was selling three-fold higher than today, neither should the dealer expect to make the profits of those days. All this is necessary to reach the great consumers, the common laboring masses, who consume the largest quantity of apples. We should endeavor to place them within their reach, so they can afford to buy them throughout the year, and put apples in their and their children's dinner pails freely, and in that way we will open a demand, which otherwise we cannot reach.

DISTRIBUTION.

This seems to include all the troubles and vexations known to mankind. The greater part of the apple shipping season it is either too hot or too cold, too much fruit or none at all, etc. No one can fully appreciate this unless he has been in the apple shipping business, trying to find a market for perishable fruit with the thermometer at about one hundred in the shade, with all the principal markets overstocked and glutted.

Our apples mature within about three months' time, and to distribute this crop over all of the twelve months in the year, which we should do in the future, will require much intelligent labor and good management as well as the investment of much capital.

Cold storage and other methods of keeping fruit, properly constructed fruit cars, cheap and rapid transportation, etc., are indispensable for the successful handling of and marketing of apples in the future. But to attain this it is necessary that we should follow and encourage specialties of occupation.

The fruit-grower, to do this work well, so as to reap the largest returns from his orchard, will find all of the work for his energy, mind and body to master that special calling. He will have no time to look up the markets and reach the consuming masses, to look after cold storage and other requirements of distribution.

It is my firm conviction that the future apple market will depend for its fullest efficiency and effect upon the proper, wisest and most economical distribution, and this can only be done through large plants of invested capital, whether it be cold storage, canning factories, evaporators, cider mills, distilleries, vinegar, jelly or other factories, any one of which is a business of itself, and to make them efficient and profitable, and to keep up with the requirements of the trade, will require the employment of much capital, skilled labor, intelligent management, and careful studying of specialties. CHAS. C. BELL.

MISSOURI AT THE ST. LOUIS EXPOSITION, 1895.

INJURIOUS INSECTS OF THE SEASON OF 1895

BY

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INTRODUCTION.

While some of the more common insect pests recur from year to year with the recurring seasons, apparently but little affected by climatic conditions, there are others whose development is greatly checked or promoted by unusual droughts or excess of moisture and by extremes of heat and cold. The character of the season, then, is always a more or less important factor in the entomological record of the year.

The season of 1895 was peculiar throughout Missouri and in many of the contiguous states for the unusual dryness of the winter and spring. This was compensated in some degree by frequent and refreshing showers during the summer months, succeeded by the usual autumn drought and accompanied by early frosts and generally low temperature in October and November, following excessive heat in September.

The lack of winter floods and the dryness of the spring favored the hibernation and development of all insects that pass the winter upon or beneath the surface of the ground. Among these insects are cut-worms, root-feeding aphids and many injurious species of true bugs. Consequently there was, later in the season, more than usual injury inflicted by pests of these species in fields and vegetable gardens, as well as in the orchard and nursery.

Another factor which will entail much labor during the season of 1896, in the destruction of insects, was the abundant fruit crop of '95 and its somewhat inferior quality. This caused much of it to be suffered to waste, and the insects which it fostered were afforded ample opportunity for development and increase. Careful attention to the clearing up and burning of rubbish and fall and winter cultivation of the ground, are excellent preventive measures against many species of garden and orchard pests, but will not affect to any great extent the plum curculio or the codling moth from which, in Missouri, fruit suffers more than from all other insect enemies combined. For the codling moth, we have a fairly reliable remedy in the Paris green or London purple spray, which, if used reasonably, and especially when combined with some fungicide, insure the health and vigor of the trees, and in

great measure also, the soundness of the fruit. Spraying with the arsenites in order to preserve stone fruits from the curculio is still of questionable value, but there is hope that some recently discovered insecticides may be found more effectual. Undoubtedly human ingenuity will, in the course of time, vanquish even this, as yet, invincible foe.

At the last meeting of the Society of Economic Entomologist at Springfield, Mass., August 27, 1895, a number of discoveries were announced in the line of new insecticides and of combinations of those well known, with substances, which while not diminishing their poisonous effect upon the insects, rendered them less caustic upon the foliage of the trees and plants to which they were applied. In the treatment of the Gypsy moth, for example, which has for several years been such a scourge upon trees and shrubbery in Massachusetts, Prof. Fernald reported that, after all known insecticides that could be used with even a measure of safety to the trees, had failed, a preparation of arsenate of lead, a discovery of the station chemist, had been found effectual in destroying the insects without injury to foliage. Fish oil soaps had given very favorable results both as insecticides without admixture, and when used instead of the ordinary domestic soaps in the manufacture of kerosene emulsions. Prof. Smith of New Jersey gave the results of his experiments with two viscous products of crude petroleum. One of these, "Raupenleim," was of German manufacture, and in general use in many sections of Germany, where it is applied to the trunks of the trees to prevent the oviposition of boring beetles, and to make it impossible for those already in the tree to make their way out when they have arrived at the perfect state. It also acts as a barrier against all species that naturally crawl up or down the tree in the course of development, and is still further useful in protecting the bark from the gnawings of wild or domestic animals. The second of these products is "Dendroleum," which is produced in America. It is of lighter color and lacks the tarry odor of the foreign article, but in other respects closely resembles it. Both are recommended for use, not only against borers, but for catching such insects as canker worm females, bag worms, Tussock moths, climbing cut worms, and for destroying the eggs and trapping the minute pear tree Psylla, which is very destructive in some of the Eastern states to the foliage and fruit of the tree from which it derives its name. These substances are daubed upon the trunks of the trees with a paddle, and afterward spread more evenly over the bark with a stiff brush. They are said not to injure the tree in the least. The cost of the Raupenleim—which the experiments reported had proved to have some advantages over Dendroleum—is $12.75 per 100 pounds in New York, while Dendroleum may be purchased from oil works for $5.50 per 100 pounds.

That an intelligent interest in applied entomology is growing in our State is evinced by the hundreds of letters which were addressed to me during the past year, on the subject of injurious and beneficial insects, in most cases accompained by well packed specimens and by notes that indicated careful and correct observations. Some of these letters were answered through the St. Louis Republic, the Rural World, the Journal of Agriculture and other papers, but by far the greater number required immediate attention and were answered personally. Among the insects concerning which from one to twenty inquiries were received, were the following: Meat-flies, horn-flies, bot-flies, katydid eggs, box-elder bug, peach-tree borers, cucumber-vine borers, rhynoceros beetle, long-tailed ichneumon fly *(thalessa lunator)*, galls on willows, galls on blackberry stems, woolly aphis on apple branches, the same on apple-tree roots, lilac stem borers, apple-tree pruner, saddle back caterpillars, ambush bug *(Phymata erosa)*, *Calopteron reticulatum*, plum and other fruit-feeding curculios, grain pests, small webworms on evergreens, bag worms, chinch bug, tarnished plant bug, tent caterpillars, walking stick, oyster shell bark-louse, scurfy scale, San Jose scale, apple, peach and cherry-tree borers, hickory borers, tussack moth, aphis on plum, aphis on melons and cucumbers, striped leaf beetle, bark lice on elm and blackberry, buffalo bug, squash bug, white ants in timber, peach tree scale, mole crickets, imbricated snout beetle, rose slugs, corn-root aphis, bill bugs, wire worms, yellow necked apple-tree caterpillar *(Datana minestra)* blister beetles, buffalo tree-hopper and many others. These cover a wide and interesting range of subjects and indicate in some measure the number and diverse character of the insect enemies with which the Missouri farmer and fruit-grower have to contend.

The insect problem, with us, continues to be complicated by the danger of natural immigration, or the unconscious introduction by dealers in trees and plants, of insect pests from which we have hitherto enjoyed immunity. We are liable, also, to the sudden development in destructive numbers of insects indiginous upon our local flora which in some inexplicale way, acquire the habit of feeding on cultivated plants. Hundreds of such instances are on the records of economic entomology. This acquired habit is often quite local, and if observed in time may be stamped out, so to speak, and the widespread acquisition of new taste retarded, even if it cannot be ultimately prevented. Along this line, the investigations carried on at the State Experiment Stations should be especially directed and warnings widely published against the weeds from whose especial insect inhabitants danger to cultivated plants may be apprehended. As an illustration: There is

no question in my mind but that the pernicious little cabbage stalk curculio *(Ceutorhynchus rapæ)*, of which I gave an account in a paper read before this Society some years ago, originated, or at least was perpetuated, in the wild pepper-grass *(Lepidium virginicum)*, from which I bred it ten years before it was reported as a pest of the hot-bed and market garden. It is this same plant also which chiefly fosters the striped flea-beetle, another pest of our most valuable cruciferous plants. It should, therefore, be especially guarded against in the neighborhood of the vegetable garden. Many similar examples of the danger of certain weeds might be adduced, but would too greatly extend my space limits. They simply point to the value of the study of the habits of insects attacking wild vegetation, especially that which is generically related to valuable cultivated plants.

There are, it is true, instances in which insects radically change their food habits, and attack plants in the garden which are of an entirely different group from those on which they originally fed. Such erratic developments cannot of course be anticipated, and can only be met by the use of insecticides in the garden or orchard.

In conclusion, it may be said that, taking all things into consideration, the warfare against destructive insects is progressing favorably, and that, as a knowledge of their life histories and habits becomes more general, preventive measures and direct attacks will be more intelligently used and will, therefore, meet with a measure of success which may save the agriculturist from all but a very small percentage of loss.

THE TARNISHED PLANT-BUG.

(Lygus pratensis, Linn.)

No insect attracted so much attention or inflicted so much damage during the spring of 1895 as the species named above. Letters came to me from all parts of the State, but especially from the south and west, inclosing specimens, and giving accounts of its disastrous work on the blossoms of fruit-trees, strawberry plants and other vegetation. The rather mild and dry winter preceding had permitted the survival of a very unusual proportion of these bugs, and as there were few drenching showers during the spring to beat them from the trees, they naturally "did their worst" for the fruit-grower, and were the cause of great loss.

Fig. 1. The Tarnished Plant-bug. After Riley. From Dept. of Agriculture.

The popular name of this insect has been changed from its original, somewhat inconvenient, adverbial

form of "Tarnish Plant-bug" to the adjective form now commonly adopted, but which is far less appropriate than the former, which so exactly describes its effect upon whatever plant it appears.

It hibernates under loose scales of bark, among drifts of fallen leaves, or under any rubbish that will in a measure shelter it from cold and damp. From these hiding places it emerges as soon as vegetation starts in the spring, and, ravenous from its long fast, it flies to the orchard and congregates upon the opening buds in which it makes numerous punctures and pumps out the sap that should have nourished the expanding leaves and blossoms. Nor is it alone the loss of sap from which the plant suffers, but the wounds made by it seem to be peculiarly poisoned, so that the young leaves and flower buds upon which it has worked speedily turn black and wither up, and the whole tree or plant presents a "tarnished" appearance, and, when the attack is very bad, the twigs and small branches often dry up and drop off. The fruit-trees which suffer most are pears and quinces, although all other sorts, except, perhaps, the peach, receive a proportion of punctures. On the strawberry bed it has the effect of checking the development of the berry, and producing deformity where it does not entirely blacken.

The bug is a small species, not exceeding one-fifth inch in length, of flattened oblong form and dingy brownish yellow or yellow gray color, variegated with dull yellow and dark brown in patches and has a more or less distinct yellow V on the little triangular scutel just behind the thorax. The latter division of the body is narrowly bordered and divided down the middle with yellow lines. As in all "true bugs" the tips of the upper wings are membranous and the markings are arranged in oblique lines. The head has three red marks on top and bears the round prominent eyes, the long, jointed antennæ and the beak or sucker, which is one-third the length of the body, and when not in use, is folded under against the breast. The six legs, on which the insect runs so nimbly, are rather slender and of a dingy yellow, with two dark bands on the thighs. The males are, as a rule, somewhat smaller than the females, and more brightly colored. The young bugs are entirely green, but in other respects differ from those that are mature only in size, and in the absence of wings. During the summer months they are seldom found in any abundance on trees and shrubs, but seem to prefer the more succulent growth of the vegetable garden, and of many weeds.

The only application that has proved a remedy for this pest is the kerosene emulsion. This may be used without danger to trees and

plants, except when they are in bloom, and if the orchard and berry beds are watched and treated upon the first appearance of the bugs the latter can be greatly reduced in numbers before the fruit blossoms are fully expanded. They are also very easily jarred from trees during cool mornings while they are more or less torpid.

As this insect feeds upon such a variety of plants it is one of the most difficult species with which to experiment, and, as yet, I have not been able to innoculate it with any of the fungous diseases of which the germs were obtainable. Nor would it be of much value had the efforts succeeded, since the bugs seldom congregate so closely as to infect one another. I have found it in the autumn quite abundant on the flowers of sunflowers and on the green seed heads of *Chenopodium* (Pig weed or Lamb's quarter). It is also said to be partial to the yellow flowers of cabbage and lettuce, and may be knocked from these into vessels of hot water or upon cloth saturated with coal oil. The most reliable preventive, however, is the thorough clearing up and burning of all rubbish, in which the insects naturally harbor, during autumn, winter and early spring.

THE MELON OR CUCUMBER PLANT-LOUSE.

(Aphis gossippi, Glover; *cucumeris*, Forbes.)

The species above named was more than usually abundant during the past summer, and proved exceedingly destructive on cucumbers and all sorts of melons in many sections of Missouri, and in other States where these fruits are produced in great quantities for the markets of large cities. In some localities the melon and cucumber fields were practically destroyed by it, causing very serious loss to the growers.

This aphis appears upon the vines about the last of June or early in July, congregating on the under sides of the leaves, and as it increases in numbers, covering the growing points, flowers and even the young fruit.

It is usually found in two forms, the one winged and the other wingless, both of which produce living young at an incalculably rapid rate. The species is of medium size, one-fifteenth to one-twelfth inch in length, with a pear-shaped body. In color it ranges from pale yellow and green to brown. The eyes, joints of the legs, tips of the antennæ and the honey tubes or "nectaries" are dark brown or black. The more slenderwinged form has the body ornamented with various black bands and spots. The winged forms are the migrants, first from the spring food plant to the melon or cucumber vines, then from one vine

or part of vine to another, and in the autumn to the plant upon which they are taught by instinct they can pass the winter in comparative safety.

They are found in greatest abundance on the newest and tenderest growth which the irritation of their innumerable punctures and their abstraction of the sap, causes to turn yellow and die back, sometimes for eight or ten feet, the result being to greatly diminish the quality and quantity of the fruit product, even where the vine is not killed outright. The area of the country in which this pest has established itself has increased very rapidly within a few years, and unless measures are taken to suppress it, or natural checks develop, it threatens all the profits that have heretofore been made from the culture of cucurbitaceous plants.

It was first observed on cucumbers in 1880 and in 1883. Prof. Forbes of Illinois described it as *Aphis cucumeris* and gave an account of its habits upon the plants from which it was named; but its method of hibernation and early spring history were not traced for many years. Prof. Smith of New Jersey has devoted considerable study to it during the last two or three years, but lacking time for the close and repeated observations required, the investigation was, in 1892, assigned to Mr. Theodore Pergande, one of the entomologists of the Department of Agriculture at Washington. Mr. Pergande's studies have established the fact that the species is identical with the one first described in 1854 by Prof. Townsend Glover of the Department as the cotton plant louse *(Aphis gossipii),* being then only known as a formidable pest of the cotton plant. It was still further identified with what were supposed to be two different species attacking the orange tree in Florida, and with a strawberry root louse, discovered by Prof. Clarence Weed, and by him named *Aphis forbesi.* After thus recitifying its synonomy and bibliography, Mr. Pergande found that it was not by any means confined to the various plants already mentioned, but that it was a very general feeder, occurring on more than 20 of our common weeds, as well as on clover, hops, beans, spinach and other garden plants. This general food habit was a most unwelcome discovery, as it had been hoped that in some stage of its development it would be found only on one or two plants, on which it might be possible to so reduce its numbers that it would cease to be a formidable pest of melon and cucumber fields. At present there seems to be no ground for such hope and it only remains to fight it, as effectively as possible, when it appears on the vines. It passes the winter on the roots or bases of the stems of herbacous

perennials, and probably it is to these plants that the true sexed individuals resort, in the fall, to place the fertilized eggs by which the vitality of the species is annually renewed. The young lice hatch from these eggs in the spring, and, after attaining their growth, begin the agamic reproduction process, which goes on for a number of weeks and finally develops a brood of the winged form. These desert their spring feeding ground and, guided by instinct, find their way to the plants upon whose juices they feast during midsummer.

Nature has already some checks upon the undue multiplication of this species. Lady-bird and syrphus fly larvæ are found in large numbers preying upon the lice, and the latter are also often parasited by a minute chalcid. But, so far, these friends of the horticulturist have not been adequate to the task of clearing the leaves of the pest. The general character of the season too has a bearing on their numbers and destructiveness. Prof. Smith has observed that cold, wet springs retard their development, and that heavy rains and gales occurring late in June, about the time that the winged brood migrates to the melon vines, beat to the ground or sweep away such a large proportion of the insects that the vines enjoy for the season a comparative immunity from attack.

As to direct remedies, the principal difficulty is to bring them in contact with the insects on the under sides of the leaves which lie so close to the earth. This requires the time of two persons, one to lift the vines while the other applies the insecticide. The plants should be frequently and critically examined early in July and the aphids headed off upon their first appearance.

In experiments on a small scale I have found the insects easy to kill with equal parts of pyrothrum powder and air-slacked lime, or with the preparation of tobacco and creosote sold as "X. O. dust." Tobacco tea and kerosene emulsion are the most effective liquid applications. Prof. Smith made some interesting and successful experiments with the fumes of bi-sulphide of carbon, evaporating it under wooden bowls, tubs or boxes that had been placed over the plants, using about two teaspoonfuls of the chemical (which must be poured in some small receptacle and not on the ground) to each plant. An exposure of an hour was sufficient to kill the lice without serious injury to the plants. The poisonous and inflamable character of the bi-sulphide necessitates great care in the handling.

THE APPLE-TREE ROOT-LOUSE.

(Schizoneura lanigera, Hausin).

Probably few insects have been the cause of greater disappointment to the apple-grower than the insidious pest above named. Especially is this the case of the inexperienced horticulturist, who plants his trees without careful examination of the roots or of the soil in which they are set, and who, after wondering over their feeble growth, and the fact that a large proportion have languished and died, makes a thorough investigation for causes, and finds his young trees, that ought to be about ready to fruit, with their roots knotted and decayed, covered with a bluish white mouldy-looking substance, and altogether incapable of holding the tree firmly in the soil or of conveying nutriment to the branches and leaves. Still closer scrutiny reveals myriads of small, pale-yellow lice clustering in the crevices and creases of the distorted roots, all more or less densely covered with the mouldy-looking, cottony matter which is excreted in exceedingly fine threads from the upper surface of the body. The beak or sucker, of which a magnified figure is seen at *e* in the illustration, is, in the young lice, nearly as long as the body, beneath which it is folded when the insect is not feeding. In more mature specimens, which are often of a pink or purplish color, the beak is proportianally somewhat shorter. As soon as the weather becomes warm, there will be found associated with these more or less numerously, the winged migrant form. The latter are of darker color, and excrete very little of the downy matter, so characteristic of the apterous form. They are all parthenogenetic females, and their mission is emigration and the formation of new colonies on young and healthy roots.

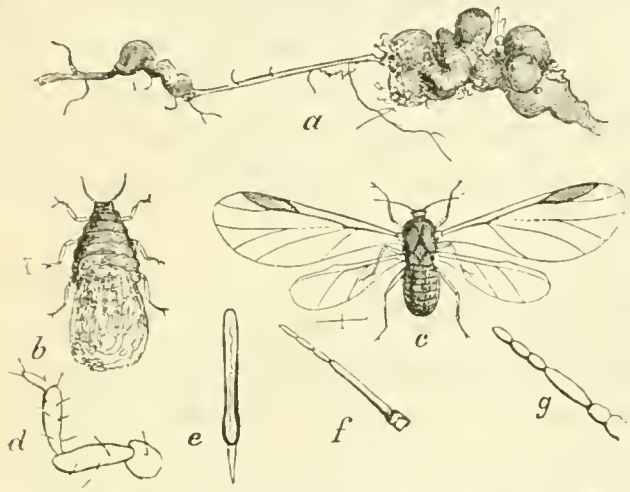


Fig. 2. Apple-tree Root-louse (*Schizoneura lanigera*); *a*, diseased root; *b*, wingless form; *c*, winged form; *d*, leg; *e*, beak; *f*, larval antenna; *g*, perfect antenna; all enlarged except *a*. After Riley.

This species has an aerial as well as a subterranean form. The former is more often found in the New England States than the one upon the roots, and is also so widely diffused over Europe as to make "its supposed" American origin quite doubtful. This form is called woolly aphis with great propriety, as its colonies work under a downy coverlet of the bluish-white excretions. In clay soils, and especially

during wet seasons, it becomes very conspicuous in the orchards of Missouri, clustering upon the suckers from the base of the tree, about the axils of twigs and leaves and upon the scars where pruning has been done. Everywhere its punctures are not only exhausting to the tree, but possess a poisonous property which causes gall-like growths, those above ground appearing like small kernels or seeds.

As with most aphids, a true sexed generation is produced in the autumn, the females of which lay their microscopic, shining black eggs in crevices of the bark near the base of the tree, and a large proportion of the young lice, hatching from these eggs, find their way to the roots while, under certain circumstances, the remainder start small colonies above ground.

Orchards on gravely or porous soils are peculiarly liable to suffer from the apple-root aphis, and every precaution should be taken to have the roots of the trees when planted, absolutely free from the insect, and also to make strict examination of the soil for fibres of roots that might be infected.

Where the presence of the insect in the nursery is suspected the roots of the young trees should be immersed for a couple of hours in soap-suds or in water heated to not more than 130°. This will kill the lice without injury to the roots.

When it is designed to plant newly cleared timber land to apple-trees it should be first cultivated for one or two seasons to corn or some other crop requiring repeated plowing or hoeing. This to make sure that all the roots of wild crabs, thorns, etc., on which the lice are often found, have been thoroughly cleared from the soil. It is also hazardous to replant an orchard in the position occupied by old trees, but sometimes it seems desirable to replace a few trees that have died out, to preserve the symmetry of the rows. In order to do this with safely the soil should be repeatedly worked over and fertilized heavily with fresh wood ashes.

There are a number of natural checks upon the multiplication of both the root feeding and the aerial forms of this insect. Among these are a small chalcid fly *(Aphilinus mali),* the root-louse syrphus fly *(Pipiza radicum,* Riley), a lace-wing fly and several of the lady-bird beetles. These have never, however, been found in sufficient numbers to locally exterminate the pest, though, no doubt, at times greatly reducing its numbers.

To apply artificial remedies for the root inhabiting form, it is an excellent plan to first mulch the trees, and by this means bring the insect as near to the surface of the ground as possible. The roots

should then be somewhat uncovered and copiously drenched with very hot, but not quite boiling water, or with strong soap-suds. An application of soap-suds with about one pint of turpentine to a gallon of suds has also been recommended. Kerosene emulsion is also a reliable remedy when thoroughly applied, and that vile-smelling and inflamable chemical, bi sulphide of carbon, may also be used effectively by pouring a few tablespoonfuls into holes made around the tree which should be covered as soon as the sulphide has been injected.

The woolly aphis on the trunk and branches can be cleared off, with comparative ease, by one or two drenchings with kerosene emulsion.

THE PEACH-TREE BARK-LOUSE.

(Lecanium persicæ, Modeer).

The peach-tree scale is a recent addition to the injurious insect fauna of Missouri. Previous to my observations upon it, published in Bulletin 32 (1894) of the U. S. Department of Agriculture, there is no record of its presence in any part of the State. It was first brought to my notice during the meeting of the Horticultural Society at Car-

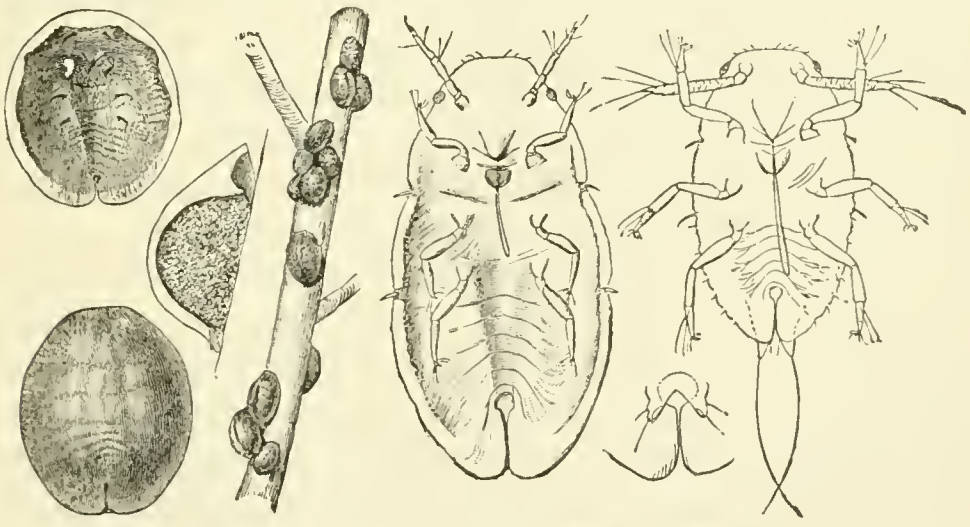


Fig. 3. The Peach-tree bark-louse *(Lecanium persicæ).* Newly hatched on the right; young female next; twig with full grown female scales; female scales from above and underneath—all much enlarged except specimens on twig. From Department of Agriculture.

thage, when the janitor of the hall exhibited several branches badly infested with it. Strangely enough, the following spring I received a number of letters from different parts of the State complaining of its prevalence, and about the same time a neighbor brought me some twigs covered with a "new pest" that caused him much apprehension. This gave me the much desired opportunity to study the habits and development of the species, to which I accordingly devoted considerable time during the summer of 1894. This seemed the more worth

while, as no American entomologist had given it more than brief mention, and its life history had never been published in this country. It was afterward ascertained by Mr. Howard, the successor of Prof. Riley as U. S. Entomologist, that the species was of European origin, and that its habits had been described more than a century and a half ago by the French naturalist Reaumur, and, although the date of its introduction into this country could not be given, that it had been known for some time in a number of the Eastern States.

It is one of the largest and most conspicuous of fruit-tree scales, almost hemispherical in form—approaching conical in the middle—highly polished, of a black color, with a longitudinal band and marginal streaks of bright red. Such is the fully developed female insect as represented in the illustration. The larval and male scales—seen only during summer—are thin, flat and of a pale greenish-white color. These are usually seen on the leaves and none are to be found in winter. When a scale is detached during winter or early spring the body of the female can be clearly distinguished from the underside, imbedded in a jelly-like substance, and fixed to the bark by the strong, hair-like beak, which measures one-twelfth of an inch in length. From the time the sap begins to circulate in the spring until the eggs are fully formed, about the last of May, there is a coprous secretion of what may be called "honey dew," although it has no sweet flavor and does not seem, to any great extent, to attract ants or other nectar-seeking insects. The abundance of this fluid is remarkable. A branch of peach very badly infested, which had been cut for my examination, was laid on the floor of the piazza and a half hour later every part was outlined in fluid on the paint. This secretion afterward becomes the nutriment of a smutty fungus which blackens and disfigures the tree, but is, in time, a means of dislodging the scale, as it gradually extends to the under sides of the twigs and branches which are most affected by the latter, and penetrating under the bodies of the insects causes them to loosen and drop off.

To quote from my notes above referred to: "By the 20th of May the eggs are fully formed, crowding every scale—a mass of pale yellow granules. Hatching begins in June and continues for nearly a month. The young are comparatively large, very flat, uniform pale yellow, with long well-developed legs and antennæ, and are very active and for a much longer period that is usual in the *Coccidæ*." By July 15 hatching was completed, and the twigs and foliage of the tree under observation were covered with the young in all stages. At this time the sexes were undistinguishable, but shortly afterward a large number became

stationary, and on the 22nd the first winged males appeared in the rearing jars. Beautiful little creatures they were, with rose red bodies ornamented with a broad, brown thoracic band and with filmy, iridescent wings expanding about one-tenth of an inch. The females were still active, crawling over leaves and twigs with a wavy motion which, with their flat scales, suggested a strong resemblance to the tingitids.

After the disappearance of the males, early in August, the females clustered upon the tender twigs, fixing themselves by their beaks, and began to grow and darken in color, attaining their full size in November.

According to a recent bulletin of the Department of Agriculture, in which scale insects are especially discussed, this species has frequently appeared in such numbers as to cause the death of young trees; but while it is unquestionably a serious pest, its conspicuous size, its less close adhesion to the bark of the tree and its consequently greater susceptibility to the action of insecticides renders it a much less formidable foe than many of its close allies.

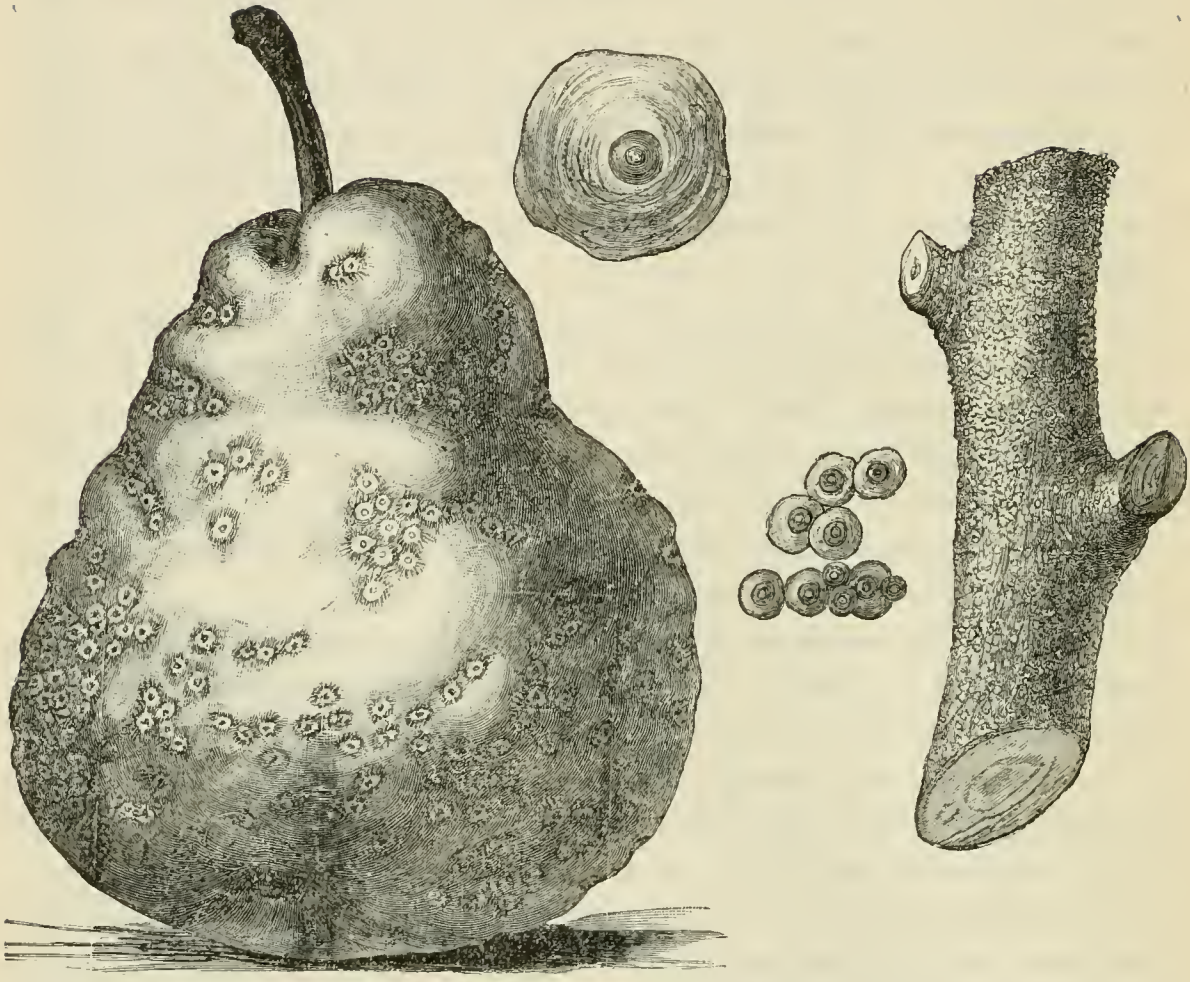
Among its natural enemies are a minute parasitic fly, a small, speckled gray bug, and an interesting little lady-bird beetle which, so far as my observation goes, is peculiar to this and a few other coccids.

Last year I was greatly pleased to discover that the scales were pecked off during winter by birds. A large branch, thickly encrusted with scales, was suffered to remain on one of our trees for purposes of observation the coming spring; but before the ice and snow had disappeared not a scale remained, while snow birds, titmice and other birds were frequently noticed flitting among the branches apparently in search of more of the juicy morsels.

From the results of recent experiments, Mr. Howard gives the preference to whale oil soap, as a winter drench, over every other insecticide, for all scale insects, while kerosene emulsions are recommended for application to infested trees at the period when the young lice are active and spreading over the leaves and new growth.

THE SAN JOSE, OR PERNICIOUS SCALE.

(*Aspidiotus perniciosus*, Comstock.)



The San Jose scale *(Aspidiotus perniciosus)* on pear fruit and branch, with enlarged male and female scales. From Department of Agriculture.

The illustration here given graphically represents a recently introduced pest of the bark-louse family, with which, happily, neither the horticulturists nor the entomologists of Missouri have as yet much personal knowledge. The following notes and descriptions are compiled mainly from Mr. Howard's valuable bulletin of recent date entitled "Some Scale Insects of the Orchard."

My object in devoting a little space to it in this report, is to warn our nurserymen and orchardists of a danger which menaces them, and to stimulate them to observe more carefully and quarantine against more rigidly all importation of trees and shrubbery from sections of the country already invaded by this most to be dreaded of all scale insects. This has become the more imperative since the reception of a letter last season from Mr. E. J. Walker of Blue Springs, Mo., accompanied by twigs upon which were a few unmistakeable speimens of the pest. Later in the season I received another letter, through Mr. Goodman, from Cassville, Mo., making very especial inquiries con-

cerning the insect, but without indicating whether or not it had manifested itself in the locality-from which the communication was dated.

Mr. Howard says: "The original home of this insect is still in doubt. It has been supposed that it came to America from Chili, but recent investigations, by the writer, seem to show that it was taken to Chili from the United States. It occurs in Hawaii, but it was brought to this point also from California. It made its first appearance near San Jose, Cal., twenty years ago, at a time when many trees were being imported from many parts of the world. It may have come from Australia, since it is known to occur there, though rarely, or it may have come from some Pacific Island or possibly even from China. It has been carried to British Columbia and has extended by natural spread eastward to Idaho on the north and Nevada, Arizona and New Mexico on the south. Chance importation of California nursery stock has, within the past few years, resulted in its establishment at many points in the East, and particularly in the states of New Jersey, New York, Pennsylvania, Deleware, Maryland, Ohio, Indiana, Virginia, Georgia, Alabama, Louisiana, and Florida." From all these points it it has therefore become imperative to use great care when importing, either at wholesale or retail, any tree or plant which is known to foster this scale. To still further complicate the situation, it is such a general feeder that it would almost be easier to give a list of the trees and shrubs that it does not attack, than of those which it does. In California the apricot, prune, almond, English walnut, euonymus and rose are among the valuable plants that suffer most from its ravages. In the east its principal injuries have been on pear and peach; but a long list, including our most valuable fruits and choicest shrubbery, is given of the varieties which it has been known to seriously injure or destroy. It does not attack any of the citrus fruits. Its life history was worked out for the first time in 1894, in the Insectary of the Department of Agriculture, and some remarkable features of its development disclosed. It does not, like the typical coccids, multiply by means of eggs, but the young are produced alive. Another very important and discouraging peculiarity is that there is a succession of generations and a constant reproduction going on throughout the summer, whereas other species are but single brooded, and their brief period of activity once discovered enables us to apply our remedies just when they will be effective, after which we can rest from our labors, so far as they are concerned. The winter, in this species, is passed as a half grown female and young are begun to be produced about the middle of May, these, in their turn, becoming productive in about forty days. The males acquire their wings when twenty-four days old.

The insect is very minute, but quite characteristic. The scale is tough and papery, with a broad grayish white margin, surrounding a darker elevated portion. Another feature by which it can be recognized is a peculiar reddening of the bark under and around the scale. It is very gregarious, the female scales crowding together upon branches and twigs until they are piled upon one another and present the appearance of a thick and unsightly scurf. They also cluster upon growing fruit, producing much distortion of form and discoloration of the skin.

Two or three parasitic flies have been bred from this scale in the East, but not in such numbers as to give promise of much assistance in its extermination.

In the way of remedies Mr. Howard and others have found nothing absolutely reliable, but a strong solution of whale oil soap 1½ or 2 pounds to 1 gallon of water, thoroughly applied during winter or early spring, to every part of the tree. Strong kerosene emulsion comes next in value, while the various lye and caustic soda washes, effective against most bark-lice, cannot be depended upon as a remedy for this species.

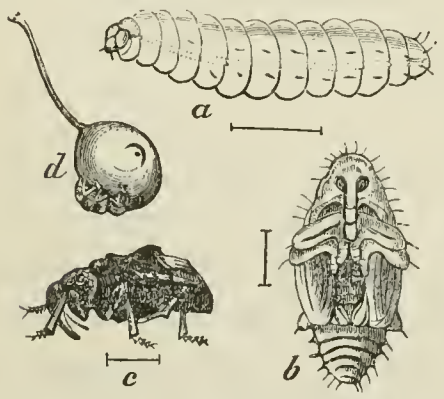
Where only a few trees are found to harbor the scale, it would be the best economy to dig out and burn, to prevent the wider spread of so dangerous an insect.

Missouri seems as yet to be practically free from it, and with proper precautions on the part of nurserymen and planters it may for many years, if not forever, continue to enjoy this immunity.

THE PLUM OR PEACH CURCULIO.

(Conotrachelus nenuphar, Herbst.*)*

This preeminent enemy of all stone fruits has not heretofore been represented in our Horticultural Society's "rogues gallery" of insects; but at last here we have him, to paraphrase the old saying, larger than life and more than twice as natural. His proper size is represented at *d*, engaged in carving his (strictly speaking *her*) Turkish autograph on a young plum. Every orchardist is well acquainted with the little, hard, rough brown beetle and its soft maggot-like larva, but the enlarged figures give us a more perfect idea of the distinguishing characters in the various stages of development.



The Plum Curculio *(Conotrachelus nenuphar) a*, larva; *b*, pupa; *c*, beetle; *d*, insect at work; all enlarged except *d*—the hair lines representing true size. After Riley.

I should be rejoiced to tell the peach and plum-growers of our State that a per-

fect remedy for the ravages of this insect had been found, but as yet that pleasure is denied me.

Spraying with the arsenites alone, while it may save a percentage of loss, is always attended with danger to the tree, while destroying but few of the insects. The only safe admixture of Paris green for use on the foliage of peach and plum is with the Bordeaux mixture or with lime without the vitriol—not more than one ounce of green to fifteen gallons of the lime water or mixture and applied in as fine a spray as possible. Spraying should be done very early in the spring before the blossoms open, or just after they have fallen. The curculios are then congregating on the trees and breaking their winter fast by nibbling the buds and tender bark. After the fruit has formed the chances of the insect for absorbing any of the poison that might adhere to it are scarcely one in one hundred.

Some of our St. Louis county peach-growers maintain that spraying with the Bordeaux mixture either destroyed or drove away the curculio as well as prevented leaf curl and other fungus diseases. They used the spray freely two or three times in the spring, and claimed that the general perfection of their crop was due to its action. I think it was rather the result of comparatively few of the insects, as the stone fruit crop of the previous year had been cut very short by late frosts.

Trapping, jarring and perseverance in gathering up and destroying all fallen fruit, early and late, wearisome and imperfect as these measures are, still seem to offer the safest means of keeping the pest in check.

Experiments with some of the recently discovered insecticides will be in order this season, and it is fervently hoped that among these may be found a remedy even for this hardy and resourceful insect.

Second List of Questions and Answers.

1. What are the functions of the root of a tree ?

To brace the tree and give it secure support in the soil ; also to take up the sap from the soil. This sap is taken in through tiny root hairs along the growing parts of the roots. It is carried upward through the roots, stem and branches to the leaves.

2. What are the functions of the leaves ?

To digest or assimilate the crude sap brought up from the ground. No sap can be used in building up plant tissue until it has been digested in the leaves. The leaves also act as a shade to the tender twigs in summer.

3. What are the functions of the bark ?

The bark is a covering or protection for the tender growing layer beneath. It prevents the too rapid evaporation of the sap from the tree.

4. Give garden selection that will give variety and plenty throughout the season in Missouri for a family of six persons.

Rhubarb, spinach, asparagus, lettuce, onions, radishes, peas, potatoes, cabbage, corn, beans, beets, squashes, carrots, tomatoes, cucumbers, turnips, melons, salsify, parsnips, pumpkins, celery, cauliflower, horse-radish.

5. How much land is required for a kitchen garden for a family of six persons ?

One-quarter to one-half acre.

6. Give plan of such garden ?

Plant in long rows to admit of horse culture. Some of the early varieties are out of the way in time to admit of some of the later kinds taking their places.

7. What is the difference in meaning between the words "horticulture" and "agriculture ?"

From the Latin *hortus* a garden, and *culturo* to cultivate, and *ager* a field and *culturo.*

8. Give the chemical analysis of an apple ?

Analysis of the pulp of apples average of two analysis of American apples :

Water	90.8 per cent
Nitrogenous material (protein)	1.0 per cent
Fatty material	0.7 per cent
Sugar, starch, cellulose	6 9 per cent
Mineral matter (ash)	0.6 per cent
Total	100. per cent

9. What about apples as food?

Very healthful food.

10. What is the average weight of 100 young trees, from five to seven feet, ready for shipment?

One hundred pounds.

11. What is meant by truck farming?

Market gardening.

12. Name four bulbs considered worthy of a place in every flower garden.

Gladiolus, hyacinth, tulip, lillum candidum, dahlia.

13. How can you propagate hardy roses?

Layering or grafting.

14. Can figs be grown in Missouri?

Yes, but not successfully.

15. Where are the grape producing sections of Missouri?

Central and Southern part of the State.

16. What cultivation should be given grapes?

Thorough culture; shallow.

17. Can grapes be grafted?

Yes.

18. Does it injure grapes to prune them after the sap begins to flow?

Yes.

19. When is the best time to prune peach trees?

Early spring or late fall.

20. Are the common seedling peach any more hardy than the budded peach?

Yes; a little.

21. Should cherry trees be cultivated?

Yes; very little; for two or three years only.

22. Will ungrafted Early Richmond cherry sprouts produce hardy trees true to kind?

Yes.

24. Why use imported roots on which to graft cherries?

To keep them from sprouting, and also these roots are easier to get.

24. Name the different kinds of imported stocks.

Mazzard and Mahaleb.

25. Name ten varieties of strawberries which are extensively cultivated west of the Mississippi river.

Bubach No. 5, Crescent, Downing, Gandy, Sharpless, Michel's Early, Cumberland, Captain Jack, Wilson and Warfield.

26. State the facts about the flow of the sap.

The sap is carried upward in the plant through the cells forming the plant body. These hollow cells are tightly filled with sap by an affinity which they have for moisture. The cells thus exert a pressure on the sap much as an elastic rubber bag or bladder exerts a pressure upon water or air with which it may be filled. Evaporation from the leaves takes out sap from the uppermost cells. The cells below press their sap up to take the place of water that is being evaporated, and thus a continual upward current takes place to supply the evaporation from above. When the leaves evaporate faster than the roots can take up water these cells above lose their water faster than it can be replaced andthe plant wilts. There is an erroneous opinion that sap rises and falls in sugar-maples, during the time that the sap is being obtained in the spring. The facts are that the cells of the tree are charged with sap. In warm days this sap thaws out and the cells exert a pressure on the sap in them. If tapped, the tree will give off sap from the cut tissues. When growth of the sugar tree begins, and evaporation begins through the starting leaves the flow of sap ceases.

27. What does it mean to callous plants?

To callous plants is to cut them, tie in bundles and set them in dark cellar, with the cut ends in the sand or dirt. They callous themselves.

27. What are some of the conditions required for plant growth and development?

Heat, light, air, moisture and food.

29. What principles are true concerning the length, size, etc., of roots as compared with the branches of trees?

Roots are longer, but not so large.

30. What are the principle factors to be considered in apple growing?

Climate soil, market and varieties.

31. Mention some of the well-kept botanical gardens in the world, and give a brief sketch of them.

Shaw's Botanical Garden at St. Louis, Mo., is devoted to scientific research and training of botanists.

Government garden at Washington, D. C., for the improvement of native plants and introduction and dissemination of foreign ones.

The best known is the Royal Botanical Garden and Arboretum at Kew, near London, England. This was established by the mother of George III in 1760. Seventy acres of land are devoted to the garden and 178 to the arbaretum. The cost of maintaining the whole is about $100,000 per year.

The gardens at Paris and Berlin are also celebrated.

32. Mention some notable flower gardens.

Some of the most noted private flower gardens are the following:

The grounds of Adolph Sutro, in the suburbs of San Francisco; the grounds of Prof. C. S. Sargent, at Brookline, Mass.; many English estates, notably the Duke of Bedford's place at Chatsworth; the grounds of M. de Vilmorin at Verrier, France; many places on the Riviera, notably the grounds of Mr. Thomas Hanbury, at La Mortola; several fine gardens in the Azores, notably those of Senhor Jose da Canto, at Ponta Delgada and the Furnas.

33. Mention some notable vegetable gardens.

The grounds of the large seedmen, like Haage & Schmidt, Vilmorin-Aunrieux and others are the largest. A fine one is that of the late J. M. Smith, at Green Bay, Wis.

34. What are the most destructive insects to the apple-tree?

The woolly aphis on the roots; the round-headed and flat-headed borers in the trunk; the canker worm on the leaves and the codling-moth in the fruit.

35. How many these insects be recognized?

The woolly aphis or apple root plant-louse may be found both on the roots and on the trunk of the tree. Upon the roots its punctures are peculiarly poisonous, causing knots and swellings of all shapes and sizes, upon and between which it lives until the sap can no longer circulate, when it migrates to healthy roots, which it deadens in the same way. The diseased roots gradually decay and drop off, and when a large proportion are attacked the tree perishes.

The young lice are of a pale-yellow color, but as they grow acquire a purplish hue and are more or less densly covered with a bluish white cottony-matter which is excreted from the pores of the skin. The full grown, wingless insect is of about the size of the head of a common pin, but of an oval-shape. It has six slender legs, and the mouth is in the shape of a needle-like beak. With this it pierces the skin and extracts the sap. Like all plant-lice this species produces, during the growing season, numerous generations of living young, by a process analogous to the multiplication of plants by buds, slips and layers. This kind of reproduction is peculiar to the *Aphididæ*. The insect spreads from orchard to orchard by means of winged individuals that develop above ground, mainly on suckers around the base of the tree, and in the axils of the leaves or on any bruised portion of the trunk. During very wet seasons this aerial form is apt to be more numerous than the subterranean. Late in the fall the true males and females are produced and the latter lay great numbers of glossy, black eggs in

cracks of the trunk and under scales of bark. From these are hatched in the spring the stem-mothers of other vigorous generations that find their way to the roots.

The round-headed apple tree borer *(Superda candida)* is usually found in the lower part of the trunk. When full-grown it is more than an inch long, a stout, yellowish white grub, broadest across the joint, just back of the small head, but not so disproportionately expanded in this region as the so-called flat-headed species. The head is dark brown, with strong, horny jaws. So far as has been ascertained, it requires three years for development from the egg to the mature beetle. The latter is a beautiful species belonging to the group of long horns or capricorns *(Cerambycidæ)*. It is three-fourths of an inch long, of somewhat flattened, elongate-oblong form and cinnamon brown color, ornamented on the back with two broad, milk-white, longitudinal stripes. This beetle is so strictly nocturnal that it is seldom seen, even in the worst infested orchards, unless taken out of the tree before it is quite ready to emerge. It lays its eggs during the mid-summer nights in incisions cut by its jaws in the bark of the tree near the ground. The larvæ hatch in about two weeks and at once cut their way into the sap wood upon which they begin to feed just under the bark. Over the flat, shallow tunnels which they make, the bark will usually shrink and become discolored, which will reveal their presence to the careful observer. They may also often be located by the grains of sawdust-like castings, which drop from the hole by which they entered. The greatest damage is done during the second summer, as it burrows back and forth through the sap wood destroying the tissues and choking the circulation of the sap. The third season it cuts deeply into the solid wood in which it forms a cell where it may safely pass its transformations, first, however, gnawing a passage to the outer bark which it loosely packs with chips and fibres that are easily penetrated by the beetle when, after two or three weeks' rest as a pupa, it is ready to emerge in its perfect form.

When this borer is once in the tree, there is no remedy but to look up its situation and cut it out with a knife or kill it with a pointed wire. It may be kept from laying its eggs by painting the trunks of the trees with soft soap thickened with caustic soda, or with a wash of common soap-suds to each gallon of which is added a couple ounces of sulphur and about a tablespoonful of carbolic acid. Common white-wash will also keep it off.

The flat-headed borer *(Chrysobothris femorata)* works, generally, in the upper part of the trunk and main branches. It requires but a single year for its development, and in the destructive stage, while

it is a grub or larva, may be recognized at a glance by the proportionately enormous breadth of the joints just back of the head, which are very much flattened and horny on top, and which taper very abruptly to a thin-skinned and attenuated hind body. While in the tree it works under the bark, in the sap wood, as in the case of the round-headed species, but it has a tendency to girdle the trunk instead of tunneling back and forth in spots. Late in autumn it cuts a passage from the bark into the heart-wood within which it excavates a cell for winter habitation and for undergoing its transformations in the spring. The perfect beetle comes out of the tree during the month of June. It is somewhat more than one-half inch in length, of flattened oval form, with a very dense shell of a metallic greenish gray color above with brassy spots, while underneath it appears sheathed in copper. The antennæ are short and serrated. This beetle and its numerous close allies delight in the hottest sunshine and may be found at midday on the south side of the trees laying their yellow eggs in cracks of the bark. It is found not alone on the apple, but is almost equally destructive to peach and several other varieties of fruit trees. Newly transplanted trees or those in which the vigor is somewhat impared, are most subject to its attacks. Its presence is denoted late in summer by exudation of sap, and it can be taken out with the knife. The same applications recommended for the round-headed species will prove the best possible preventatives for this one. Both these borers are native Americans and bred naturally in the wild pip and stone fruits of our forests.

Among the one hundred or more of caterpillars that feed upon the foliage of the apple tree the "canker worm" (*Anisopteryx vernata*) is by far the most general and the most destructive. This larva is a "measuring worm" or "looper," so called because, from the absence of abdominal prolegs, it moves with a looping motion, placing the hindmost legs close toward the head at every step. These worms often appear in great numbers in orchards in the spring and devour the tender leaves and gnaw the stems that support the young fruit. They feed for five or six weeks, as they do not all hatch at once, by which time badly infested orchards appear as though a fire had passed through them. The worms then enter the ground to the depth of two or three inches and, enclosing themselves in little oval cells formed of silk and particles of earth, change to golden-brown chrysalids. In this state they remain through the summer, autumn and winter. Very early in spring—sometimes in February if the ground is open—the moths begin to come out of the ground. The males have broad silky

wings of a pale gray color, variegated with pale brown lines and white dots and deeply fringed. The females, on the contrary, have no wings at all, but look very much like a heavy-bodied spider. They crawl up the trunk of the nearest apple tree, and lay their tiny pearly eggs in masses of from fifty to one hundred or more in the axils of the twigs or under scales of the bark. From these eggs the larvæ hatch in ten days or two weeks.

The fact that the females of this species never have wings gives us complete mastery of it when once its habits are known. All that is necessary to exclude it from the foliage is to encircle the trunk two or three feet from the ground with some sort of sticky or fibrous band. In this the female will be trapped, and will be prevented from laying her eggs where the larvæ can find the leaves. Tar of any sort mixed with oil to prevent rapid drying and applied either directly to the tree or upon a band of paper has been much used. Cotton batting cut in strips four inches wide held close to the trunk with a twine string also makes an excellent trap.

Where spraying with Paris green is practiced as soon as the fruit is set these preventive measures are not necessary, as the worms are poisoned before they have had time to do much injury.

The fruit of the apple has several important enemies, but among these the codling moth *(Carpocapsa pomonella)* is by far the most generally distributed and destructive. This insect is of European origin, but has been a recognized fruit pest in this country for 50 or 60 years.

The moths, which are the parents of the disgusting apple worms, appear early in the spring from under scales of bark or between boards, or from cellars and store-rooms where the worms had spun up. They are very pretty creatures, with broad wings, which appear like brown watered silk, ornamented near the outer edge with a large horse-shoe-shaped spot in burnished bronze or copper color. They fly only at night, unless disturbed, and are not attracted either to light or sweets. The first brood places its eggs upon the apples as soon as they begin to form, always in the cup of the calyx. The tiny caterpillars hatch in about a week and begin to eat their way toward the core. The tunnels by which they entered are enlarged from time to time and a part of the castings are pushed out through them. As it grows the larva works back and forth around the core and causes the center of the apple to decay and would thus impairing the flavor of even the portion that is uninjured.

The full-grown worm is somewhat more than one-half inch long and one-tenth inch in diameter. It is of a pinkish white color, dotted with minute pale brown, glassy spots from each of which arises a light

hair. The head and broad, horny collar covering the first joint are black in the young larva, but afterward become of a shaded brown color. It gets its growth in three or four weeks from the date of hatching and it then cuts its way out through the side of the fruit and either drops to the ground or crawls down the branch and trunk and seeks a crevice or scale under which to spin its flat, white, papery cocoon. It is very partial to folds of paper or cloth for this purpose, and bands of these materials make excellent traps, and before the discovery of the spraying processes were much used by orchardists to keep the pest in check. The chrysalis is oval, brown and beset with tiny teeth by which to work it out of the cocoon when the moth is ready to issue. There are two broods annually, the moths from the first brood appearing early in July, while the second brood passes the winter in the chrysalis state.

The codling moth has a number of natural enemies, but these are not able to materially reduce its numbers. It may be temporarily conquered by the Paris green or London purple sprays, using not less than 200 gallons of water with one pound of the poison, which should be kept thoroughly diffused.

36. Give brief account of plum curculio.

The plum or peach curculio *(Conotrachelus nenuphar)* is a native American insect, and is the chief enemy of all our choicest stone fruits. The perfect insect is a small rough brownish beetle, with some markings of shining black and ochre yellow. It is about one-fifth of an inch long, quite stout, and with its beak and legs folded close to its body, bears a close resemblance to a dried bud of the peach or plum. Its small but sharp jaws are on the end of a stout-curved beak. It comes out of its winter quarters early in the spring, and feeds sparingly on the opening leaf buds. Shortly after the young peaches or other fruits are formed, its work will be found upon them. Two sorts of punctures may be noticed: one a simple cut through the skin for the purpose of feeding upon the flesh underneath, the other larger and deeper, accompanied by the crescent-shaped slit, which marks the position of the egg. The cavity for the latter being prepared, the insect reverses its position and drops into it a single pearly white egg. The crescent is then cut, partly encircling it, apparently for the purpose of deadening the little flap, in order that the delicate egg may not be crushed by the too rapid growth of the fruit cells. The curculio is a long-lived insect, and the females continue the process of egg-laying at the rate of from two to five a day for a period of six weeks or two months, and, though but single brooded, their period of activity is so long that their larvæ will be found in all but the latest varieties of

peaches and plums, and even these will often be seriously marred by punctures made in feeding.

This insect hibernates in the perfect state around buildings and under loose bark of forest trees, or any convenient shelter. The best remedies are trapping in the early spring, by means of chips and cobs placed upon the carefully smoothed earth around the trees, and by jarring from the trees upon cloths, or in the regular curculio catcher.

Spraying with the arsenites has not proved sufficiently successful to warrant its advocacy in the case of this insect.

37. Give brief account of cabbage worm?

There are a large number of "cabbage worms," but the most destructive of these is the larva of the European cabbage butterfly *(Pieris rapal.)* This was accidentally introduced into this country about forty years ago and has since spread throughout the length and breadth of the land. The larva, which does the damage, is a velvety green worm with a yellowish stripe down the back and one along each side. When full grown it measures one and one-eighth inches in length and one-fifth inch in diameter. It is very voracious, often boring into the heart of the cabbage and feeds for a period of two or three weeks. In this latitude there are three annual broods. It has passed its period of greatest destructiveness in this State, as its parasitic enemies have have so increased in number as to keep it measurably in check. Where it appears in great numbers it may be killed by dusting with Paris green—one part to twenty of flour—or with white hellebore or, best of all, with pyrethrum powder.

38. Give brief account of Colorado potato beetle.

The Colorado potato beetle *(Doraphora 10-lineata)* is a native of the far West, which has migrated eastward until it has reached and even crossed the Atlantic. It is a stout, handsome beetle of oval form, nearly one-half inch in length. The body and under wings are of a red color, and the shelly wing-cases ochreous-yellow, each one with five broad black stripes. The larvæ, which do most of the damage, are thick, slug-like, disgusting grubs, with black heads and collars, but otherwise of a dark, livid, flesh color. The bright, yellow eggs are deposited in clusters on the under sides of the leaves. They hatch about a week later, and the grubs feed for three weeks. When full grown the burrow into the ground and there transform, the beetles coming out again in ten days. There are in our latitude three or four annual broods. Like the cabbage worm, this insect is much less destructive than formerly, owing to the increase of its natural enemies. It is also easily killed by the use of Paris green, either as a spray or dust mingled with flour or air-slacked lime.

39. How may any person recognize any one of the curculios?

By the shape of the head, which is prolonged in front into a more or less slender beak, and by the habit of the insects of "playing possum" when frightened.

40. In what way does the honey bee assist the fruit-grower?

By the distribution of pollen.

41. What class of beetles easily recognized, is made up of species beneficial to the farmer and fruit-grower and should be protected rather than be killed.

Lady-bird.

42. How do rabbits destroy trees in the winter?

By eating the bark.

43. What effect does mulching have on trees?

Mulching trees is of great benefit. It retains the moisture, keeps down the weeds, if plenty is put on. It will enrich the soil and is much better than cultivating.

44. How are new varieties of fruits originated?

By planting seeds from a flower that has been pollinated from a flower of a different variety; also by sports. A sport is a flower or a fruit on a plant that happens to be different from the rest of the plant. New varieties of flowers and vegetables are originated in the same way.

45. What standard varieties of apples originated in Missouri?

Missouri Pippin, Huntsman's Favorite, Gano, Lawver, Loy Ingram.

46. What State has originated more standard varieties of apples than any other?

Missouri.

47. Give brief historical account of the apple.

Origin unknown, probably from a wild crab.

The tree was introduced into Rome in 449 B. C. Into England in 55 B. C., and to America in 1629.

48. Give brief historical account of the peach.

The peach is a native of Persia; it flourished and was valued at a very early period in China also, and has been found growing spontaneously in Asiatic Turkey.

It traveled west to Italy, and in 16th century was introduced into England. It is cultivated in France and China, but in greatest quantities in America. New Jersey first began to grow it extensively.

49. Give brief historical account of the cherry.

The cherry is of Asiatic origin, introduced into Italy from Pontus during Mithradatic war about 170 B. C., and 120 years afterward was carried to Great Britain.

50. What does an experimental station as established by the Government have to do with fruit, flower and vegetable growing?

In relation to these lines, the station should carry on experiments for the improvement of old, the introduction of new varieties, and the care and cultivation of both. Its tests and results give reliable information as to the value of the varieties and of certain processes and methods of treatment.

51. Where are located the Missouri State Horticultural grounds, and the Missouri State Agricultural College?

Both at Columbia, Boone county.

52. What state is conceded to be the best adapted to fruit-growing?

California has largest variety. Missouri is third in apples.

53. In what part of Missouri can the tender varieties of fruit be best grown?

Southern slope of the Ozarks.

54. Why should shade trees be planted on the farm?

They furnish beauty, wind-break and shade.

55. In what kind of cars are perishable fruits shipped?

Refrigerator.

56. What is meant by "Holding fruit in cold storage?"

It means storing fruit in buildings erected for that purpose, which are kept at a low or even temperature by means of ice and ventilation. The fruit is thus preserved in its natural state beyond the time possible in other ways.

57. What would be considered a long-keeping apple?

The best long-keeping apple is the Lansingberg; others are the Clayton, Hopewell, Willow Twig, Limber Twig, Small Romanite and Lawver.

58. What plants are best for house decorations?

Palms, geranium, begonia, chrysanthemum, lillium grandiflora.

59. What plants are best for winter blooming?

Geraniums, carnations, begonia, ageratum, colla, petunia.

60. What flowers—house grown—are most fragrant?

Hyacinths, rose geranium, mignonette, narcissus, heliotrope, rose.

61. What general treatment is best suited to plants?

Warmth, light moisture, light soil.

62. What house plants are least trouble by green aphis?

Begonia, carnation, geranium, etc.

64. What is the best method of growing roses and forcing bloom in winter?

The best houses to use are the regular "¾-span" or "short span to the south," an abundance of light during the winter months being the great object sought. They should run east and west, facing South. If the houses are naturally dark, keep them well painted, thus increasing as much as possible the brightness. Plant on benches in June strong plants from 3-inch pots, in 3½ or 4 inches of soil. The soil should be light in preference to heavy. If heavy, make it light with well rotted manure and sand. Soil from lowland is preferable to upland soil, the best being taken from places that have received the washings from hillsides; thoroughly mix with the soil one-fourth to one-sixth well-rotted manure according to the fertility of the soil used, and a sprinkling of bone meal, about a No. 4 pot to a barrow load of soil. Give all the air possible during the summer, and if the houses get too warm, shade slightly. The plants must have an abundance of water; never let them suffer for it. Firing should commence as soon as the glass falls to 60 degrees during the night. For the first month the temperature in the house can be held at 65 degrees, dropping afterward to 60 degrees, at which point it should remain during the season. The day temperature should vary from 65 to 80, according as the day is dull, half bright, or with bright sunlight. Syringing should be attended to promptly, and the water applied with force if red spider is to be kept in check; this should be done as early in the day as possible. Watering should never be neglected and frequent examinations of the benches must be made.

As soon as the plants are established, a light mulching of manure may be applied to prevent too rapid drying out of the soil; manure water can also be used about once in ten days; make it from horse or cow manure, with an occasional change to sheep manure and chemicals. As the sun gains power in spring, another mulching, composed of equal parts of well-rotted manure and soil, with a liberal sprinkling of bone flour can be applied. Manure water can be used oftener, about once a week, or every five days, according to the strength of the plants.

Keep the plants properly tied and cleaned, and insects and disease will be much better kept in subjection. Use virgin sulphur or Fostile for mildew, and tobacco in its many shapes for green fly.

65. What varieties bloom best indoors?

Marschal Heil, Bon Silene, Catherine Mermet, La Pactole, Bride, Papa Gontier, Hiphetos, Mad. Joseph Schwartz, La France.

66. What is the best method of exterminating the red spider?

Kerosene emulsion or sulpher fumes.

67. Name collection of objects bearing on the study of horticulture which would be instructive to children of school age.

Seeds—Beans, corn, pumpkin, squash, radish, mustard, melon, pine.

Roots—Radish, turnip, rhubarb, sweet potato, grass and others.

Bulbs—Onion, gladiolus, oxalis.

Tuber—Common potato.

Flowers—Many kinds, wild and cultivated.

Fruits—Many kinds, wild and cultivated.

Whole plants—Trees, shrubs and bushes, with plant, flower and seed.

Wood—Of various trees.

68. How prepare a collection of different kinds of wood?

In making a collection of woods, care should be taken to get the blocks of a size as nearly uniform as possible. Eight inches long and four inches thick is a very good size, if the woody plant grows so large. Each block ought to be split lengthwise through the center, so as to show the heart wood and sap wood in the longitudinal section. It ought to show the bark on the outside, and one end at least should be sawed off square to show the rings of growth and the medullary rays.

69. How prepare a collection of different kinds of seeds?

A sufficient quantity of seeds for examination should be collected from each kind of a plant as soon as the seeds are ripe or a little before. They should be thoroughly dry. Expose them to the sun the first day or two after gathering (care being taken not to allow the hot rays of midday sun to scorch them.) The collection of each kind of seeds should show some examples of the seeds in the receptacle as well as the naked seeds. The seeds may be kept in small pasteboard boxes, which may be glued, if desired, to a tablet of pasteboard. Each box should have a cover, or the whole tablet may be put into a drawer and the drawer covered with glass. A thread case answers very well as a repository for such a collection.

Each box of seed should be carefully labeled. The label should show accurately the date on which the seed was gathered, the locality, and, if possible, the name of the plant which produced it.

70. How prepare a collection of different kinds of nuts?

The directions for making a collection of seeds will answer very well for making a collection of nuts. The nuts should be gathered about the time they are ripe, and the collection should show the nut

in its covering, as well as the naked nut. If desired, the receptacle and the nut also may be fastened with glue to the bottom of the box. The label should be accurate as possible, especially regarding the locality and date.

71. How prepare a collection of different kinds of leaves?

When a person starts into the fields and woods to gather leaves for a collection, he should take with him a number of pieces of newspaper between two smooth, thin boards, and around the boards should be a strap, fastening with a buckle—12×18 inches is a good size for the boards and pieces of paper. As soon as a leaf or leaves are gathered for preservation, they should be placed between two of the pieces of paper, the paper replaced between the boards, and the whole apparatus fastened tightly with a strap. After arriving at home the papers should be changed for dry ones, and pressure may be exerted upon them by weights placed upon a board which covers the paper. The same boards between which the leaves were placed when collecting may be used, but most collectors will prefer to use other boards. The papers should be changed for dry ones twice on the first day, and once a day afterward for about a week. The leaves should then be pasted upon clean, white paper about 11×17 inches, and the locality, date and name of the plant, if possible, should be written in the lower right corner.

72. What special lines of thought would these object lessons stimulate?

The special lines of thought stimulated by making and studying such collections as are indicated above will be: 1. An excercising of the mental faculties of abstracting, comparing, generalizing. 2. It will lead people to see that a great deal more exists around them than they ever before suspected, and to a close observation of nature's forms. 3 It will make the people who collect find that the things immediately around them are worthy of study; that the world is full of grace, beauty and harmony. 4. It will direct the thought toward the cultivation of the valuable and the eradication of the harmful.

73. Where are oranges and lemons grown in the United States?

Florida and California.

74. What are pomegranates, and where grown in the United States?

The pomegranate *(Punicum granatum)* is grown more or less all over the state of California more for ornament rather than use, though a limited quantity of the fruit is marketed every year. It forms a shrub or small tree not exceeding 20 feet in height, and there are numerous varieties with very attractive flowers, some of them yellow,

some crimson, and single or double. These are followed by the fruit, which is of the size of a medium apple, and ripens in October. This is covered with a leathery hull or skin and contains a number of seeds encased in a crimson pulp, which is very refreshing if eaten with sugar, and considered an excellent febrifuge. If once known, it would form an article of export, as it bears shipping well, is very attractive and can be used for many purposes. The shrub, whether in bloom or fruit, is an ornament to any garden.

75. What are tangerines? Where grown in the United States?

The tangerine is a Japanese orange of dwarf habit, which is grown to some extent in California, generally budded standard high on the common orange. The fruit is deep red, small rind, separating radily, and very sweet.

76. Has the persimmon ever been improved?

Yes.

77. Report on Japanese persimmons.

They are very successful in California, and are seen in almost every orchard, I mention them here. There are many varieties, from the size of a common hen's egg, up to the size of a Belleflower apple. The tree is beautiful in every phase in summer, whether covered with its shining foliage or with its beautiful fruit in autumn. The fruit can be picked when just coloring, and will ship long distances, ripening well in the house; the pulp when ripe is very sweet, and generally eaten with spoons. It is destined to be one of the coming fruits for distant markets.

78. What State has the honor of having issued the best known series of entomological reports, a set of which ought to be owned by every farmer and fruit-grower in Missouri?

Missouri.

MISSOURI AT THE ST. LOUIS EXPOSITION, 1895.

MISCELLANEOUS PAPERS.

Specked Apples.

Old Farmer Grump, with thrifty care,
  Had safely stored away
For winter use his apple crop—
  Enough to last till May.

"We'll not begin," said Farmer Grump,
  "To eat 'em yet awhile;
They've got to last the winter through—
  There's none too big a pile!"

And so they lay 'neath lock and key,
  Till the ripest showed decay
"Begin on 'em," then the farmer said,
  "Begin on 'em right away?"

"We'll kinder sort 'em out," said he,
  "And use for sass the wust,
And everyone who goes for 'em
  Must take the specked ones fust."

And so they used the specked ones first.
  As Farmer Grump had said,
But though they ate some every day
  The specked ones kept ahead.

And they not only ate them first,
  But all the winter through.
If that's their way, I've naught to say,
  And naught I'm sure have you.

Now, Farmer Hearty also had
  A well-filled apple bin,
But as he stored them in he said,
  "Now, listen:" We'll begin

"To eat the best of 'em right off,
  And keep on so each day,
For some of 'em will not keep long
  Though some will last till May:"

And so his household, one and all,
  Enjoyed the fruit while sound;
And eating still the ripest first,
  Had some when May came round.

Now, boys and girls, it's out of date
  To hitch a moral on—
I'll leave it to your common sense
  To see if there is one.

—Arthur's Magazine.

Handling Apples.

The publication committee of the National Apple Shippers' Association has issued the following address to apple-growers:

The National Apple Shippers' Association desires to acquaint apple-growers of the country with the aims of the Association, and to ask their aid in the reforms proposed. Dealers, shippers and growers must prosper together or not at all. In this view of mutual interest, the following suggestions are submitted to orchardists, representing the result of careful thought and discussion:

1st. It will be to the advantage of all interested in apples—growers, dealers and consumers—if there is a recognized size and quality of packages as well as for size and quality of fruit, both in what is known as No. 1 and No. 2 apples. A good size of package is easily suggested, one that has been in use for some years by the best class of Western dealers and larger orchardists. A full size flour barrel (that is a barrel with 17⅛-inch diameter of head and 28½-inch length of stave) will meet all requirements, giving a good, generous-looking barrel, and, when well shaken down and pressed, holding three bushels of apples. In some sections of the West the barrel now in use is smaller than this size, but these barrels are invariably discriminated against by the better class of traders. In fact, they are generally spoken of as the "snide" barrels. In a good apple year, like the present, the difference of a peck of apples in a barrel will mean to the grower not more than five cents in the orchard, but when the apple comes to sell in the market, the small barrel will bring on an average at least twenty-five cents less. Besides, the trade is so generally convinced that a package "snide" generally contains fruit "snide" in quality that they avoid it as far as possible, even at a fair difference in price, and as a consequence in times of over supply they are the ones neglected, while the more honest-looking, if not really more honest packages are given more prominence and consequent better sale.

2d. It is not so easy to arrive at a proper standard for size and quality of fruit for the reason that sizes and qualities of the same varieties vary considerably in different sections and in different seasons. The standard adopted by the Association will come as near to properly covering the ground as is possible without naming all varieties of apples, and it is recommended to your favorable attention: "That the grade No. 1 shall be divided into two classes—A and B. That the standard for size for class A shall not be less than two and one-half

inches in diameter, and shall include such varieties as the Ben Davis, Willow Twig, Baldwin, Greening and other varieties kindred in size. That the standard for class B shall not be less than two inches in diameter, and shall include such varieties as Romanite, Russetts, Winesap, Johnathan, Missouri, Pippin and other varieties kindred in size. And further, that No. 1 apples shall be at the time of packing practically free from the action of worms, or defacement of surface or breaking of skin, and shall be hand-picked from the tree."

This standard does not prevent any grower who may have good apples, below the standard of size in either class, from marketing them for what they are. Occasionally, some reasonably choice fruit might run below this standard, but the exceptions are so rare that there can be little objection to the standard as fixed.

These suggestions are to the interest of every intelligent, capable apple-grower. It may not suit his shiftless neighbor when he finds that his neglected fruit will not grade as No. 1. But that class has no legitimate place in the industry. To increase the consumption of apples, the consumer must be pleased, and nothing will tend to that end so much as to furnish him with a better, rather than a poorer apple than he expected when he made his purchase. Let the barrel branded No. 1 be not only No. 1, but fine; and let the purchaser find the barrel branded No. 2 not cider apples, but good fruit. Each barrel sold under this plan will make a customer for two more, and a crop of apples cannot be raised in this country too large to sell at fair prices, and that without going to Europe for a market for the surplus.

It may be too much to hope that all that is outlined can be accomplished this year, but by co-operation a long step can be made toward it. One thing is sure in this big crop year, the grower who most closely follows the suggestions will be the man best satisfied with the results of last year's work.

The Association is especially anxious to have growers understand that the prosperity of both growers and legitimate dealers are bound up together. Anything advancing the interests of one is for the benefit of the other, and for that reason it urges the hearty co-operation between the two interests, to the end that the apple trade may be further extended upon a sound basis with a reasonable profit to all concerned. The apple is the king of fruits, and its use can be greatly enlarged by honesty in all dealings, and intelligent organized effort upon the part of growers and dealers.

Apples and Waste Apples.

Since some of the many commercial orchards in the West have come into bearing, the question naturally arises in the mind of the orchardist—What can be done with the vast quantity of windfalls and culls of our orchards?

It is a natural result of every orchard that bears fruit that, from first to last, at least 30 per cent of the crop is not fit to be packed and sent to market. Nor is this confined to the apple orchard, the pear, the peach and the plum all come in for a large share of waste. The latter are still more difficult to handle than apples, as they come earlier in the season, and must be handled quickly, if at all.

There is always some demand for canned or evaporated peaches at some price, but, since the country has been flooded with canneries and evaporating plants, the prices are so low that the products will scarcely pay for the labor, to say nothing of five or six thousand dollars invested in canning machinery or several hundred in evaporators.

There is a growing demand among hotels, eating houses and pie makers for canned apples in gallons, and at one time we thought we had solved the problem as to what to do with our cull apples, but like most other products in this line the price has gone so low that it barely pays for the labor and other expenses of getting them ready for market.

Apples may be evaporated at a cost of about three cents a bushel, and a bushel will make about five pounds of dried fruit, worth on the market now about 4¾ cents a pound, or nearly 25 cents for the product of a bushel of apples, leaving less than ten cents for fruit, freight and commission.

If we were prepared and could utilize in canning and evaporating all the waste products of our orchards and could sell them all readily and quickly at a small margin of profit, then the problem would be solved, but can we? I say, "No." There are now in the hands of the producer canned goods of the pack of '94 that could not be sold any time up to now for more than barely the cost of packing them. Slick-tongued agents, mostly representatives of a Chicago firm, have flooded all the country and persuaded people of many small towns that their only salvation was a canning factory. They agree with them to furnish the outfit for a canning plant for so much (about double the value) and as an inducement will take a liberal amount of stock in the concern, and the deal goes, the plant is erected and run the first year at a

loss, the products, good or bad, are forced on the market at a great sacrifice, and this is one reason why canned goods are so very low.

It is said that there were erected last year in the State of Indiana alone enough canneries to produce canned goods for allmost the entire country.

A large amount of our culls may be worked into jelly stock, but then, it would have to compete with the cheap stuff made from gelatine and other cheap material, so that there would be nothing left for the man who grows the apples.

A vast amount of our culls might be worked into cider, but that is sold at so low a figure now by those who are prepared to make it in large quantities that there is nothing in it for the grower. You say—"make vinegar." Well, apples do make the best vinegar, but what will be done with it when it is made? Go to the dealer and offer it for sale and he will tell you he can get all the vinegar he wants at 6 or 7 cents a gallon, and his customers are satisfied and gets his profit, admitting it is a worthless stuff made of cheap acids, so there is no money for the grower in cider. Even if we could utilize all our culls in all or any of these ways, there would remain a large amount of what we call "waste." The rotten, knotty, ill-shaped ones, those that have dropped prematurely, and so on. What will be done with all this waste? You say, "feed it to hogs." Well, a reasonable amount of it is good for the hog, but too much without other feed is harmful; besides what commercial orchardist keeps a sufficient number of hogs to consume all the waste of his orchards?

Now, Mr. Chairman, as there is no money in canning, evaporating, making cider or vinegar, or even feeding to hogs, the question remains unanswered. What shall we do with our culls?

There is a way to answer it, however, but it is a way I would hardly dare suggest to the Kansas fruit-growers, besides the statutes of the State prohibit him from availing himself of it. In that way every bushel of fruit not suitable to pack and ship to market can be made worth from 30 to 50 cents, besides converting them into a greatly condensed form, saving largely in packages and freight and shipping when you please.

Many are taking advantage of this—some, perhaps, as a matter of choice—but most of them through necessity. The extreme low price of fruits the last few years and the extreme high rates of transportation, have made it necessary for the fruit-growers to look for some other way to turn the products of his labor into money. In this way

the windfalls, culls and waste of a commercial orchard may be made to go a long way toward paying the running expenses.

While the manufacture of fruit spirits is not popular in some sections, it is the only way to answer the question, besides it enables the fruit-growers to furnish the laboring man more work and pay him better wages and give his children better schooling.

It is an inducement to the orchardist to clean up and take out all wormy, scabby and diseased fruit that woul l otherwise remain on the ground and breed destruction for the next crop.

Mr. Chairman, your secretary has asked me to answer this question, and if I have not suggested anything that will help your orchardist to utilize his culls, I may at least have told some ways that will not pay, so that they need not make the mistake that so many have made, and squander their means in canning factories to be sold out at 50 cents or less on the dollar, after running the first year at a great loss.

J. C. Evans.

Prolonging the Early Apple Season.

There are at least three things to be observed in trying to prolong the ordinary season of apples, if we would be successful. First, careful handling in picking; second, picking at the proper time, and third, storing in a cool place. J. J. Thomas says that "Mankind consists of two grand divisions, the careless and the careful. Each individual may be assigned his place under these two great heads by observing how he picks or gathers fruit." Much of the difficulty in keeping apples arises from careless handling of the fruit while it is being picked. This is especially true of early fall apples as they are generally picked before the temperature of the air sufficiently lowered to arrest decay, which begins immediately where the apple is bruised.

My observation leads me to believe that farmers do not exercise the same caution in handling fall apples that they do in the case of winter varieties. Many seem to have an idea that they will not keep long anyway, and so they are thrown into the wagon and hustled off to town as soon as possible. I have seen the Fameuse or Snow brought into market this fall in such a damaged condition that it was impossible to keep them but a few days, when they should keep until the holidays, even in our warm climate. On the other hand, I have seen the Golden Sweet, a summer variety, on exhibition in November. These were kept in an ordinary cellar, but they had not been bruised by careless handling. The best keeping apples we have will remain in good condition but a short time after they have been bruised. Then the degree of

maturity at the time of picking will have much to do with keeping qualities. An apple should be mature but not ripe when it is picked, if it is to keep for any considerable time. The process of ripening is only the first stages of decay, and if this is allowed to continue before picking until the apple is ripe, that is, until it becomes mellow, this breaking down process has proceeded so far that it is very difficult to arrest. As soon, therefore, as the stem will separate readly from its union with the branch, the apple is sufficiently mature to keep well.

In this case of early apples, however, there is another element which enters into the problem, viz: flavor. Fall apples picked very early do not, as a rule, possess that richness of flavor which is developed during the last days of ripening, so that for home use, where the best is none to good, this becomes a very important element, and one that can be preserved only by keeping the fruit in a cool place where the tempture does not reach much above fifty degrees. This brings up the question of cold storage for the farmer and fruit-grower which may be continued in a future article. J. TROOP, Indiana.

Marketing.

If you have an orchard in bearing and have plenty of apples to sell, then be careful to pick, pack and market them as if the buyer were watching every apple that goes into the barrel. Every barrel should show by opening the top just such apples as it contains, no larger and no smaller. It is a disgrace to our Western fruit-grower to fill his barrel with apples unfit to go to market. This year of great abundance of apples will be one when the buyer will be much more particular than ever before. It will be a good object lesson to us, and this year may help us learn how to pack our apples. No apples that are to be kept over winter or used for shipment should be picked from the ground. Every sound apple should be picked from the tree carefully, and if there are any that are not sound they should be dropped to the ground and picked up with the culls.

In packing into barrels choose average size, well-colored specimens and place them into the barrels with the stem end down, placing in two layers in the same way. Then fill up with the selected apples, shaking the barrel at the emptying of each half bushel, until the barrel is full even with the top of barrel. If well shaken this should be sufficient; if not, then they should be a little fuller. Press them in with a lever or screw press, and label with your name and address, guaranteeing the packing, the variety and the quality. You will soon find that

it will pay to do this if you wish, to sell apples every year. Another very important matter in the selling of fruit is to have good, clean, smooth, full size barrels. This is much more important than one would think at first appearance. It is of very great importance and one or two cents on each barrel is worth much more than it costs.

L. A. GOODMAN.

Picking and Marketing the Quince.

The error of many growers is the time of picking and the manner of handling. As quinces do not blow off like apples or pears, many growers pick when convenient and that may be only after they have become yellow. An experience of years in growing, buying and shipping quinces, causes the writer to believe there is a right time to pick, that two days before this time is too early, and two days after that right time is too late for the good of the fruit. A little too early, the fruit is not well colored and it does not present its best appearance in market; a little too late, especially if the weather be warm, and it is over-ripe, and it is just then that black spot, where it exists, gets in its work rapidly.

People are cautioned over and over again, to handle fruit carefully, and this applies more to quinces than to any other fruit. A slight bruise, from dropping into the basket or turning into the barrel, in 10 hours has become an ill-looking brown patch. Slack packing in the barrel is disastrous, for fruit carelessly put up this way will hardly bring freight charges. The moving about of specimens during transit, perhaps for hundreds of miles, is ruination to the whole package. Another thing to be observed is to pack and ship at once, or as soon as they are taken from the bushes.

The writer's own quinces, while no better than many others, have for years sold for from 50c to $1 per barrel more than average quinces, on account of the care in picking and packing which made them show well in market. The proverbial "handle like eggs," applies very much to the marketing of quinces. JAMES F. ROSE, New York.

Picking Fruit.

It is a pleasant and exceedingly desirable kind of work to have fresh fruit to pick at will during four to six months of the year. We pass by the saving and convenience of having a plentiful supply of fruit at all times handy, and will speak only of the gathering. Where large quantities are to be gathered it is purely a business transaction.

and it is hard to get pickers to understand this. They are too apt when settled down into the fruit fields to act, talk and behave as if they were on a picnic excursion, and even the older pickers are imbued with this spirit. We have found that well-raised ladies and girls make the best hands, especially those upon whom the burden of the support of the family has entirely or partially fallen. While everyone thinks he knows how to pick fruit there is scarcely more than one in twenty-five who can pick profitably to himself or to his employers. We have been compelled to discharge even a large percentage of applicants who have tried it. This, of course, gives the fruit-grower the reputation, even among the pickers who are retained, for crankiness, and he must treat them with firmness and frankness and make the pay good, showing enough discrimination in favor of good picking to create a rivalry that will secure good work. Berries must be picked clean and without mashing, and the work done rapidly and loud talking or visiting reduced to the minimum. We rarely find it profitable to employ children in the work. Berry picking is real hard work; too hard for children. Vitality and ability to stand the heat are among the more important requisites. It is possible after being in the work and becoming well acquainted with the heads of families who are pickers to have them bring along this or that promising girl or boy who has good home habits and let them pick next to and under the direct care of the parent, developing them in this way. The principal reason why children are not profitable pickers is because they look at the work from a picnic standpoint altogether, and when the picnic idea works off and they have eaten all they want the thing begins to look like work pure and simple, so they become of no account and must be dismissed.—Live Stock Indicator.

Picking, Packing and Marketing Fruit.

My purpose has been to gather and arrange for the South Missouri Horticultural Association, and all the fruit-growers of Howell county, the fullest and the best obtainable information on my subject, such as may be a practical guide to the inexperienced with some new and useful suggestions to all. With this aim, I sought, and have been kindly accorded, the assistance of Col. J. C. Evans, President; Hon. L. A. Goodman, Secretary, and Hon. A. Nelson, Treasurer Missouri State Horticultural Society; Hon. George T. Powell, of New York, noted as a lecturer on horticulture; Geo. W. Barnett, of Chicago, President of the National League of Commission Merchants, and Col. Louis Erb,

the well-known commission merchant of Memphis, owner of the extensive Cedar Gap Fruit Farm. Valuable material has also been collected from the horticultural reports of Missouri and other states. This acknowledgment is made at the outset in order that you may take this paper at its full value, as mainly a condensation of what I have gathered from the high authorities named. I will first refer to our fruits separately, in the order in which they are marked, and will follow with such matter as relates more or less to all.

STRAWBERRIES.

Pick as soon as evenly colored, just before fully ripe, always with stems on. Pinch off stems with the nail, about an inch from the berry. Carefully avoid bruising, which causes fruit to bleed when it soon sours and is valueless. Never pick when berries are wet or soft; keep them constantly cool after picking. Pick only berries of uniform ripeness; two or three green, over-ripe or imperfect berries will render a box of otherwise choice fruit unsalable. Go over the rows at least every day, whatever the quantity of ripe berries obtained and whatever you do with the fruit; keep over-ripe berries off your plants. Pick in two grades, and don't ship the second; a good picker will soon learn to grade properly. Turn out a box now and then as brought in by pickers, and discharge any picker detected a second time in careless picking.

You cannot maintain your correct standard otherwise. Fill boxes as full as possible and do not fear rounding up; the fruit settles in transit and a little pressure on top berries is preferable to the shaking up from slack boxes. Leave no space between top tier and cover; a layer of leaves protects and freshens the berries, especially if shipping small lots by express. Use only new, perfect boxes and crates, 24 boxes to the crate, and be sure that they are dry. The Leslie box is recommended. Stencil handsomely and cleanly. Always use tickets, or card and punch, for pickers, and, in large fields, work them in squads.

The strawberry is the fruit of the million and constantly becoming more popular. The grower who can market choice, uniform strawberries not expensively raised will always find a profit, and the means of doing this cannot be too closely studied.

CHERRIES.

Pick as soon as well colored. Always leave stems on the fruit and handle by them. Ship in quart boxes same as berries; grape baskets will do if not to go too far; fill top of boxes so stems are not exposed. If very fine, it pays to layer the fruit; assort carefully.

PLUMS.

Pick when not quite ripe, when changing color if for express shipment; if for freight, pick green, though they must be fully grown. Let no soft plums go in. Pack in berry boxes or four basket crates if quite ripe; if hard, pack in one-third bushel boxes. Handle plums so as to prevent their bloom. Fancy varieties will pay to wrap in paper like the California plums. Wild Goose plums may be shaken from trees on sheets.

RASPBERRIES.

Handle same as strawberries, except they should be fully ripe when picked and need not be graded. Pick as soon as they will slip from the stem. They must be handled more quickly than strawberries as they mold easily. The red raspberries do not stand long shipments, but are such a prime favorite with all lovers of fruit that it pays to get them to market when possible. In picking them, give berries a roll between thumb and finger instead of pinching them. A good picking device for raspberries is a tin box attached to a waist belt, into which the berry box is set. It has a hinged cover with funnel shaped hole to admit berries; this prevents waste and leaves both hands free to pick.

BLACKBERRIES.

Blackberries will stand shipping longer distances (picked when just ripe) than other berries, as they are less likely to mold or decay. Handle about the same as other berries.

PEACHES.

Pick just when they have a good color and the green becomes yellowish, while still hard. Use half-bushel picking-baskets and take great care not to bruise the fruit. Don't empty the picking-baskets; pack from them. Pickers should pick, and packers should pack. Young men make the best pickers, working by the day. Women and girls make the best packers. Grade carefully, using a board with holes in to guage sizes. Rigidly reject all over-ripe or blemished fruit; make three grades—extra, No. 1 and No. 2. Wrap the extras in tissue paper and pack in trays, 16×16 inches, three inches deep, holding one teir each, held together by strips nailed on sides, with cover on top tray. No. 1 peaches may be shipped in one-third bushel boxes, or four and six basket crates. In packing boxes set them on edge, not flat, and lay the peaches in rows along the sides with the stem ends inward, filling in the center carefully; if packed thus, unbroken rows of well

colored fruit will show at all openings and not a peach can move; let every package show just what it contains, however. Covers, when nailed down, should press fruit. Choice or mellow peaches may be put in eight-pound baskets, with slatted covers, and it is a good plan to put excelsior on top to hold the fruit solid. Compartment boxes, like egg cases, are also used for choice fruit. It is well to stencil the name of variety on package. Do not ship your No. 2 grade of peaches.

GRAPES.

Pick when just ripe, never before, nor when too ripe. Protect the bloom as much as possible. Pick in convenient baskets and, at picking place, remove all green and imperfect grapes with scissors. Hold two days before packing, if to be shipped long distances. Pack early grapes in five-pound baskets, later in nine or ten-pound baskets. Shake down well and fill baskets full. Turn stems of top bunches out of sight and have the surface of the baskets smooth. The cover should press the fruit sufficiently to hold it firm. Stencil the variety in each basket on the cover.

APPLES.

Pick summer varieties as soon as ripe. Select the best and ship in bushels boxes. See that they are dry and cool before packing. Pick winter apples before fully ripe; they keep better and have better flavor. Be all ready for apple picking and packing by September 1. Ben Davis and some others may even be picked the last day of August. Two pickings of Ben Davis are recommended, about three weeks apart. Never pick apples wet or allow them to get wet. Use baskets for picking, and it is a good plan to line them. A bag slung over the shoulders is good to pick into. Pick only such apples as are intended for shipment; don't hand-pick your culls. Separate your varieties closely. The best fruit is on the topmost branches, and therefore requires the most careful picking. Small home-made stepladders will do for most of our Howell county orchards. Picking should be done under a foreman and it is better to hire your pickers by the day. Let each picker chalk his name or number on every box or barrel filled by him, and you can then know how much he does and how he does it. It is better not to pack from the trees for shipment, and the best authorities now advise against piling apples in orchards before packing. Never, and again never, haul shipping apples in a wagon a rod. Peel a few apples which have been hauled thus and held two or three days, and you will find them covered with bruises. The best way is to haul from orchards, loading your wagon with empty shipping barrels,

the bottom head taken out and left loose in the barrel, the top head (being the bottom in wagon), nailed in and all hoops nailed except those at the open end. Empty the pickers' basket gently into the barrels. When filled, haul to cellar.

PICKING.

Do your best to get experienced and careful pickers. Hire them by the day, except for picking berries. If picking on a large scale always have an extra man to every 12 pickers to watch the work, make ladders, handle fruit, etc.

CONDITION.

Dryness and as cool and even a temperature as practicable are essential to the preservation of all fruit. From the moment of picking, it must be carefully protected from sun and moisture; the latter is the surest agent of fermentation and decay. Have your packing shed so arranged as to catch every breeze to help carry off the surplus heat and moisture in the fruit. All fruit should be cooled off before loading in car; this is important as heat will increase in car.

SELECTION AND PACKING.

Choice, well handled, well selected, fruit always find a market when inferior fruit can not be sold to cover expenses. The best commission houses do not want the business of careless packers. Quality, not quantity, is what every fruit shipper should strive for. The saying "There is always room at the top" is especially true in the fruit business. Never yield to the temptation to top off your packages. Put nothing in that you would be unwilling to see on the top. That is your safest rule. To arrange the top fruit to show to the best advantage is, of course, advisable, just as you give a picture its best light. Remember, your name or number is on every package and the dealer is guarding his own reputation, which depends on his handling attractive, uniform fruit. If he is deceived once only in your fruit he will remember and shun your goods thereafter be they ever so straight. You will get more for your selected fruit than you would for twice the quantity by letting your inferior fruit go in, besides saving labor, packages, transportation and reputation (and reputation is much to the fruit-grower). Select carefully, not only as to size but stage of ripening. Put into separate packages all unripe or over-ripe fruit that finds its way to the packers, to be disposed of quickly or held longer, as the case may be, without spoiling the appearance and sale of the standard fruit. Get your packages and make them up, in time to dry out

thoroughly before use. You should always have your own stencil from a regular stencil maker; this should give your name and address and be sure to get "Howell county" on it. It should be attractive in style and as large as the space it is to be used on will permit; have different sizes if necessary. If you belong to the Shipping Association of Howell county, as is presumed you will, the stenciling of your packages will doubtless be regulated by the Association. If you have no stencil, a shipping tag (not a common card) tacked on smoothly, or a heavy lead pencil will suffice.

Never use large or irregular nails for fruit-boxes or crates; they are unsightly. You must pack so that the "Howell county" mark on a package means standard quality, to be accepted without inspection. Such goods will be sought after when unknown brands, however, well deserving, cannot obtain notice.

HAULING.

Do not carry tender fruits, if avoidable, in any but a spring wagon do not allow them to be loose in the package and always cover them from sun, dust and rain. Never carry any fruits loose in a wagon; Time the movement of your fruit from the orchard or packing shed so that it will not stand long on the depot platform, and ship by night trains when possible.

MARKETS.

It is important to keep track of your markets. One market may be good one week and another the next. Your commission man cannot control conditions and you must not expect to much of him. In finding markets (aside from the question of profit) you have an ample safe-guard against that bugbear of many, over-production; for if you seek them diligently you will surely find them. It is claimed that the market is never broken down by good fruit. As a rule, avoid solicitors and traveling buyers; deal direct with houses of well known standing and do not scatter your shipments. In marketing your fruit, however, you are embarking upon an unknown and dangerous sea; without chart or compass, over which even the experienced captains I have called to your aid cannot pilot your small barks, and you must either stay ashore and sell your fruit to local buyers, without the means of knowing its actual market value, or you must put it aboard a ship big enough to carry it anywhere and under a guidance which knows the best ports and how to sail into them. I mean a fruit-growers co-operative shipping organization.

ORGANIZATION

Will protect the transportation of your fruit in every way from the time you deliver it to the association shipping agent at your station. He handles it carefully into the car and the car goes intact to the association commission agent in some distant city, who does not handle and rehandle it (as do the express companies, in sorting and delivering to the various consignees), but delivers the contents direct to his customers as their orders come in, and they, in turn, get them to the consumers in the best possible condition. In the matter of railroad rates, to any and all markets, I need not tax your patience or question your intelligence, by setting forth the immense advantage an association will have.

Organization accomplishes that all-important object, the finding of the best markets. The association's manager should receive daily advices, either by mail or wire, from reliable agents in every available city. Transportation charges would be closely watched. Railroad and express companies do not reduce their rates without knowing why they must do so to hold their business. Hon. Geo. T. Powell says: "The county would get its most valuable reputation to handle this fruit, especially apples, peaches and grapes, through an organization that puts its stamp of thoroughness and uniformity on everything that goes out." Co-operation in shipment is of the utmost importance to small shippers, who cannot avail themselves of the market without it, and with it have equal advantages with the large shippers. Beginners often let fine fruit waste because of having too small lots for shipment ready at any one time. "Refrigeration laughs at time," and no country has the monopoly of any market very long. California can sell fruit in the Chicago market in prime condition 30 days from the tree. Refrigeration will help immensely to market our fruit, however great the production, and renders the problem only one of the cost to grow and transport. Refrigerator car service can only be obtained for continuous large shipments through the organized co-operation of shippers.

Our apples must find their way to other countries in the near future, and it is altogether possible that we may even ship our peaches to England. Peaches go there now from the Cape of Good Hope, and why not as well from the United States? A really fine peach is never to be had in England for less than 8 cents. When the right time comes our shipping association can test the carrying qualities of our fruit by sending trial packages to the various markets of this and other countries and noting the results.

I close with the prediction that the Howell County Fruit Grower's Association, if organized now on a business basis, will, within three years, be known throughout this country and probably in Europe.

CHAS. S. WHEELER.

Frozen Apples.

The question of what to do with these may well be asked, for I have no doubt there are lots of them. If in barrels or boxes the best plan is to leave them alone to thaw out gradually; if in the dark, so much the better. By no means remove them to a warm room, for they will surely spoil. They may be frozen hard as ice for months without injury if placed in a dark cellar to thaw out. There are doubtless bushels of apples yet lying on the ground, covered with snow, that will keep there all winter if the snow remains on them. On my own grounds there are enough in that condition to supply the needs of many families. The low price in market did not warrant one in expending much time or labor in gathering them. Some men near me hauled their apples to town eight miles and sold them for twenty cents a bushel.

Those apples frozen and thawed out in the open air, and are soft, can be mashed and put in open barrels. Then pour on to them as much water as they might contain of juice, leave stand for a few days, tap from the bottom, and draw off as long as it has a fair taste of cider. By the laws of gravitation the heavier fluid will reach the bottom and the lighter remain in the pomace.

The Aiken Apple.

Our subscriber, L. V. Dix, of Cole county, Mo., writes, our friend, E. A. Riehl, for information as to the value of the Aiken apple for orchard planting. He says: "I have some 300 trees of it planted, but as I have never seen it in bearing, wish to learn something of its value before planting more. Have planted quite largely of Paragon, and think it one of the best. What would you plant of peaches for hardiness, productiveness and profit? The peach in this locality is more or less affected with the yellows, although it is contended by some of our fruit-growers that this disease is not found in the State."

Ans.—I have the Aiken apple growing, but never fruited it on my own premises. I have, however, seen the fruit often at meetings of the Horticultural Society in Southern Illinois. I have also visited the

original tree, and seen numbers of young trees in orchard. The fruit is only medium in size, and I fear when the trees become old and bear full crops many will be too small. The color is attractive, being a bright red striped. The quality is best—sprightly, fine-grained, and juicy. The tree is an upright grower, and comes into bearing late, so that the limbs retain their upright position unless spread out artificially before they come into bearing.

I think if Mr. Dix has 300 trees of it growing, it would be safe to wait results from them before planting more.

The paragon (black twig) is a large dark red apple of good quality. The tree is a strong, sturdy grower, that comes into bearing early. I think it a promising variety.—E. A. Riehl in Coleman's Rural World.

Watch 'Em, Tige.

A new market has been opened for American apples by the enterprise of Canadian fruit-growers. This is that far-distant colony of Great Britain, Australia, to which 115 cases—not barrels—of the best fruits have been sent for the Christmas markets. The result of the new opening for the disposal of fruits will be watched with interest.

It should be remembered that this Southern locality has its seasons reversed as compared with ours, and that the Christmas holiday season is in their midsummer. At this season apples are at a premium in the far Southern countries, and this, in point of fact, doubles the period of consumption, affording a timely market for our winter fruits. The Canadian government, with the vigor and promptitude which it has shown itself very capable, has a commissioner on the ground to dispose of the fruit and arrange for future business in the whole Southern hemisphere, in which doubtless some of our future most valuable business connections will be made if the right methods are pursued. The whole world may be made contributary to the traffic in our fruits, of which we have a very large variety of the very best kinds.

Apples for Everybody.

"The apple yield of this year is an enormous one," remarked a prominent fruit dealer, "and will not fall short of 70,000,000 barrels. Just think of it, a heaped up, old-fashioned barrel of apples for every inhabitant of the United States. A cargo of 5000 barrels of choice apples sent to London from Philadelphia arrived there in good condition, and was readily bought up at fair prices. The present damp

weather is hard on the gathered apple crop, for apples will 'speck,' and one unsound apple in a barrel will soon contaminate others. Style, fashion and taste rule the apple market as completely as they do the silk, satin and dry-goods counters, and many of the old reliable sorts of fruit that were popular in our grandfathers' day have little call in the market now.

Of all fruit, there is none more conducive to health than a choice, ripe apple, and from the days of the famous dumplings whose mechanism puzzled the old-time English king until the present period, apples in some form have been one of the mainstays of the household menu. The mallic acid they contain is as important as lime or carbon for the general constitution, and a barrel of apples in the cellar for constant use will save, it is said, more than quadruple its cost in doctor's bills. Francis Gowen, the great railroad lawyer, used to boast during his lifetime of eating an apple regularly as a daily afternoon lunch, and many of the corner applewomen have among their best customers some of the most prominent business men in their districts. Apples are gathered from the trees nowadays as carefully as if they were eggs, and no kind of winter weather is too cool for their keeping. The apple crop of this year will take rank with the phenomenal yield of corn and potatoes."

Fruit Storage.

There is some hope that sanitary reasons will banish the cave under our houses that goes by the name of cellar. But there are other reasons why a storage-room for fruit and vegetables should not be under a house in which people live. The ideal cellar for fruit should have an even temperature and does not require ventilation. In fact, apples will begin to rot rapidly as soon as windows are opened in April. Keep the cellar closed. But it must be added that to keep apples well a cellar must be slightly damp; not wet or moldy, but moist. This is not the right atmosphere to have under our habitation rooms. Besides a moist air cannot be had in connection with a furnace. The object of the moisture is to balance the natural waste by evaporation or drying of the fruit. Such a cellar as described, moist and close, preserves fruit far better than one that is ventilated. The apples are then placed in bins or hammocks that rise in tiers one above another; leaving the fruit not over six inches deep anywhere. These, after careful sorting, and handling with tenderness, are stirred as little as possible till spring. A cellar such as described is easily constructed under a barn or carriage-house, or as a separate building.— E. P. Powell in American Agriculturist.

Planting Apple Seeds.

By request, I state my mode of planting apple seeds. Having planted more or less each year for the last forty-two years, and tried spring and fall with varied success, the fall planting always did the best. I sow the seed in the drill and cover not more than one inch deep, and so planted, scarcely a seed will fail to germinate the next spring. The seeds to do their best should be planted not less than one inch apart, and if to be grown as orchard trees without grafting, they should take one winter in nursery to test their hardiness, and then reject all that fail to make a healthy growth and a perfect terminal bud. Take up and set in orchard at one year old, for at that age the tap root can be had entire and easily planted. In growing a healthy tree the most important point is the tap root. Small fibrous side roots are better cut off, doing more injury than good. I grow and fruit thousands of seedlings, and in a promiscuous lot not more than one in fifty will be a fairly good apple. To make seedlings a success requires experience and careful culling. My best success was 1200 culled from 10,000, and even then some poor ones.

PETER M. GIDEON, Minnesota.

Selection of Apple Trees.

Prof. Taft, of Michigan, says that the success or failure of the orchard will depend largely upon the varieties and the character of the trees purchased.

While many experienced orchardists wisely prefer a strong one-year tree to anything that is older, as it enables them to form the head at the height and the manner they prefer, for the ordinary planter a somewhat larger size is to be commended. As a rule the two-year, medium, four to five feet, five-eights to three-quarter inch trees will do as well, or better, than those of a larger size, and the cost and expense for boxing, freight and planting will be materially less than for the three or four-year-old trees that some planters insist upon having. The No. 1 two-year trees, graded at five to seven feet, three quarter inch and upward, are, as a rule, not objectionably large. While it is desirable to obtain trees at a reasonable price, cheapness should not be the only consideration. When buying trees of the above-mentioned sizes, care should be taken that the nurseryman does not work off cull trees that

are three or four years old. By supplying such trees, and even worse, if he is unscrupulous, substituting worthless varieties, a nurseryman or tree dealer is often able to make a low price that will tempt the purchaser, who in the end will find that the trees would have been dear as a gift. The fact that a healthy tree of a good variety may, in good seasons, return a crop worth from ten to twenty or more dollars, while the crop from a poor tree, even if it lives to come to maturity, may not be worth gathering, should show everyone that too great care cannot be taken in selecting the varieties and trees when planting an orchard.

In the present days of low prices, trees for an orchard can be obtained for a comparatively small sum. If only a few trees are needed, it may be well to secure them from a local agent, whose stock came from a responsible nursery, as the cost for packing and express upon a small bundle might be more than his commission, but if from 100 to 500 trees are needed, it will be better to get them directly from a nursery.

As a rule, the trees should be brought from the nearest reliable nursery, when good trees of the kinds wanted can be obtained at a reasonable price.

If they have to be shipped in the cars, however, it will make but little difference whether they are sent 50 or 150 miles, so far as the distance is concerned. In selecting a nursery, however, it is well to choose one with the soil and climate as much like those where the orchard is located as is possible, but from the fact that some sections do not have nurseries or they are not reliable, it often becomes necessary to go some distance for the trees. If the trees needed cannot be found in some local nursery, it will be well to send a list of the numbers and varieties required to several reliable firms, and obtain estimates as to the cost. For not less than 500 trees of standard varieties, medium size two-year, the cost should not be more than 6 or 7 cents each, and the first-class trees should not be more than 8 cents. When smaller numbers are wanted, the price will range from 8 to 15 cents, according to size of trees and number wanted.

These prices are the highest that should be paid, as many reliable nurseries quote prices by the thousand considerably less than those given. It must not be forgotten, however, that these prices are for trees at the nursery, and that there will be an additional charge of nearly 1 cent per tree for small lots, for boxing and packing, and perhaps as much more for freight.

How to Bud Young Trees.

The proper time to bud is when the stock—the young tree that receives the bud—is completing its growth to the season, and while the bark still separates freely from the wood. If the bark adheres ever so little, the work will be unsuccessful. This right time is usually all through the month of August. Some trees, however, complete their growth early and require to be budded earlier than August. The Morello cherry, for instance, and some of the plums. Others, including the peach in its first season's growth, the Mahaleb cherry and the quince grow late, and are best budded in September. The season governs largely. If dry, growth is checked and the bark soon adheres, and budding must be done early. If wet, growth will be continued late and the work must be performed late. The stock will indicate its readiness by the points of the growing shoots ceasing to elongate, and forming their terminal buds," says the National Stockman and Farmer.

The most convenient size for the stock is half an inch in diameter; but with care a smaller size can be worked, and a larger one up to an inch or over.

The scions of the kind desired to be budded should be of the current year's growth; best if from the outside of the tree, growing in full sunshine. The buds at the base of the scion are generally not very well developed, and those toward the point too soft and immature, so that an inch or two of the lower end and two or three inches of the point should be rejected.

As soon as the scion is cut the leaves are to be removed; they carry off moisture rapidly if left on, and so ruin the buds. In cutting off the leaves half an inch or so of the footstalk is to be left to hold the bud by when putting it in place. This prepared scion, or "stick of buds," is to be kept in damp cloth until used.

The regular budding knife, costing 50 cents to $1 has its point rounded to nearly the quarter of a circle, and there is generally a thin piece of bone or ivory on the end of the handle for raising the bark. The expert budder rarely uses this thin ivory, but raises the bark with the rounded point of the budding knife. A good common pocket knife may take the place of the budding knife. It must have a keen edge and a thin blade, and the fine edge is so imperative that the blade used in budding should be used for no other purpose whatever.

For tying material prepared basswood bark is generally used, but its place can be supplied by woolen yarn, or by strips of half-worn muslin, half an inch or so in width.

With everything in readiness the work of budding may be said to consist of six different operations. 1. At a smooth place in the stock (preferably two or three inches above the ground) an upright incision an inch or over in length is made clear through the bark. 2. Across the upper end of this incision a short horizontal one is made: at right angles is the usual way, but it will be better to make it oblique, as in this case the tying material cannot get into the upper incision but must cross it, as it should. 3. The bark is then raised by pressing the thin piece of ivory (or the point of the knife) against the cut edges with a kind of lifting movement, beginning at the upper end of the incision and proceeding to the lower end one side at a time. In this operation special care is needed to avoid touching the soft new wood immediately under the bark. Touching this soft wood makes a wound which the tree will proceed to heal. But it is this healing process which fastens the bud to the stalk, and while it is expended in healing the wound the bud perishes. 4. A bud is now cut from the prepared scion, the knife entering about half an inch below the footstalk and coming out three-quarters or so above it, taking as thin a slice of the wood with it as may be. This wood need not be removed from the bud. 5. The bud is then taken by the piece of footstalk left for the purpose, placed under the bark at the upper end of the incision and pushed gently down to the lower end. If a portion of the bud projects above the cross incision it is to be cut off, making a neat fit. 5. Tying it is now in order. This is to hold the bud in position and to exclude air and moisture. It should be done at once, beginning at the lower end of the incision and covering every part of it, but leaving out the footstalk and the point of the bud. This completes the work.

If the stalk is growing rapidly, the tying may cut into the wood before the bud adheres properly. Should this occur the tie is to be removed and immediately replaced but not so tight. In three weeks from the first tying it may be removed permanently.

In ten days or so after budding, it may be known that the bud has taken, by the piece of footstalk dropping off on being touched. If instead of this, it has dried and sticks fast, the operation has failed. But if the bark still peels freely the budding may be repeated, selecting a new place on the stock.

As a rule there must be close affinity between the stock and the bud. Apple must be budded on apple, pear on pear, cherry on cherry, peach on peach, etc. But many of the plums do well on peach; and

some of the pears—only a few, however, Louise, Duchess, Howell and three or four more—make good, rather small trees on the quince, dwarf pear trees, they are called.

Root Grafting.

Root grafting is the process by which small apple trees are now transformed from worthless seedlings into choice, well-tested fruit. Root grafting is an economy of both time and material, as the work can be done in the leisure of winter. The roots of seedling trees are taken from the ground before cold weather sets in, and are stored in a cool cellar in sawdust or moss. In the winter these roots are taken a few at a time, to the room where the grafting is done, after which process they are again returned to the sawdust, where they remain until set in the nursery rows next spring. The grafting process is what is known as "whip" or "tongue" grafting. A portion of the root as large as a lead pencil, or a little smaller, is cut off obliquely in much the same manner as the lower side of a steel pen may be imagined to be beveled off with a jack knife. This cut surface is one or one and a half inches long, evenly cut and straight. A scion two or three inches long is cut in the same manner so that its cut surface will apply on the cut surface of the root, in exactly the same manner as two pens, with the points toward each other, may be applied to each other by their lower beveled faces.

If the process proceeded no further than this it would be "spliced grafting," and the scion and stock would be tied and waxed together with the simple cut surfaces in contact. To render the union more complete, however, a split an inch deep lengthwise the scion and above the center of the beveled surface is made, and a similar one is made in the stock or root. By this split in the beveled surface we have divided it into two parts, the upper one of which being the smaller is called the "tongue" or "whip." This tongue is inserted into the split in the opposite piece, either stock or scion, the two beveled faces are brought close together, as before, and the union is firm and complete. All the work must be done with a keen-edged knife, so that the surfaces may be clearly cut. Care must be taken in putting the scion and stock together that the inner bark of the scion exactly matches on one side at least, the inner bark of the stock. The scion and stock are now lashed firmly together by waxed twine, and the grafting is done. It is not necessary to wind the twine closely, as the earth about the cut surfaces will exclude the air and afford protection. Small

pieces of root can in this manner be furnished with a top of two or three scion buds, which draw up the sap and set the plant in activity in the spring. The scions are cut from thrifty trees in early winter and stored in the cellar with the roots.—American Cultivator.

Next Year.

The fruit-grower's hopes were running high
As on bud and blossom he cast his eye,
His every nerve with joy did tingle
While he thought of the dollars he soon would jingle.

Great castles in the air were by him built,
He'd buy carriage and harness trimmed in gilt;
Houses and barns around him would grow,
On a trip to Europe he surely would go.

His wife might wear a costly gown
And they'd buy a residence in town,
On a new piano his daughter would play,
His son might ride a "bike" all day.

Jack Frost came along—said "this never'll do,"
"Of your buds and blossoms I'll take a few."
The drouth followed Jack and took a large share,
Then came the grower, but he found no fruit there.

His castles topple over, his plans fall through
And people wonder what next he'll do;
He tills his farm with right good cheer
And says he'll wait for the crop "next year."

CHAS. L. PEARSON, Baraboo, Wis.

Pruning Frequently.

One trouble in pruning is that, in many cases, the work is put off from time to time and then too much is done at once, and a considerable injury to the tree is the result. It would be much better in every way to do a little at a time and do the work oftener. Shortening back or cutting off a branch here and there wherever it seems needful.

The first and most important pruning must be given when the tree is first transplanted. Then the tops must be cut back in proportion to the roots and it is at this time that the general shape or form of the tree should be decided.

So far as the natural growth of the tree will permit a spreading, open head that will admit air and sunshine all through the tree is best. In securing this another benefit is derived; that is, the trunk of the tree is shaded and this offers a good protection, and, to some extent at least, lessens the liability to their being infested with the borer. This

pest largely depends upon the warm sun to hatch out their eggs, and shielding the tree thoroughly will in a great measure avoid this.

It is nature's way, if the tree is growing in an open place, to send out lateral branches along its stem, these serve to strengthen it, as the tree grows and spreads out these become useless and are taken off if they do not die of their own accord. Some pruning can be done during the summer if the tree is making a vigorous growth, by rubbing off superfluous shoots, or pinching back the ends of others, but usually the principal part of the pruning should be done in the fall or winter, when the tree is dormant, and not frozen. It is best to do a little summer pruning and a little winter pruning every year, rather than a considerable amount at a time and this less often. A fruit tree should be low-headed, evenly balanced, with as few forks as possible, and sufficiently open to admit air and light freely through the branches, and the pruning that best secures this is the one to be followed.

N. J. SHEPHERD, Eldon, Mo.

Some Fundamentals in Pruning.

The apple tree grows with a superabundance of limbs. The hardness and vitality of most varieties enables the cultivator to prune and train according to his particular taste, or to fit various requirements, the divergence not exceeding certain limits. So we see orchards pruned to low-heads and widely branching tops, while another's taste prefers the taller tree, and both succeed in their desire.

As L. F. Abbott says in the New York "Tribune," there are fallacies in pruning which, if avoided, make the difference between success and failure. As a matter of fact, the training given the young tree the first five years of its life determines the form and largely the future usefulness of the tree.

The young tree in the nursery requires but little, if any, pruning for the first two years.

While in the nursery rows the side limbs contribute to the growth of the stock. Nature provides that the young tree should grow with a perfect taper from the ground up. Too early pruning destroys this symmetry. When the lower limbs of a young tree are early removed and the sap driven into the top, the tree will not sustain an upright position. It becomes unbalanced—thrown out of natural symmetry. The top increases faster than the trunk, which becomes too weak to support it.

The experienced nurseryman never makes this mistake—the inexperienced fruit-grower and farmer frequently does, and there is this difference in the quality of trees by the two managements: In the former case, the well-grown apple tree from a first-class nursery requires no staking when transplanted to the orchard site; with the latter, a a slim-stemmed, top-heavy tree is produced, that nine times out of ten must be supported to keep it in an upright position, and an exposed stem invites sun-scald and the flat-headed borer.

Between the third and sixth year in the life of the young apple tree is determined the character of future tree. Some trimming should be done in the nursery row, but it is hardly possible to shape the head and leave on only such limbs as will be required when the tree arrives at a bearing age. Hence, the most critical part in the training of the tree comes to the hand of the farmer and fruit-grower. Many fail from the lack of knowledge of the growth of trees. Not only is a correct understanding of the habits of growth of the apple tree in general required, but the farmer should be familar with the variation in the habits of growth of different varieties, and to be able to conform his practice thereto. Faults of pruning in the nursery can never be fully overcome by training on the orchard site.

Few trees when received from the nurserymen but need some pruning when planted. There are two reasons for this. One is to balance the roots and top, the other to lay the foundation for the symmetry and usefulness of the future tree. The first thing to be thought of in forming the head is whether the tree shall be low-headed or the leading branches high enough so teams can comfortably pass near to the trees. Orchardists very generally agree nowadays that the lowest limbs at the trunk of the tree should be out of the way of teams passing under it.

It is found a great convenience in plowing to have the trees trained with one straight, upright stem. This cannot always be done to the satisfaction of the orchardist, because of the variation of the habits of growth of different varieties.

The endeavor in pruning the young apple tree should be to retain only side branches which join the main stem at a right angle. Any other angle—size and nearness to other branches modifying somewhat—is faulty, and invites disaster in after years. It requires the exercise of good judgment to always accomplish this in practice—the theorists and picture-makers do it easily.

One object to be kept in view is to distribute the leverage of the top upon the trunk, so that the minimum of force will be exerted upon

each branch when the tree is laden with fruit or loaded with ice and snow.

The top properly balanced as a whole, the branches will bend; the hard substance of the collar which forms at the junction with the main trunk rarely gives way, even if the limbs are bent to the ground.

A tree properly shaped when young rarely requires the removal of large limbs in after-training. If this is ever necessary, it is well to check the flow of sap for one or two seasons by a narrow girdle around the branches to be removed. Cut the limbs away in the autumn, and the wounds will keep dry and soon harden up. Always cover the exposed part with some water-proof substance—thick paint, with 25 per cent of coach varnish added, is excellent.

Scions set in thrifty stocks generally require no pruning the first season. The second year, while two scions have been set out and both lived, one—the inside one—should invariably be removed and the wound covered.

If limbs of much size are to be removed, cut in autumn, else when the tree is in full leaf, about June 15. In June the wound will immediately begin to heal. Spring pruning—cutting off of branches of considerable size—invites disease. When the sap starts it oozes from the wound, discolors and kills the bark, the heart wood becomes affected, and the whole tree suffers. Small trees are often ruined from this injudicious pruning, and larger trees seriously damaged. The twigs of young trees from the nursery may be cut at pruning time with safety.

A Study in Fruit Buds.

How are fruit buds formed upon trees preparing to grow their first crop? For a study of this subject an apple-tree twig from a tree that has been set in an orchard four or five years will show the general method upon our common fruit trees.

At the axil of each leaf—that is, just above the base of each leaf stalk—there is a bud. These buds appear to be nourished each by its own leaf, for the development of each bud seems to correspond in size, vigor and character to that of its leaf—good leaves producing good buds and poor leaves poor buds.

It is the function of leaves to perform their part in storing the buds and terminal twigs with starch and surplus plant food with which the end growth of trees should be gorged in the fall. If the foliage is poor this store of material is deficient and since the buds that expand each spring depend upon this surplus store to give size and vigor

to the first foliage produced, only such buds can develop into fruit spurs and fruit buds as were sufficiently strong to do so, and only those fruit buds well nourished this season can expand into good bloom next season.

Subsequent growth modifies the fruiting method, and there are some differences in varieties about producing fruit buds, but a large share of tree fruits lay the foundation of productiveness along the same lines for the growth of their first crops. In all cases, whether fruit spurs are produced or not, fruit or blossom buds are formed the year previous to that of fruit production, and are directly dependent upon the foliage for their character, and sometimes for two or three seasons preceding. In this matter of the growth of fruit buds, a tree fruit differs from raspberries, blackberries and grapes, for they produce bloom upon branches grown the same season.

Every orchardist should be able to determine what influences cause trees to produce fruit buds. This article is designed as a study in this direction and should be supplemented by observations in the orchard, of trees in fruit, and better yet by a study of the philosophy of tree growth.

Pruning Trees at Transplanting.

It should not be forgotten that the branches of trees have varying degrees of vital power. Strong, vigorous, healthy branches would endure unfavorable circumstances when the weaker ones would give way. In growing trees, it is always the weaker wood which we find among the dead branches. In transplanting a tree, we want all the branches that are full of life and vigor, and not those that are already half dead. The practice generally followed, therefore, of shortening back the strong, vigorous branches, and leaving the half dead ones, is a mistaken course. If all the half dead branches were cut away, and the stronger ones left without any shortening, transplanting would often be more successful than it is.—Meehans' Monthly for October.

The Crown of Trees and Plants.

The crown is that part of the tree or plant which unites the top to the roots. It is the enlarged portion at and just below and above the surface of the ground. It is the most vital portion of all plants, and if the top suffers serious injury, it is here that renewal takes place.

On the other hand, if the roots are damaged there is generally sufficient plant food stored here to start new roots. The importance of this part of the plant may be readily seen, and if severe stump-sprouting varieties of trees are cut off several inches below the surface in the spring of the year when the sap is thin, no sprouts will issue from the remaining roots. During the season of growth a large amount of vitality is stored in this part of the plant, and it also contains large starch deposits. Both are important requisites in the matter of hardiness and successful wintering. Trees can be greatly aided in going through the winter by banking earth around them, and this should be done in early winter. Fresh earth should be used and a steep bank formed around each tree and hilled over vines and small fruits. Especially is this so where there is some trash or rubbish collected around trees, which may form a lurking place for insects that are feeders on the tree. These are usually found near the crowns. Placing mounds of earth about plants and making a clean fresh surface around them forces the insects to find a lodging place elsewhere, and lessens the danger from injury to the crowns, as well as protects the plants through the winter. In view of these facts it is important to bank up trees and clear away all trash around them. This lessens the danger from rabbits and mice. Care should be taken not to leave pumpkins lie in the orchard, as there is no bait that equals pumpkin seeds in attracting mice. Pocket gophers, which show a period of activity just before freezing up, should be caught now and all danger to the young trees minimized so far as possible.

Replacing Spurious Trees.

With the utmost care, errors in the correctness of nursery stock are liable to occur; hence the occasional occurrence of a spurious tree or plant might reasonably be overlooked. The offer to replace the spurious trees, is the one almost universally made by nurserymen in such cases; but it may fairly be doubted whether even nurserymen regard this as adequate compensation; since, even if the error shall be detected, and the tree safely and correctly replaced at the end of a year, the planter will have borne the loss of the year's use of his land and the expense of the year's cultivation and replanting. Furthermore, each annual crop during the subsequent life of such tree, will necessarily be deferred a twelve-month; while if the detection of the error must (as will in most cases prove true), await the fruiting of the tree, the damage and loss to the planter must necessarily be largely

increased. To determine the actual loss to the planter in any given case, must necessarily be an uncertain and difficult problem; yet there is scarcely room for doubt that, in a court of last resort, the planter would be awarded damages substantially upon the theory suggested.

T. T. LYON, South Haven, Mich.

An Old Riddle.

I am obliged to plant a grove
To gain the hand of her I love.
Said grove she says I must compose,
Of just nine trees in ten straight rows,
And three in every row must place,
Or ne'er expect to see her face.
But if the grove in order rise,
I win the girl, a glorious prize.
Ye learned bards with laurels crowned,
Assist my hand to till the ground,
That this fantastic grove may shade
The blushes of this charming maid.

Mounding Up Trees.

Some years ago a gentleman residing near Cincinnati created a sensation by what he regarded a new method of keeping peach trees healthy. All that he did was to pile up earth about the trees, the mound reaching up to the branches. It took several cart-loads of earth to make these mounds, and the little orchard had the appearance of bushes growing out of the cone of earth. Every one used to look on and laugh at the thought of burying up the trunk of a tree in order to make it healthy. Those who saw simply stated their belief that it was only a coincidence, and that the trees would probably have been as healthy without the mound of earth as with it. Since it has come to be well recognized that many of the diseases of plants, not merely of the peach tree, but of other trees, are caused by the mycelium of a minute fungus attacking the roots, it is not at all unlikely that this mound of earth operated beneficially by preventing the growth of the fungus which preys upon the roots of trees. Meehan's Monthly says that it is not well understood that all plants of a very low order of vegetation, which we know as fungi, will only grow under a peculiar combination of circumstances. Among other things they must be very near the surface of the earth, and if buried to the depth they would be under a mound, it is unlikely that fungi would find a satisfactory home. Some will say right here that they thought of burying up the

trunks of the trees and covering up the surface roots with earth was destructive to health; but the burying by itself is not the reason trees die when earth is piled over them to a considerable depth, but from the fact that the young growing roots do not get air. These young, growing roots are almost all at the extremities, and the mound of earth around the trunk would not in the slightest degree injure these outer roots. Whenever a valued tree is somewhat buried, it is customary to leave a space around the trunk, perhaps building a dry wall, in order to keep the earth from getting near the trunk; but this is not that the earth is injurious, but to give a chance for water to flow freely down into the soil, and the flow of water always leads to a flow of air following the water.

These remarks are suggested by an article in an agricultural paper, stating that the apple-borer and the peach-borer have been kept out of the trunk of trees by making a mound of earth around the trunks.—Arkansas Farmer.

It is doubtful if this plan is a good one. It better be tested before you depend upon it. My experience has been just the opposite.

SECRETARY.

The Nursery—Its Importance.

The census bureau gives us the following interesting figures: The number of nurseries in the United States is 4510. Their value is estimated at $41,987,835. They occupy 172,806 acres of land; the capital invested is $52,425,669. Employment is given to 45,657 men and 2279 women. Certainly this is a remarkably good showing, resulting as it does from about fifty years' work, and still the nursery business is constantly growing and spreading in every direction, and there is practically no limit to the call for trees and plants. I venture to say that there is no industry which has done more for mankind and the country at large than this great enterprise.

To deny the nursery a high position among the most important and beneficial industries of the land would be to withhold it from its just dues. Think of the vast amount of trees, plants, shrubs, vines, etc., which the nurseries of this country send out each year. Visit a portion of the country which is well planted with nursery stock and one that is not, and notice the difference. This will in some degree impress upon the mind the great value and usefulness of the nursery. People must have these plain facts brought before them to realize and see that they are of vital importance to the country.

I have in mind two magnificent nurseries of one thousand acres each, managed by men of great ability. What a great benefit to this country! The good these men are doing will last as long as the world stands. We often speak of "public benefactors." It is often said that he who makes two blades of grass to grow where before but one grew is a public benefactor. Let me ask you in all sincerety, what position does the nursery occupy in this country of ours?

In the nursery the choicest trees and plants are propagated, tested, selected, and are then sent out over the universe to do their work in foliage, fruit and flowers. Where were those fine conifers, shade and ornamental trees grown before they were planted on the lawn, in the yard or in the park? Yes, the nursery is an important institution, in an important field.

JNO. M. WISE.

Stephenson St. Nurseries, Freeport, Ill.

In the Orchard.

A lengthening vista of yellow and green,
With shafts of deep shadows and sunlight between;
The branches, wind-tossed, dapple tree-trunk and ground,
With ripples of light on the soft waves of sound.

The apple-trees, old, with arms gnarled and gray,
Like sentinels grim, stand in martial array;
Their armor of green disclosing o'erhead
Rich treasures of fruit shining yellow and red.

The vanishing point is a crooked rail fence
Where scampers a squirrel with malice prepense;
A chattering robin doth hotly pursue
The little red thief, and chases him through.

BERTHA EVELYN JAQUES.

How to Grow an Orchard.

The soil should be in a good state of cultivation, and is generally best to cultivate in hoed crops before planting the trees. There is a great difference of opinion as to which is better, fall or spring planting, but we prefer fall because the trees become established during the winter and a better growth is secured the first season, and also they stand the midsummer drouths much better than when planted in the spring.

In planting, the holes must usually be made by hand and should be large and deep. Chop up the soil in the botton of the hole and set the tree about two inches deeper than it stood in the nursery, giving the roots their natural position. The earth should be firmly pressed down around the tree.

One of the most important things in planting an orchard is to make no mistake in selecting varieties. A common and serious mistake is that of buying too many varieties. Determine at your leisure what you want and don't be spurred into giving an order because some man comes along with a smooth tongue. For commercial use select those which are known to be of good quality, handsome appearance and good keepers, and which have proved themselves adapted to your locality. An apple tree is something you can't afford to experiment with. Our principal variety is the Ben Davis.

The first two or three years is the time we do most of our pruning. We start our trees with a low head, two or three feet from the ground. If your tree is pruned right the first three years it will not be neccessary to do much pruning after that. A tree should not be allowed to make an acute fork as the tree will split down when in heavy bearing. Pruning should be done every spring before buds swell. Don't cut and slash whenever your knife is sharp.

Cultivation of an orchard is another important item. Our plan is to cultivate our orchard the same as we would a corn crop. If an orchard is to be made profitable it must receive as good care as any other crop. Corn is a very good crop to grow in an orchard while young as it makes its principal growth after the apple has ceased to grow. Never grow crops in an orchard that make their growth early in the spring as it has a tendency to check the growth of the trees. Sowed crops should always be avoided. Oats is the worst crop which can be used, for it stands on the ground so long and pumps out the moisture at a time it cannot be spared; and in all sowed crops there is no conservation of moisture by cultivation. The man who hopes to raise an orchard and grain on the same ground had better leave the orchard unplanted. After the orchard is large enough to bear it should have clean cultivation during the growing season. Some crop, such as peas may be planted, when cultivation ceases to cover the ground during the fall. If the orchard is cultivated every year it will rarely ever fail to have a crop.

A part of our orchard has been bearing about seven years and we have never had a failure since it commenced to bear. The key to success in growing an orchard successfully is to stir the soil.

J. S. FOSTER.

Budding to Make Fruit Trees Symmetrical.

When young fruit trees are received from the nursery, one is occasionally found that is one-sided. No branches, or but one, it may be, are growing on one side, while the other is well provided with them. It is difficult to prune such a tree into symmetrical shape without cutting it back very severely, and so losing considerable time in growth. In such a case one may try the experiment of budding the one-sided tree with buds from the same tree, or another of the same variety. Of course, only a small, young tree could be operated upon in this way, but the smaller trees are by far the safest to order when planting an orchard.

How to Raise Fruit and Tree Seedlings.

The producing of seedlings is now a great industry in this country. In former times Europe was depended on to furnish all the fruit and tree seedlings required, but it is not so today. There are still a few articles, which, owing to climatic conditions, we are unable to produce here, and these are got from Europe, and many seeds are better had from there. Taking the fruits, there are pear, apple, plum, peach and cherry as the main articles. Of these, pear is had altogether from Europe, and so are the Mahaleb cherry and the Myrobolan plum. Apple, peach, many plums and Mazzard cherry are home products. Hundreds of bushels of some of these are sown annually, and of the apple perhaps a thousand bushels. The cider mills turn out a great deal of seed, but there are hundreds of bushels got together by a few parties who make a business of procuring them for nurserymen. In France, where pear orchards are as much a feature as those of apples are here, the pears are used to make a drink which is called perry, corresponding to the cider we produce from apples, and it is in this way that so many pear seeds are obtained. The pear is such a sure bearer that it is rare indeed that there is a failure of the crop. Mahaleb cherry comes from Europe, but the Mazzard is the wild cherry of the older cities, which have sprung up along fences and in woods from stones dropped by birds from cultivated garden sorts. These are got together in small lots, often by the small lots children gathered.

In nursery practice pear and apple are mostly sown in spring, the other kinds named in the fall, though there are large planters who prefer to keep the whole lot until spring. The only secret of success is not to allow the seeds to become dry. In old farm houses it used to be the style to have cellars with earth floors. There was, generally,

a little dampness in these cellars, and in such places the seeds mentioned kept well. Wherever they are they must not lose weight, but instead must add a little to it. Cellars with cement floors are dry and when seeds are to be kept in these they must be mixed with slightly damp earth in boxes, and so remain until spring. As spring approaches it will often be as well to add a little more water to the soil if the seeds appear not to have swelled sufficiently. A belief was once almost universal that seeds of this kind would not germinate without being frozen, but this is a mistake. There are states in which no freezing occurs, and yet seedlings are raised as well as in places where it does freeze. And in many a Northern state seeds are kept in cellars all winter and are never frozen. If sufficiently moist stones will crack open and shells burst at the time they should do. To be successful, the sowing should be made in spring, just as early as possible, which will be as soon as freezing is over and the soil in a condition to work. The stone fruits are usually sown in beds of about three feet width, for the convenience of weeding, etc., but apple and pear are sown in rows, often being drilled in. Where but a small quantity is in question the three-foot bed answers very well. Tree seeds are to be treated very much as fruit seeds are. Nuts of all kinds and all hard-shelled seeds, as well as acorns and the like, may be sown in the fall, or may be kept till spring. The tendency among the growers of seedlings is to adopt the latter plan. It certainly saves the seeds from the ravages of vermin and from mishaps incident to the winter season, such as upheavals by frost and the drying out of the seeds from the lack of snow or rain. I have known of pecans, shellbarks, English walnuts and such seeds kept in a damp cellar in barrels with no earth around them to grow splendidly when sown in spring. But the safer plan is to mix a little dry earth with them, then there is an assurance that there will be no loss of weight. When spring comes it finds the seeds with the kernels swelled, waiting for the warmth to cause them to sprout. Many seeds, such as those of evergreens, are always sown in spring and it is the same with the deciduous ones of the nature of maples, catalpa, linden, beech, box-elder and birch. The bed system is to be preferred to these, and as in the case of the fruit seeds mentioned, the earlier in the spring the sowing is done the better it will be. Tree and fruit seeds are not nearly so easily raised as are flower and vegetable seeds. Even those with much experience often fail. Amateurs should not make much outlay in the matter until they have gained experience.

JOSEPH MEEHAN, Pennsylvania.

Our experience here in the West is that all nuts are much more certain of cracking if frozen. SEC'Y.

About the Care of Orchards.

In September the first thing to do in the orchard is to see that all the grass and weeds around the trees are cleared away. If the trees have been somewhat neglected, and weeds or grass have grown up, then, by all means, the ground should be plowed, if it is possible to plow at all, before September 1; and if it cannot be plowed, then the trees should be cleaned about so that they will mature well to go into winter quarters. No cultivating should be done after the first of September, but we should not allow grass or weeds to stand about the trees.

Orchard Work For July.

Too many of our fruit-growers think that there is nothing for them to do in the orchard during July; all of our farmers think the same way, and so neglect the care of the orchard, not only during July, but during the whole year, usually.

Orchards if not plowed or cultivated before this season should be plowed and cleaned up now, and then cultivated once or twice until the middle of August, when cultivation should cease. This cultivation will so loosen the ground that the trees will go the dry season without injury.

The Orchard.

How shall we manage the old orchards which have been neglected for years? is a question, not unfrequently asked, to which Professor Baily, of Cornell, replies: "Such orchards, of course, are in sod. The roots are so high that the land cannot be plowed. In this case, the best that can be done is to break up the turf in spring when it is soft, using a sharp-toothed or disc harrow. When the sod is once well cut up, sow on fertilizers, and continue to work it shallow. But the tree tops are often so low that a team cannot be used. An orchard in which horses cannot be driven is worth little, and it is doubtful how much labor can be spent upon it with profit. Trees which have been cultivated from the first have their tops formed by gradual and timely prunings, the owner scarcely knows how, but the untilled trees often develop into brush heaps which no amount of good intentions can correct. But, if possible, these old orchards must be trimmed up to admit of

cultivation. Swine can sometimes be utilized as plows in such orchards. With a crowbar make holes three or four inches deep all through the orchard, and drop a handful of corn or buckwheat in each hole. Let the hog root for it.

Renovating Old Orchards.

Nearly all the orchards in the State are in sod, and are in anything but a flourishing condition. They have for the most part been allowed to shift for themselves, and as a result have become "hide-bound," and make but little growth, and produce still less fruit.

We are often asked to recommend a course of treatment for such orchards, but the conditions vary to such an extent that what might be desirable for one orchard might not be required in another. In a general way, supposing the conditions to be stated, we would make the following recommendations:

1. Cut down all trees that have gone so far beyond their prime that they have badly decayed trunks and only one or two broken branches.

2. From trees that have healthy trunks and promise to in a measure renew their youth if given proper care, remove all dead or dying branches, thin out surplus shoots where absolutely necessary, and attempt to bring the trees into good form. If they are badly misshapen, it may be well to cut the stronger branches back severely in order to force the others into growth. If a tree of some worthless variety is fairly healthy and vigorous it may pay to topgraft it with some desirable sort. The branches should be cut back so that they will be about one and one-half inches in diameter and two scions inserted in each stub. As a rule, it is best to extend the operation over two or three years, and lessen the check to the tree.

3. If the land has not been manured, as will generally be the case, it should receive an application of twenty to thirty loads of decomposed stable manure. The land, if in sod, should then be plowed, taking care to injure the roots no more than is necessary. For at least two years the land should be cultivated, either with or without hoed crops. Fifty to one hundred bushels of wood ashes per acre can generally be used to advantage.

4. If the trunks of the trees are covered with a thick layer of dead bark it will be well to remove it, taking care not to scrape into the living bark beneath. The trunks should then be washed with soft

soap thinned with water to a thick paint. If borers are present, a teaspoonful of sulphur and carbolic acid to a gallon of the soap mixture can be added to advantage.

5. Spray the trees with the approved remedies for the insects and fungus diseases that attack the apple. Good results can not be expected unless a perfect and healthy foliage is preserved, and the fruit will be of little value unless it is protected from the ravages of the codling moth and apple scab.

The above treatment is, of course, only suggestive, but as most orchards will be benefited if handled as recommended it is submitted for consideration.

PROF. L. R. TAFT.

What Not to Plant.

In past years the planting of trees and shrubs in the new West was a matter of choice of what was desirable in our former home, as its success or failure was an uncertainty and one thing was as likely to succeed as to fail; but now the list of both are so large thatany one can plant and predict in favor of the result. Of old favorites in Eastern orchards there are none of their winter sorts that are such here, in fact, Eastern planters are now setting extensively the best Western sorts and they with the shorter seasons will not ripen the varieties there, as they do here. The Jonathan never gets the dark red color in New York as in Kansas, so of Ben Davis, but they will be longer keepers as a result, so they do in Colorado or anywhere much North of here. But the early varieties do not make much difference, only they ripen to suit the season where grown. Of apples that have been largely puffed and proved of little value the Mann, Deleware, Red Winter, Lawyer, White Winter Pearman, Red Winter Pearman are of very little value. No man should cumber the ground with them. The Sonlard Crab is too rank flavor for any use. Of pears the Idaho brought forth as with the flourish of trumpets as the coming fruit, is entirely worthless because the tree is so apt to blight; so is the Le Conte but little better. The Japan Golden Russett pear is the Hawaii renamed, a hardy tree, but the fruit is no better than a turnip. One of the most advertised berries sure to disapoint here, is the Japan Wineberry. I have it on my place since first offered, and never saw a berry on it. The Wilson and Wilson Jr., blackberry are no use here. The list can be extended in many ways, and a list of good things should be held up. The main cause of unprofitable orchards is planting worthless varieties, planting too many kinds. For a family supply

some twelve or fifteen best sorts of apples are needed; for market use, two or three winter kinds alone would result in more profit and better results than if a larger list were set out.

A. H. Griesa, Lawrence, Kas.

A California Brush Rake.

Various devices have been used for clearing the trimmings and brush out of the vineyards and orchards after pruning. This is a big job on large fruit plantations, and, sometimes, a costly one for lack of the right tools. Some farmers use a hay rake; others use a cultivator widened out, and with most of the teeth removed, and others haul a long pole lengthwise of the rows, scratching or pushing the brush together. In California this work of taking out brush is very costly. The prunings are heavier than in Eastern orchards, and there are vast tracts of ground to be gone over. In a country where the greatest expense is in hand labor, and where every device for utilizing horse-power is adopted, it is not strange that inventors have tried to solve the brush-raking problem. Mr. W. C. Anderson, of San Jose, has invented a brush rake. It is made of oak or hickory, with teeth 18 inches long, and attached directly to the shafts. A slatted fender or guard hangs from the shafts on hinges so that the ends drag on the ground between the teeth. The fender, of course, rises as brush is gathered. It keeps the brush in compact shape, and cleans the rake of brush while dumping. There is a lever on the rake, and, by lifting on it, the rake is raised, and the fender cleans off the brush from the teeth, and then rides over the pile.—Rural New Yorker.

Fertilizing Orchards.

It is a very general practice to let orchards take care of themselves as soon as they have been brought to the bearing stage, and there is little doubt but that this is the cause of so many profitless acres in fruit, scattered throughout the Central and Western States. It is a very simple matter to understand that orchards must be fertilized for precisely the same reasons that the wheat or corn fields are fertilized. Cropping removes potash, nitrogen, etc., in apples and other fruits just as it does in cereals or root crops. But this is not the only reason. In soils being constantly worked with the plow, harrow or cultivator and other implements the natural store of plant-food in the soil is constantly taking available forms, manures are worked into the soil at

the most advantageous time and place, and nitrification is promoted by the nature of the materials incorporated with the soil at the actual time of tillage.

This subject of available plant-food, so to speak, is of the first importance. It is not enough that the soil is amply supplied with potash, nitrogen, etc., but these elements of fertility must be present in such form as to be readily assimilable to the growing plant itself. This "availability" is largely a matter of solubility. That is, if the materials are soluble in the soil moisture, they will sooner or latter be brought within the range of soil agencies, which will fit them for the immediate needs of the growing plant. The soil may be exceedingly rich in all the elements of plant nutrition, and still be practically barren. At the Rothamsted Experiment Station in England the fertilzing value of excessive applications of manure was accurately determined. The results demonstrated the fact that what is called the residual effect of manures is of greatly diminished value—it is unprofitable to manure this year for the crops of succeeding years.

In considering the fertilizer requirements of orchards, it must be remembered that little or nothing from the harvested crop itself finds its way back to land on which it was grown. The leaves in part are returned to the soil, as well as a part at least of the prunings, but the fruit is removed wholly. It is well known that the twigs and new wood are relatively rich in potash; the leaves are also very rich in potash, etc., but every farmer well knows that but little of these find their way back to the orchard soil. Now, as to the fruit: An actual test in an orchard in Pennsylvania shows that one acre of the various fruits given herewith removed from the soil potash, nitrogen and phosphoric acid as follows:

	Nitrogen, Pounds.	Potash, Pounds.	Phos. Acid. Pounds.
Apples, 360 bushels	23	34	2
Pears, 335 bushels	16	13	5
Grapes, 8260 pounds	13	22	8
Peaches, 335 bushels		40	8

It would not be good judgment to apply precisely the quantities indicated above, with the expectation of obtaining a full crop. The new wood growth and foliage must be accounted for as well as an allowance for losses through fermentation, drainage, etc. It is also impossible to distribute small applications so perfectly as to bring all within the arena of the growing plant. Notwithstanding the fact that the residual effect of manures is economically almost valueless, it will

prove more profitable to manure considerably in excess than to risk the crop year. While there may be ample supplies of plant nutrients in the soil through direct applications as manures, it is good agricultural judgment to be sure they are there. A year lost in an orchard is exactly the same as a year in one's life lost—the one can be gotten back about as easily as the other.

Orchards should be regularly manured with materials of a high degree of availability. Barn-yard manure will not do; its nitrogen is partly available, but the potash and phosphoric acid are not. New wood will be formed in abundance (it is a bearing orchard we have in view), and as little new wood as is consistent with bearing spurs, should be the aim of the agriculturist. There is another point of not less importance. Fruit from improperly balanced manuring will not only keep badly, ship badly, but also lack flavor. Try the fruit of an abandoned and unmanured orchard; it has little distinctive flavor and is generally lacking both in form and color. Manuring is a provision of Providence, not an accidental acquirement of plants. There is the very best reason for its being done or it would not prove of utility.

A fertilizer of apples should have approximately the following formula:

Ammonia	4 per cent
Potash, actual	6 per cent
Phos. acid, available	2 per cent

Or, double the figures with higher grade goods, 8, 12 and 4 per cent respectively. The ammonia should be about one-third nitrade of soda and the remainder a good packing-house ammoniate or fish scrap. The potash may be either as kainit or mutriate. The phosphoric is preferable as acid phosphate—in this instance, bone is not the equivalent of acid phosphate, though it is such in ordinary tillage crops. Of the fertilizer as tabulated above, about 600 pounds should be used per acre, and well harrowed in. To use less would be to "skimp" the orchard.

S. PEACOCK.

Increased Fertility Possible.

Land properly treated will increase in fertility and in aptness to bring forth fruitfully, because the elements of fertility are being not only gradually developed, but those that are free do progress. Chemical action in soils may unfold the rich treasures thereof and mechanical appliances render their effective aid, but if wrong conceptions of the use of the land continue, all means used to increase its fertility will leave it more hopelessly exhausted than before. Land was

given to live on, and whatever is taken from it as food should be returned as manure. Land so treated will increase in fertility, but land continually under the plow not only loses the mechanical condition favorable to fruitfulness, but insect life is thereby greatly increased. Very minute creatures attack the tender plants, and sometimes a crop will nearly be destroyed, while the same kind of plants, the same season, on land less injuriously treated, will yield a remunerative crop.

Let land be properly dealt with, and chemistry will then come to the aid of cultivators of the soil, teaching them how to strengthen the growth of their plants, how to hasten the time of ripening, how improve the quality of their grain, and to increase the aroma of fruit, and how to cause soils now yielding inferior plants to bring forth superior ones. It teaches us that alkalies give strength and stability to the stalk, that the phosphates hasten maturity, that lime renders peas more melting, potatoes more mealy, and has changed rye lands into wheat-growing fields. It will also tell us of the action of carbonic acid gas on the small particles of rocky matter in the soil, and what chemical changes result from the frequent admission of common air into the ground in the process of cultivation.

There is much land worn out by bad management and so located that to bring it in condition with barnyard manure is out of the question, as it takes time with barnyard manure to get lands again into condition, whereas by the use of artificial fertilizers lands may be made at once to produce paying crops. As long as a farm has not reached the highest point of cultivation, every means must be pronounced acceptable which puts the farmer in a position to provide his fields with more liberal dressing than he is able to give them from his own supply of home-produced natural manure. Whoever seeks to arrive quickly at this stage of cultivation must make extensive use of those auxiliary or artificial manures that are now offered him by commerce.

As long as these powerful agents for increasing the productions of lands were unknown, an advantageous rotation of crops was indeed the only means of insuring a large yield from the farm, and this leads slowly but surely to the result; now, on the contrary, it is the farmer's power, by buying additional manures, to attain his object with far greater rapidity. The more extended employment of artificial manures is an advance in farming that has already opened a new era. By this means, the business of a farmer is becoming more closely approximated than formerly to that of a manufacturer.

For while formerly our farming arrangements were conducted in the manner which the quantity of manure produced on the farm itself prescribed, we are now free to cultivate, as may seem most profitable, every plant which is suited to the soil. ANDREW H. WARD, Mass.

Fertilizers.

The influence of fertilizing on the health and fruitfulness of trees is not seen in a single season. It takes several years before the effects of a certain fertilizer on a certain soil can be determined. With cereals and other annual plants it is different. The use of a certain kind of fertilizer on annuals gives unmistakable results in one season. It has been proved by long experience that the liberal use of potash is essential to successful fruit-growing, and, as a rule, the most successful growers are those who take cognizance of this fact. In North Carolina and Georgia, the great success in peach-growing is due largely to the knowledge which the growers have the needs of their soil. Last spring I went through the orchards in the long leaf pine region of North Carolina. The manurial treatment of the orchards I found to be as follows: They are kept cultivated during the summer up to the latter part of June, when the land is planted in cow-peas, which are grown for the purpose of supplying humus and nitrogen to the soil. Nitrogen is the most expensive ingredient; but when supplied to the soil by means of cow-peas, it costs very little. In order to make the peach trees thrifty and strong and long lived, heavy applications of acid phosphate and kainit are given annually. In place of kainit, muriate of potash can be used. An average application would be about 350 pounds acid phosphate and 500 pounds kainit (or 150 pounds of muriate.) The cost of this fertilizer is very little; but if this plan is followed, the results will be large yields and the best quality of fruit.

L. JAMES.

Crimson Clover.

Crimson clover was introduced in this country several years ago by the late Dr. Haradine. Being a great lover of flowers, he was attracted to this plant by its great beauty, which is hardly exceeded by the finest flower that adorns yard or garden. The beautiful deep green, which may be seen all through the winter, when not entirely covered with snow, grows deeper and brighter as spring advances, until early in May, when the flowers appear, and the field changes from a deep green to a brilliant crimson, making a sight to behold and remember. At first its value as forage was not understood, and as a soil restorer was unknown, and the progress of the plant at first was rather slow. Everyone admired its great beauty and numerous plots were grown for

ornamental purposes. But years elapsed before farmers awoke to its value as a regular rotative crop.

Crimson clover has now been tested in all parts of the Union with the most favorable results, and is no further an experimental crop. It is good for hay; will yield two or three tons per acre; is valuable for seed, which it produces in large quantities, and is the only clover which remains green all winter. But its greatest value is in its ability to store up plant food, and at the same time send down deep-feeding roots far in the subsoil, and bring to the surface elements of fertility that would be otherwise lost.

Crimson clover is an annual, and must be sown in its proper season. This extends from the first of August until the last of October. About ten quarts of seed is required to sow an acre.

L. STAPLES, Michigan.

Water in Orchards.

B. T. Galloway and Albert F. Woods, chief and assistant chief of of the Division of Vegetable Pathology, United States Department of Agriculture, gives us a fine treatise upon water as a factor in the growth of plants in the year book of the Department of Agriculture, 1894. After going into detail, they make the following summary: The facts presented show,

1. That water makes up the largest proportion of the weight of green plants, indicating at once its great importance.

2. That water, with the food which it contains, is obtained by plants exclusively through the roots, and, therefore, a well-developed root system is essential to the best development of the plant.

3. That the development of root systems may be controlled in various ways, thereby increasing or decreasing their ability to absorb water and food from the soil.

4. That a saturated soil is detrimental to the growth of roots, a soil half saturated is most favorable to their growth, and, therefore, favorable to the growth of the whole plant.

5. That growth is dependent on the turgidity of the cells, and turgidity is dependent on the absorption of water by the roots.

6. That the water absorbed by roots is continually being lost by evaporation from the leaves. If the loss is equal to or greater than the absorption, the plants will cease growing, and unless the absorption is increased or the evaporation decreased, the plants will die.

7. That evaporation may be controlled by increasing the amount of moisture in the air, by protecting from hot winds, and by the use of

certain substances in the soil or on the leaves to enable the plant to hold on to the water that it has.

Finally, then, an accurate knowledge of the relation of water to the growth of plants will enable us to control more fully the delelopment of the plant as a whole, and also the relative growth of its parts. It will show us how to so modify the growth of the plants that they may be able most successfully to withstand the adverse conditions and produce the most valuable substance for a given amount of labor.

The above speaks volumes and should be carefully studied by all horticulturists. Those who irrigate fully realize the truth of the above summary. It shows conclusively that everyone should irrigate.

Hardy Peaches.

G. F. Espenlamb, as quoted in report of Missouri State Horticultural Society, says:

If peaches were as hardy as apples, there is no fruit that would pay the horticulturist as well as the peach. But from 10 to 15 degrees below zero will surely kill the fruit buds. To improve the hardiness of the trees, seeds of the hardiest varieties of seedlings as well as budded varieties should be selected and planted out; when these come into bearing, and choicest and hardiest kinds should be cared for and the poor and most tender to be cut out. Yellow and white varieties could be grouped so as to make crossing more sure. Each generation would thus be an improvement and a step toward the object to be obtained, and there should be no halt made, as there is no limit as to what may be reached.

If the several experiment stations would take hold of this and make it a branch of their work, and then exchange seeds of their most promising kind with one another, there is no telling what may be accomplished in a few generations, which would not require a very long time, as the peach soon comes into fruiting. We older horticulturists could not expect to reach the maximum of success, but it would enthuse our young men to take up the thread where we leave off, and the same improvement can be made in the future as there has been made in the past, when our luscious peach is the offspring of the once bitter almond.

The Peach's Ten Commandments.

The basic principles of successful peach culture in Connecticut are thus stated by J. H. Hale in a paper to the United States Pomologist, and he adds: "On these ten commandments hang most of the law and all the profits:" (1) High, dry or sand-loam soil. (2) Careful selection of varieties most hardy in fruit bud. (3) Vigorous, healthy seedling stocks budding from bearing trees of undoubted purity and health. (4) Trees given entire possession of the land from the start. (5) Thorough culture from the opening of spring till the new growth is well along. (6) Liberal annual manuring, broadcast, with commercial manures rich in potash and phosphoric acid, and lacking in nitrogen. (7) Low, leading and close annual pruning for the first five years. (8) Keep out most borers with some suitable wash and dig out all others. (9) Search for traces of yellows every week of the growing season, and at first sign pull up and burn every infested tree. (10) Thin the fruit so that there shall never be what is termed a full crop.

Peaches Between Apple Trees.

As apple trees are usually managed, it requires a long time for them to come into bearing. The trees are small when set, and if the planter does not have an active imagination, forty feet distance between the trees each way will seem altogether too large a space to be given up for the trees. On the other hand, the peach tree lives only a few years, grows rapidly and comes into bearing very young. An orchard of peach trees may live, bear and be out of the way before the spreading apple tree branches will find them in the way. For this season we believe the practice of planting peach trees between apple trees to be altogether a good one, provided some conditions are observed. The soil must be rich enough in mineral fertility to furnish needed potash for both growths. The failures in planting peach trees between rows of apple trees come mainly from not observing this condition. The peach crop will pay the expense of both orchards, and in the shelter of the apple trees the trees will be less likely to be winter killed or to have their fruit wasted by winds before it is ripened. As a further advantage, the apple trees, finding their root growth restricted by the peach tree growing between them, will begin bearing earlier than they will if the apple trees have all the ground to themselves.—American Cultivator.

Mulch on Peaches.

There are many accumulations of straw, grass, hay, corn stalks, etc., that can be used for mulch, and if utilized would become very profitable. During the season of 1893, after my strawberry bed was through fruiting, I raked the straw off, which had been used for mulch, and scattered it around some peach trees near by, covering about the same space as the branches, to the depth of two inches. This was done about July 10, thus aiding the ripening of the fruit for the same season. But the greatest result was noticed last season, when the peaches were ready to gather. They were smooth, of large and uniform size, while those on adjoining trees were small and inferior. No other reason can be assigned for the superior fruit but the mulch. The soil under the trees where the mulch had been applied, although at the close of the extended drouth, was loose and moist, while the soil under the other trees was baked very hard, and cracks several inches deep were visible. Was it the fertilizing properties in the straw applied that caused the difference? Certainly not, since straw protected the strawberries during the winters of 1892 and 1893, before it was applied to the peaches; if there had been any available plant food in it, it certainly would have been taken up by the berries.—Meehan's Monthly.

Le Conte and Kieffer.

The Le Conte and the Keiffer pear craze of a few years ago will not only bring ruin upon those who planted these varieties so largely, but also upon the growers of choicer varieties.

A few weeks ago numbers of car-loads of the Le Conte were dumped on the St. Louis market every day until the market was so glutted that commission men refused to pay the car-load freights, and then the pears were sent to other commission houses and sold for what they would bring to enable the railroad companies to get their freight.

Now, the Keiffer is coming to market in car-load lots in such quantities as to glut the market and destroy the sale, or profitable sale, of choicer varieties. While these varieties look well and ship well and bear well, their quality is so poor as to disappoint buyers, and one pear is enough to satisfy the taste for pears for a long time.

But for the immense crops of these two varieties and the pouring of them into the St. Louis market in such quantities the growers of the choicer kinds of pears would have found St. Louis a most desirable and profitable market the present season.

The Le Conte and Keiffer ship like potatoes and are not much better in quality, but those who know nothing about varieties buy them, and thus the demand is supplied.

California is not in it in competition with the Le Conte and Keiffer. Pear-growers in the vicinity of St. Louis can compete with California, but they are not in it, even a little bit, when they have to buck against Le Conte and Keiffer.

The Lawrence Pear.

Many Eastern pomologists are fond of building up their faith with Beurre d'Anjou for their corner-stone. While nothing can be said against this excellent variety, as time goes by, the impression of many growers in this part of the country is that the Lawrence is second to none for that purpose. It would be a loss to be bound down to two or three kinds of pears, and no one here would like to be without the Bartlett and the Seckel in the garden, but where marketing or preserving is in question, it is safe to say the Lawrence is unsurpassed for profit. The tree is, perhaps, not so rampant a grower as some others, but then it is hardy and healthy, and a prolific bearer. By a little care one can have the fruit to eat all winter. Left to itself it ripens about the time of the first frosts here, say the early part of November. But some can be gathered earlier than this and ripened indoors. When all picked and stored indoors, they ripen one after another for a period of a couple of months. There are really but few good winter pears, which is what makes this of so much value. There is one way in which this fine pear can be had, not only all winter, but all the next summer, too, and this is by canning it. It is one of the very best of them all for this purpose, possessing a flavor which suits the taste of almost every one. If a half dozen pears are to be planted, let one of them, without fail, be a Lawrence.—Practical Farmer.

The Ten Best-Flavored Grapes.

The ten best-flavored grapes were named by Mr. E. P. Powell in these columns some months since: Iona, Brighton, Goethe, Herbert, Worden, Jefferson, Gaertner, Niagara, Delaware and Eldorado. But when we speak of grapes, are there not other qualifications besides

flavor to be considered, such as hardiness, reliability, etc.? Some of the defects that would militate against all of these varieties being classified as best are as follows: *Iona*—Severe winters injure buds, subject to mildew, requires special culture, requires too long a season for ripening, and in field culture does not ripen uniformly. Brighton Jefferson and Goethe, like most crosses with foreign varieties, require especial care, and unless one has had considerable experience with grapes, he gets very meager returns for the labor put upon them. I know that if I attempt to name the best grapes for general cultivation, I shall draw upon myself criticism, but as it may be beneficial to readers, I will incur the criticism: *Black*—Worden, Herbert, Concord, Clinton. *White*—Niagara and Colerain. *Red*—Brighton, Woodruff Red, Delaware and Catawba. This makes ten, but there should be be another added—the Jefferson. The Clinton is included because it is one of the best for lucinary purposes, and it can be left on the vines until Thanksgiving. Its flavor is improved by frosts, and after all others are gone it tastes very good to most persons. In fact, to eat Clinton grapes from the vine the latter part of October and in November, when other grapes are gone, gives as much pleasure as to eat luscious Brightons and Jeffersons when other varieties are abundant.

T. F. LONGNECKER, Ohio.

The Value of Our Native Grapes.

In deciding on the value of a grape for home use, or for commercial purposes, the principal point to be determined is whether our location and climate are adapted to the growth of the vine as well as the perfecting of the variety we intend to plant, as under certain conditions some varieties grow to perfection and some do not. Yet, no matter what varieties we plant, we may make a mistake, since it is a well-established fact that vineyards of the same variety in close proximity do not succeed equally well, though we will be more sure to succeed if we choose varieties from species natural to our climate. Mr. W. Barns, Orange Co., N. Y., has a vineyard of Moore's Early which is wonderfully prolific, while on his brother's farm, not a quarter of a mile distant, the same variety has proved a practical failure. On my own farm, in Yates Co., N. Y., I can show equally marked conditions. A vineyard of Catawbas planted 17 years ago, under the advice of several of the then best vineyardists, had to be torn out, or grafted, while almost within a stone's throw this variety grows and ripens to perfection; hence, we may say, be careful in selections, both of variety

and location, but do not condemn entirely because you fail once or twice.

After repeated trials of European vines, under the supervision and efforts of European vineyardists, and after European methods, this class of vines, the *Vitis vinifera*, had to be abandoned; up to this time, at any rate, they refuse to adapt themselves to our environments. Whether they ever will do so, remains to be proven. Through the earnest efforts of some of our vineyardists, such as Riketts, Rogers, Caywood, Jacob Moore and others, the effort has been made to get some of the benfits, if such they be, of the Vinifera by hybridizing, using some of our native species with the Hamburg and other Vinifera varieties. For a time it seemed as if success was assured, but apparently only to a certain extent; and the assertion will not be contradicted that many varieties so obtained, and promising well for a time, are being gradually relegated to the experimental vineyards. Commercial vineyardists feel safer with the pure native varieties. Some experts say, "but what about quality?" Well, let me ask: "are we quite sure about this apparently uncertain factor?" Pomologists have tried to make a standard, and have failed. Now, the people have made it without their help—at least it is fair to assume that they buy what they like best—and the natives are the grapes for the millions. Take the four varieties mostly grown east of the Mississippi—Concord, Delaware, Catawba and Niagara—each a pure Labrusca, or so nearly pure that no one can positively say they are not. Ninety-five per cent of the total acreage, or more properly 95 per cent of the total production, are of these varieties. The principal reasons for this are: First, because we can grow them; and secondly, because they come nearest to the standard of quality established by mutual consent.

Not many years since the Concord was spoken of as poor in quality, among grape-growers, but they must have been mistaken. It was quite the correct thing to say: "The Niagara is fine to look at, but it is off in quality;" but nevertheless, after having stood the test for some years, we seem to be wrong again, for the Niagara, as well as the Concord, is a good seller. The Concord, without a doubt, establishes the price of grapes east of the Rockies. The Delaware is more particular in its habitat, while the Catawba is still more particular, though both are successful vineyard varieties, and very much better in quality than Concord and Niagara. Yet the money test is bringing them more and more to a level, without regard to the opinions of the fruit men.

One reason why the natives succeed best is that they are self-fertile, or partly so, while most of the hybrids of Labrusca and Vinifera

are imperfect, or the ovaries start to develop but soon fall away or persist as abortive fruits. This demonstrates one grave source of the failure of the foreign hybrids. Of the new varieties which have been introduced during recent years may be named: Worden, Moore's Diamond, Green Mountain, Eaton, Elvira, Early Ohio, Jefferson, Moore's Early, Ironclad, Pocklington, Poughkeepsie Red, Vergennes, Superb, all pure natives, or nearly so, and each one has proved of value. These facts necessarily lead to the presumption, at least, that we must look to the native stock for our hardy grapes, especially in our Western country. GEORGE C. SNOW, New York.

In the Vineyard.

It should be kept clean during the whole of the season, and if so done there is nothing to do now except to gather and to market them. If they have been neglected, then cut all weeds and grass closely and use as a mulch. If grapes are wanted for late use let such varieties as Catawba, Goethe, Nortons, hang on the vines as late as possible, then pick and pack carefully in bran, or wrap closely in oil paper, put in small packages, and then place them in a cool cellar.

Stripping Grapes Does Pay.

The question is frequently asked by our horticultural exchanges, "Does it pay to strip off the new growth after being killed by late frosts, as was the case this spring?" The Leader has interviewed several of the prominent growers and nearly all answer in the affirmative.

R. S. Jones' vineyard was very badly frosted both last year and this. Last year he did not strip, and harvested 500 baskets from second growth. This spring he stripped all but eight rows, and says he expects 3000 baskets of first-class fruit. He says the eight rows he did not strip will not pay for picking.

N. O. Martin & Co. say they stripped 14 to 20 acres, and will get one-third of a crop from the portion stripped. Those that were left with the dead foliage hanging on will yield scarcely anything. It cost $5 to strip the 14 acres.

C. Dunham has a small patch that were killed and were not stripped at all. He says they now have as heavy a second growth as any vineyard that was stripped.

D. T. Root stripped a part of his vineyard and thinks it was a great help to Delawares, but as to the growth of Concords, he can see no difference between those that were stripped and those that were not.

F. E. Bitely says stripping is the only salvation after frost.

One of the finest vineyards we have seen this season is owned by James Robinson, southwest of the village. The frost in May completely cooked his vines, but they have come out well with a second growth of wood and foliage, and will yield over a third of a crop. Mr. Robinson stripped all his vines after the frost, and is highly pleased with the result.

Some others are of the opinion that it makes no difference, but we fail to find anyone who thinks it injures the crop. Different methods were followed, some cutting off the dead sprouts leaving about an inch next to the woods, while others tore it entirely off, compelling the new growth to start from the wood. The latter plan is found to bring the better results. It is also found that the earlier the vines are stripped after the frost, the better they yield. Most of the growers say that in case of frost in the future they will proceed immediately to strip every vine. Vineyards that were so treated this year will yield from a fourth to a half crop.—Lawton Leader.

Has Never Noticed Such an Effect.

I have had no experience in laying down and covering grape vines to protect them from the cold of winter, that would lead me to believe that it had any effect upon the time of ripening of the fruit. In no way could I account for such a result, because the growth and vigor of the vine is dependent upon climatic influences and the fertility of the soil. While it is true that those kinds which have an admixture of foreign blood are benefited by the protection given, I have never found that our hardy kinds like Concord, Worden, Moore's Early, etc., were injured by the cold; on the contrary, I have injured many a vine by bending it down to cover it. I have sometimes merely fastened the vine with pegs, but usually cover with earth after pegging down. As one or two weeks gained in time of ripening means a great deal to the grape-grower, I think some of us ought to have found out the secret long ago. WALTER F. TABER, Dutchess Co., N. Y.

Fall Planted Grapevines.

For several years past we have practiced planting grape vines in the fall, as well as in the spring. We order our vines from the nursery about the middle of October and plant them the first part of November, we let them stand until the first week in December without any protection, then we take a small hand-sickle and a fork and mulch them. We cut small weeds, grass or anything convenient, and scatter a forkful or two over each vine, and at the same time put a little dirt or a clod or two on the edge of the mulching to the north side.

In this way the tender roots are protected from the severe cold of the midwinter, and put in prime fix to shoot out and start the buds early in the spring.

A grape vine planted in this way will start earlier and make much more growth than one planted the following spring. There are warm spells in February and early March, when the roots of the fall-planted vine will grow long before spring planting has begun. Hence, if the late spring should be dry and unfavorable to growth, the fall vine will have had a start that insures its living, while the spring-planted vine will be dwarfed in growth, if not killed outright.

BEES AND RIPE GRAPES.

We are satisfied from experience and observation that the idea which some people have, that bees injure ripe grapes, is utterly unfounded. On our farm we have both a vineyard and an apiary, and we can confidently assert that our bees have never injured our grapes in the least. We believe that a bee cannot puncture a grape skin. The proboscis, or what we might call the honey sucker of the bee, is soft and flexible, and not intended by nature to puncture anything, but simply to enable the bee to reach the nectar in the blossoms. The idea that the bee might bite the skin of the grape and then insert its honey sucker is absurd. Bees have no instinct to cause them to approach their honey source in that way. They do not bite in self-defense. Their stinger is their weapon of warfare, or assault. Neither would they sting the grape and then take the honey from the fracture so made, for bees sting only as a last resort, as in most cases to sting means death to the bee, and the honey gatherer is not out on the warpath, but on the peaceful mission of gathering sweets while they are to be had.

We sre sure that our orchard, and our vineyard as well, is annually benefited by the presence of our bees, and we would not censure them for gathering the sweets from cracked or fallen grapes, and foolishly charge them with destruction, when in truth they are only saving that which would otherwise be wasted.—Epitomist.

Advantage of Grafting Grapevines.

The advantages to be gained by grafting grapevines are so evident that, although it was almost an unknown art at forty years ago when I began its practice, it has become a necessity to every grape-grower. It is a little more difficult than the same operation on fruit trees, yet it is so simple that anyone familiar with the use of a sharp knife can easily acquire the art. The experience of forty years has taught me that the simplest methods of grafting the vine are the best for common use, especially where it must be done on a large scale as a protection against phylloxera, and where skillful hands are not available. When whole vineyards of resistant stocks are to be grafted in a few weeks, the labor must be divided. While each opeartion is simple in itself, with only inexperienced labor at hand, it is best to give each a special task, which he can soon learn to successfully perform.

The facility with which new and valuable varieties can be increased and their fruit tested, is an important advantage of grafting. If grafts of bearing wood are worked upon strong stocks, they will bear a few bunches the same season and a full crop the next; healthy stocks of no value can be changed into the most valuable bearing kinds; and varieties which are dificult to grow from cuttings can be propagated with greatest ease by grafting. The temporary obstruction by grafting seems to have the effect upon the graft of making it produce more and finer fruit than on its own roots. Last but not least, grafting affords us the only means by which to combat successfully the phylloxera.

As to the best time to perform the operation, I differ with most of the writers on this subject. I have met with the greatest success when the sap was flowing freely, which will, of course, vary according to location. In California our best time is about the middle of April, though I have grafted with as good success up to the middle of May, provided the vines are kept dormant in a cool, shady place, and were selected with the proper care. When the sap is flowing freely the junction is immediate, and the sap at once ascends the graft. At this time all bandages are superfluous, and even injurious, provided the stock is strong enough to hold the cion firmly. No matter if the stock

has already made shoots a foot in length, there will be no perceptible difference, though it is safe to commence when the buds are swelling and the sap is in rapid circulation. The best success I have had was with vines from an inch to an inch and a half in diameter, strong enough to hold the cion firmly, and nothing is gained by grafting when the vines are smaller. Wait until the vine is strong enough, then give its energies full play by inserting good strong cions, with buds sufficient to take up the flow of sap; few failures will occur, and you can count upon a few clusters the same summer, with a full crop the following season.—GEORGE HUSMANN, in Orange Judd Farmer.

Grape Culture.

From close observations and study have concluded that the region lying between 36° and 40° north latitude, from the Atlantic to the Pacific (occasionally modified by the isothermal line), is one of the best for grape culture.

North of this region or earth belt is the home of the Labrusca, and south of it is the home of the Rotundifolia or Vulpina, while South and Southwest Missouri and Northern Arkansas produce the best Æstivalis. The southern portion of Missouri and the northern portion of Arkansas, known as the Ozark range, seems by nature best adapted to grape-growing. It is situated in the favored climatic belt between 36° and 40° north latitude. The northern Æstivalis, of which the Cynthiana, Herbemont and Norton's Virginia are types, flourish within this latitudinal belt, but not further north. The Labrusca species belongs north of the Æstivalis, but will flourish as far south as the Ozark range, but not further south. The Cordifolia or Ripara will succeed in the southern portion of the Labrusca belt and the northern part of the Æstivalis belt, but wholly fails in the extreme south or extreme north. It grows well and produces adundantly at about 37° and 38° north latitude, which brings it within the limits of the Ozark range.

While much has been written, yet little is known of the capability of the State of Missouri for grape culture, as the region best adapted to grape growth within her borders has never been devoted to that industry. I refer to the southern slope of the Ozark range.

We will now consider the soil and location best suited to grape culture within the region best adapted to its growth—that is, between 36 and 40 degrees north latitude.

Grape growing is possible under a wider range of conditions and soil than any other thing cultivated by man, but grapes will not thrive

in undrained soil; stagnant water is death to successful grape-growing —running water not so much so. Soil is an important factor in the growing of grapes. The soil of the great grape-growing and wine-producing districts of France is a mixture of light clay, silica, disintegrated rock and oxide of iron. This character of soil enables the vine to draw from the earth those chemical elements that give a certain peculiar flavor that the grapes and qualities to the wines of France, especially in the Bordeaux districts.

From all the information attainable I can see but little if any difference between the soil of the grape regions of France and the Ozarks. If there is any, that difference is in favor of the Ozark regions of Missouri and Northern Arkansas. Here we have what is known as the stony lands, composed of fragmentary or disintegrated rock, more or less rotten shale, red clay and large quantities of oxide of iron.

H. D. MacKay.

Grape-growing on the Ozarks.

As South Missouri is noted for its fine peaches, its wonderfully productive apple orchards and its small fruits, it is now time that the grape interest of this section receives its proper share of attention.

Grape-growing and wine-making are two of the coming industries for these sunny hills, and they will be in the near future noted through, out the land for their large vineyards and fine wines. Wines made from the choicest varieties of the Æstivalis, a class of grapes that flourish here in all their luxuriance.

There are several large vineyards in this (Howell) county, ranging from 20,000 vines down, and many small ones that have been in bearing several years, proving by their prolific yield and fine quality of fruit how well this soil and climate is adapted to grape culture.

The writer of this article has charge of a fruit farm on which are now growing 20,000 vines, as follows: 6000 Æstivalis, or wine grapes-consisting of Norton's Virginia, Cynthyana, Hebermont and Cunningham, the remainder being mostly Labruskas, or table grapes, the principal varieties being Concord, Worden, Morris' Early and Niagara, having in all something over thirty varieties including those in our experimental grounds.

Now, as to planting, also care and culture of the vineyard. Set all strong growing varieties 8 by 10 feet, with the 10 feets paces running north and south if convenient, thus admitting a greater amount of sunlight. Then 10 feets pace is also required for the spraying wagon, one of the indispensibles to successful grape-growing. Use stakes 7½ feet

long, or 6 feet after they are set. Prune grapes to one bud with the bearing wood so arranged that the fruit will set within one foot of the ground, and extending to the top of the stake.

I commenced spraying about the time the buds began to swell, with the Bordeaux mixture, and continued spraying as needed during the season; practiced summer pruning, and thinned vines that were overloaded; gave thorough culture, but used no fertilizer, and by practicing these few necessary methods produced grapes that yielded from five to seven tons per acre, leaving the vines in a fine, healthy condition, with thoroughly matured wood.

I will commence pruning the same vines as soon as the leaves have fallen, getting everything in readiness during this fall and winter with the expection of reaping another bountiful crop the coming season, as grapes seldom fail on the southern slope of the Ozarks.

A. C. SKINNER, West Plains, Mo.

How I Raise Damson Plums.

This was the subject of a paper recently read before the Columbus, O., Horticultural Society, by F. Riebel. He said that no fruit was more generally neglected and none responded more liberally to cultivation and care, or gave greater profit. I have, he says, over 600 plum-trees, and over 100 Damsons are in bearing and now loaded with fruit. I planted all these in good rich clay soil, well drained. Low wet soil will grow no good plums of any kind, and a sandy soil harbor too many insects. The curculio is fostered by all soils of light texture. Clay holds more moisture than any other soil, and the plum needs much moisture. Cultivation is an all-important factor in raising plums. Failure in this respect means a failure of crop. I cultivate my plum-trees oftener and better than corn. I run the cultivator up to the first of July, and soon after I apply a mulch of coarse manure, or straw that is partly rotten, for the purpose of retaining the moisture in the soil to mature the crop, and also to mature the fruit-spurs and the buds of the following season. In the fall of the year, however, I apply a light coat of barnyard manure, and in the spring I sow a quart of salt per tree, as far as the branches extend.

Russian Plums.

I have at least five varieties of Russian plums that have not failed in bearing as much fruit as they could well sustain every year since they were old enough to do so. The Early Red's great fault is that of the Lombard—overbearing. They are more acid than the Lombard, and must hang on the trees until absolutely ripe to afford the best results. The tree is willowy in appearance, and the fruit hangs out to the very tips of the limbs. The Yellow Varnish is equal in quality to any of the California plums I have seen, unless it be one or two of the Japanese sorts. It is very large, yellow, pear-shaped, and sweet and delicious enough to satisfy the taste of the daintiest epicure. I did not spray the trees this year, and yet they matured as many plums as was good for their health. People in passing often wondered if they were not pears. Two other varieties, both blue, I have not identified, having lost the labels soon after receiving them from the Agricultural College. One is medium in size, quite acid until fully ripe; the other is very large and sweet, and a perfect freestone. Altogether I do not see any cause for discouragement. As stated in the beginning, some of these Russian sorts are decided acquisitions, and have come to stay, and we may as well cultivate the acquaintance of our worthy neighbors.

The inferior sorts will be sifted out in time, and we shall yet see the day when Prof. J. L. Budd will be more fully honored for the work he has done in his recent introductions from Northern Europe.

J. J. MAXFIELD, Iowa.

Plum Culture.

Plum culture in the Northwest must build on our native species, if this industry ever reaches that permanent success already attained in grape culture. That it has grown in a few years to such magnitude without any special effort seems marvelous, and clearly indicates the intrinsic value of our native plum. Had our leading horticulturists devoted to this fruit the same care and culture bestowed upon the foreign sorts, that so far, in a commercial sense, are a failure, I am quite sure long ere this Iowa would be noted for its large plum orchards as Michigan is for its peach orchards. If Iowa planters desire great success in plum culture, fine, long-lived trees in orchard, bearing heavy annual crops of fine fruit, they should plant more of our best improved

natives. If properly planted and cultivated they will not be a disappointment, and our commercial centers can be supplied with superior fruit and keep the money at home that is sent out of the State for plums inferior to these best natives. We do not wish to be understood that our natives at present are superior in size and quality to the best European or Japanese sorts, but what we do say is, the high coloring and extreme earliness of some new natives give them advantages as market fruit over all others ; and to this add their sure annual bearing habits, extreme hardiness of tree, and late bloomers, more often escaping our late frosts, which makes them the safest and most profitable plum to plant in commercial orchards in our State. I hope in future articles to describe those varieties of natives as well as others that have proven the most successful and profitable to plant. There is a rich field for the scientific horticulturist to improve by seedling production our native plum. There is also a much-felt want for a standard work on "plum culture" outside of catalogues put out by nurserymen and bulletins of our experimental stations. There is no book to guide the inexperienced planter. There are many good works on grape culture, peach culture, apple culture, etc., but not a single volume on plum culture. Why is this ?

A. B. Dennis, Iowa.

Growing the Cherry.

This fruit does not receive the attention it should. Its planting is often limited to but a few trees on home premises, and because of limited amount of fruit, birds are most damaging to it. Its early bloom and fruit are subject to destruction on level lands, low lands, hot, sheltered localities that release the frosts quickly when they drop untimely and late. The cherry does not do well on wet lands, and thorough drainage is an absolute necessity. This is best attained if the fruit is grown on high, rolling lands, ridges, bluffs and in such localities where the grape thrives. If so planted it will be a fairly sure cropper, more sure with us than the apple. It is advisable to plant trees that are in vigor and not too old. One year we consider better than two, and considerable care should be taken to plant trees very early and on well-tiled ground. It is beneficial if they are planted among raspberries—small fruits of bush form three or four years—till well established and they come into bearing. Pruning from the start should receive some attention, and no knife used on the stem, but the leading shoots should be pinched back, and heading-in practiced on the trees. The cherry has the unfortunate habit of the peach—making principally

terminal growth, and by extension pushing the entire tree out into a few long, bare limbs with a few scattering branches on them that die from want of nourishment because the sap flow is not checked. This can be largely obviated and the bearing surface or area can be largely increased by heading-in and making a dense head around the central stem. Such precaution may not be necessary East and South, but it is a necessity in the West to attain success, because of our natural dry air and arid conditions, since the glaring of the hot sun that continues at times for months does much injury. The dense heads shade the stem and forks and permits a shaded and normal condition of the bark, preventing sun scald, bark bursting and destruction of all cell structure. Because markets are bare of home-grown fruits, fruit-cans are empty and the fruit has a good place in the market and is always in demand. The picking costs from 40 to 60 cents per bushel and we have always received from $2.60 to $3.20 per bushel for the fruit, averaging $3 to $6 per tree from trees planted eight to eleven years. In varieties we would confine ourselves to Early Richmond, principally two-thirds of that sort, and one-third to one-half of Morrello and Wragg, which are very similar, but both very regular bearers and reliable. In good Richmond years the Morrello does not sell so well, but we think so large a proportion should be of the late sorts, since off Richmond years when there is no cherries, in spite of the firey acid of Morrello, they will sell very readily and at a high price.

W. M. Bomberger.

Notes of the Season.

SEEDLESS PERSIMMONS.

We are frequently told of such varieties, and as often have tried to obtain them, but up to this time have failed to get a single variety entirely seedless. The usual number of seeds in a persimmon is six, on an average; but I have two varieties that have only about three, often but one, and sometimes none at all. One of these is of the largest size and best quality, and begins to ripen in September, long before frost. Some are hanging on the tree yet, and are superb eating. One of the largest is of poor quality, which detracts from its value. A large fruit of good quality and with but few seeds is what we desire. If there is one without seeds and of fair quality, whether large or small, I am anxious to get it, and will be pleased to correspond with the owner.

LATE PLUMS.

I gathered some Damson plums off the trees today (November 25), when there was six inches of snow on the ground. They are about half dried, but retain their flavor, and are fine eating. The dry autumn has allowed them to hang on the trees. It is unusual to gather plums so late, hereabouts. The work with the apples, and the low price of plums was the occasion of their being overlooked; but I am pleased with the oversight, inasmuch as it exhibits the keeping qualities of the Damson. The trees stand near to my Ruby persimmon tree, and the fruit of both on the snow together presented an odd picture. This snow has caught many farmers who have been slow at corn husking, and some turnip patches may not have been pulled, and will remain until spring. They can stand it, however, but husking corn in the snow is not a pleasant job. SAMUEL MILLER.

Cherries.

The following is a paper read on this subject by Mr. E. Yoest before the Maury County Horticultural Society at their regular meeting August 7 in Columbia, Tenn.:

"The cultivated cherry (Prunes Cerasus) is of Asiatic origin, and is said to have been introduced into Italy from Pontus during the Mithradatic war, about 70 B. C., about 120 years afterwards it was introduced into Great Britain. The Romans recognized only eight varieties; more than 300 varieties are now catalogued. Out of this number there are only two varieties adapted to the soil and climate of Middle Tennessee, the Dukes and Morello. The Dukes have strong upright branches, while the Morellos have branches more slender and spreading. These are erroneously called sour cherries, some being sweet. Hearts and Bigarreau cherries or Sweets, as they are frequently called, have too many faults to recommend them to this section, among which I will mention a few: Their tendency to early blooming, the rapid growth of the trunk, especially on rich soil, which causes the bark to split on the sunny side, when the tree soon dies. Should you be so fortunate as to have your tree to set a crop of cherries you would next be confronted by rot caused by heavy spring rains. Should you then be so fortunate as to reach the ripening period safely, your crop would then be ready for the birds, when in a few days your many thoughts of feasting on the large luscious Hearts and Begarreans will have vanished as a dream. The cherry being a very hardy

tree will thrive in nearly all good soils, but a dryer soil than for most other fruits is found preferable; a sandy or gravely loam is best. In wet places or on water-soaked sub-soils it does not flourish and soon perishes.

Raising cherries on a large scale for shipping purposes has been either overlooked or not considered of sufficient importance from a pecuniary standpoint, to induce our farmers to plant large orchards. I know of only two such orchards in Maury county, those owned by Mr. Rainey and myself. I would recommend for Middle Tennessee the following kinds, named in the order of ripening: 1, Early Richmond; 2, Montmorency Ordinare; 3, Royal Duke; 4, Hortense; 5, Large English Morello. For orchards, I would recommend planting 20 feet apart in the rows, and rows 20 feet apart. This would give 108 trees to the acre.

Cherry trees frequently do well planted in fence corners, but like other fruit trees, do better when cultivated. Beyond trimming the small, tender branches of the tree while young, to form a perimidical head, the cherry tree should not be pruned, especially the large limbs, as they rarely heal. Sometimes the cherry crops are much lessened by long and heavy rains, at the period of the bursting of the anthers, washing down the pollen and preventing the fertilization of the "stigma" and germ. Before closing this subject, I desire to call your attention to the erroneous impression that prevails among many. That in order to get a certain kind of cherry, they obtain a sprout from the parent tree. This will invariably result in disappointment, as cherries are always grafted upon the Mahaleb or Mazzard stock, hence sprouts from an early Richmond, May Duke, Morello or some other kind would result in a Mazzard or Mahaleb, a small, sour cherry not fit for the table."

The Ideal Strawberry.

The "ideal strawberry" is often mentioned when horticulturists get together, and there is a tolerably unanimous expression of the conclusion that this much-desired fruit has not yet made its advent. What qualities must a strawberry (plant and fruit) have to entitle it to this distinction?

The plant must be a vigorous grower, with a thick, stocky leaf, and it must be a free producer of runners. It must be perfect flowered—we must not be compelled to plant others with it to insure its fruitfulness. It must be productive, fully as much so as the most pro-

ductive varieties now under cultivation—more so if possible. The berry should be large—not monstrous in size—and it must be symmetrical in shape—not like Sharpless, Bubach and other lobe-shaped fruits. Color is not so important—it should be of solid color, either scarlet or crimson, and colored throughout the berry. It must be solid and firm enough to bear shipment a reasonable distance, and last, but not least, it must be of high quality, say somewhat better than the Gaudy, which is a very good berry. We have no such berry yet, but it is not unreasonable to believe that we will achieve it. Whether we are to get it as a chance seedling or whether it will come as a result of careful and scientific crossing, none can say.

J. J., of Milwaukee, writes: "What proportion of staminates of strawberries should there be to pistillates in the field?"

There is a great diversity of opinion on this subject. Some use one-half each, others one-third staminates to two-thirds pistillates, and still many growers use only one-fourth staminates and three-fourths pistillates. We have used all three methods and find very good results with one-third staminates. Much depends on the variety of the fertilizer used. If a heavy fertilizer like the Van Deman, Michel's Early, Sparta, Beder Wood or Parker Earle is used not so many will be necessary. In our fields we use but one-fourth of the above fertilizers to three-fourths of the Warfield's and derive the best results.

J. L. HERBST.

Some Large Staminate Strawberries.

After the advent of the old Wilson, now run out, the earnest efforts of propagators to produce a variety which was a staminate or perfect bloomer, and at the same time highly productive of large berries long met with only partial success. The reason is evident.

The staminate bloom having a double function to perform, that of producing both stamens and pistils (both pollen or impregnating dust and fructifying organs), its fruit-producing powers is almost sure to be much less than that of the pistillate or female bloom. When a staminate (or double-sexed variety) turns out to possess the productiveness of the pistillate, it is the exception that proves the rule. And in this case a very rare exception.

But it was imperative to find a pollenizer for the largest pistillates, like Greenville & Co., a variety rich in pollen, which bloomed just with

them and was also productive of large berries, matching the pistillates in size.

After testing all of promise in the past ten years, I find Wolverton, Tennessee Prolific, Gandy, Belle and Lady Thompson the nearest perfection. They are rich in pollen, will thoroughly pollenize the pistillates and come nearest matching the largest in size. Thus not lessening their market value by a mixture of swell berries. Where it is not desirable to plant pistillates, the above four varieties are highly profitable market varieties themselves. I have no monopoly of them. They are generally grown, and well known.

O. W. B., Kittrell, N. C.

Strawberries for Home or Market.

There is practically no difference in growing strawberries for market or for home use except in the amount planted and possible in the quality of the varieties. Generally the most productive varieties are satisfactory for home use. Sod plowed under should not be planted to strawberries, as grubs generally destroy plants. Land cultivated the previous season in any hoed crop will be in the best condition for strawberries. Coarse manure should be plowed under. Fine manure, unleached wood ashes, or bone meal should be applied as a top dressing and cultivated in, either before the plants are set or after.

Plant in rows four feet apart and eighteen inches in the row. Set the new plants not less than ten inches apart until the row is as wide as you want it, and remove the rest. Every third or fourth row should be staminate. Eleven years of experience and trial have taught me that Crescent, Haverland, Bubach No. 5, Warfield No. 2 and Greenfield, fertilized with Lovett, Beder Wood, Enhance or Cyclone, succeeding over a wide range, are best adapted for general cultivation and home use. Few persons once interested in strawberry culture are satisfied without testing some of the novelties. The productiveness of new varieties every grower must test for himself. Set a dozen plants of a variety and grow them until you are satisfied they are productive enough to be planted with your standard varieties. It may worry your patience to wait a year or two to find out the value of a variety, but it will tire your patience a good deal more to plant a thousand or two at a fancy price and get no returns.—E. L. Roser, in the Strawberry Culturist.

Winter Protection For Strawberries.

In a recent New York Tribune, Waldo F. Brown told of the fine success he had the past season with his strawberry bed, notwithstanding the drouth, and added: "It is easy to grow an immense supply for the family use, and the statement we so often hear, 'I can buy strawberries cheaper than I can grow them,' is a mistake. If a farmer buys his berries he must pay retail price, and usually the farmer who buys them furnishes his family about three meals a week of them instead of twenty-one meals as we did. Strawberries are a surer crop than corn or potatoes. I have grown them for 37 years with only one failure, and that was caused by continued heavy rains washing off the pollen, so that the blossoms were not fertilized.

"I owe my good crop this year as much to good winter protection as to any one thing. I always cover the rows with manure the first time that the land freezes. As soon as corn fodder will do to feed in the fall we stop hay feeding and cut the fodder up in lengths of eight inches to the foot, and after the horses have eaten the blades and husks we bed with the waste. The horses tramp the stalks flat and they absorb all the urine, and we allow it to accumulate in some shed or box-stall and use it for covering the strawberries. It is the best mulch I have ever used, as it contains no seed and is light, and the winter rains and melting snows leach the fertilizer down to the roots of the plants."

Two-Crop Strawberries.

The National Stockman says that in the latitude of Ohio it is possible to grow two crops of strawberries in a year with such varieties as the Enhance, if suitable special management is adopted. The second crop comes in October and the point of management are, a rich soil well manured; when the last berries of the first crop are not quite ripe they are pulled off, or, what is probably better, the blossoms may be pulled off about the time the fruit begins to form; the cultivation should begin at once on pulling off the berries and should be almost continuous, or at any rate, very frequent. This plan is practically a kind of forcing, producing a crop not three or four weeks in advance of the usual time, but six or eight months. It would probably not

succeed in all seasons and it is likely that the Greenville or Muskingum would respond in the same way that the Enhance does, and the suggestion is made that intelligent investigation by skillful horticulturists might produce like results with the Bubach, Haverland or some of the other older varieties.

Fall Planting.

"Fall planting of raspberries, blackberries, currants and gooseberries, is not practiced as much as it should be," says Mr. Wragg in Homestead. "Experience has demonstrated that there are several reasons why it is best. Currants, and especially gooseberries, start growth very early in the spring, often before the ground is in a fair condition to receive them, consequently one or two things must be done, either plant when the ground is cold and unsuitable for growth or wait until the plants are well advanced, neither of which methods will give best success; whereas, in the fall the ground is warm, ready to start growth, the plants are in first-class condition, and the shock of transplanting less felt. There is not the push and hurry of spring work, so the planting need not be rushed or carlessly done. If you buy your plants the nurseryman is not so hurried but that he can put them up in the very best order and ship just at the proper time. Raspberries and blackberries grow at low temperatures, and when planted in the fall the roots push out and make root-growth quite late. In the spring they are well established, and make a growth that is scarcely or never equaled by spring-planted plants. The following fall compare your fall-planted with the spring, and you will ever after be a strong advocate of fall planting of these varieties. The soil should be plowed deeply, as early in the fall as possible, which is in itself a benefit to the ground, and if necessary plow again. Have the soil in good order and plant from the 1st to the 20th of October. Before hard frost throw a furrow with a small plow or cultivator along each row, nearly covering up the plants. In the spring level the ground around them, straighten them up and they will be ready to make a growth that will surprise you. My attention was just recently called to an acre of raspberries set out last fall that are as large as any I ever saw after being planted two years in the usual way. You gain nearly one season's growth by fall planting."

The Raspberries.

What we have to look for then is good size, good shipping qualities and health, vigor of plant, hardiness and productiveness. I may be pardoned, perhaps, if I name two or three varieties that seem to me to meet these requirements to a marked degree. With us the Palmer is worth all the other early kinds that we have tried put together, because of its fine fruit and great productiveness, and, what is very desirable in an early berry, it ripens its whole crop in a short time, coming on the market when prices are high.

The Ohio is always profitable because of its good shipping qualities, rank, growth and great productiveness.

Prof. Budd says of the Older "it is by far the most valuable blackcap grown." It certainly is wonderfully productive of very large berries and said to be heat and drought proof and entirely hardy every way. If it had a little more firmness, I think it would stand well up toward the head of the list of blackcaps.

There are two new raspberries to be introduced this season, a description of which, it seems to me, would be of interest to all growers and lovers of fine fruit. The first of them is the Loudon, a Wisconsin production, which originated with and is named after Mr. F. W. Loudon, of Janesville, who is also the originator of the Jessie and Hoard strawberries. It is said to be a seedling of the Turner fertilized with Cuthbert. In growth and appearance of cane and in size, color, shape, firmness and quality of fruit, it very much resembles Cuthbert, and has the value of keeping longer in good condition after being picked.

The second variety is the Columbian, which originated with Mr. J. T. Thompson, of Oneida, New York. It was raised from seed of the Cuthbert that was grown by the side of the Gregg and is believed by the originator to be a cross between the two, and I think with good reason, as it seems to have some of the characteristics of both.

Gooseberry Questions Answered.

The following questions have been received from different persons and answered by mail, but as they are important to gooseberry growers in general, I offer questions and replies for publication :

1. Do you recommend fall planting, and why ?

I prefer to plant in the fall, because the gooseberry is often in leaf before the land can be got upon in the spring, and I have always found the bushes did better.

2. What kind of soil is best adapted for raising gooseberries?

I find a soil composed of sand and clay, mixed by the action of water, and also a heavy clay soil, both yield large crops of fine berries. So also do a few bushes in a yellow loam five feet deep, but they have been treated liberally with hard wood ashes and stable manure,

My bushes are planted 6×4 feet, and I keep the Planet Horse Hoe running between rows about every seven days—less might do. Between bushes I use a shovel hoe. They are very handy for working under large bushes.

3. What kind of fertilizers do you recommend?

Stable manure and hard-wood ashes, and you need not be afraid of putting it on thick—it will pay to do so. I used some nitrate of soda last year, and was so pleased with the results that I am using it more liberally this year.

4. Would offal from a tannery be suitable?

Being animal matter, I presume yes, but I should prefer to compost it with stable manure before using, or even with muck or mould.

5. Do you grow on a single stem?

I prefer the shrub form, because of the necessity of renewing the wood at least every three or four years. After about two or three good crops, the wood becomes hide bound, and the fruit runs small. So after two good crops, I cut away the old wood, and have new wood to take the place of that cut away. I strive to have about six stems.

6. Would you advise planting extensively of Industry, Autocrat and Whitesmith?

The first two, no. Whitesmith is a noble berry, and where spraying is practiced will be satisfactory. For one's own use for eating ripe it is hard to beat the Autocrat, but it has an unfortunate habit of dropping its leaves early, and I fear will never be a very profitable berry.

7. Give your system of pruning?

Clear away underneath. Thin out the head so that the hand can be easily inserted in all directions. This will allow of a free circulation of air. Cutting in I do not practice much, as it induces an abundant growth of weak shoots which thicken up the bush during summer. I prune in the fall last thing.

8. Are not Queen and Chantauqua very nearly alike?

Yes, Queen and Chantauqua are very much alike in foliage, vigor, and in shape, size, and appearance of berry, but at this writing Chantauqua shows just a little disposition to drop its leaves, as you remark, but nothing serious. Queen is as green as a leek.

9 The most prolific berry?

Champion is the most prolific berry that I have tested so far. It is enormously productive and vigorous, but not any improvement on size on the Pearl, which for vigor is hard to beat. Red Jacket is its equal in this respect, but I cannot yet pronounce upon its productiveness.

10. Yes, it is apparently an "American production." I am of the opinion at present that it is a native or it may be a seeding of some English variety.

11. What varieties would you recommend for extensive planting?

Taking into consideration the price of stock, I would take Downing for main crop, with Pearl in less numbers, on account of higher price. If these varieties are sprayed for rust, heavily manured, and renewed as described above, they are fine berries. I should also get a more limited number of Champion, Triumph, Red Jacket and Queen, and propagate them. Another point is, I would watch carefully the reports of the experiment stations, as there are quite a number of very promising novelties being tested, and some one of these may be the ideal berry.

12. Have you any success in propagating from cuttings?

By the ordinary way it can't be done successfully. Layering will be found much more satisfactory. In a wet, warm time shoots, not suckers, will root in two or three weeks.

13. Cause of Downing dropping its leaves prematurely?

I do not find the Downing to have this habit now. Some years ago when I did not spray, and gave but little cultivation, it had that habit, but now the leaves stay on till killed by frost. This I attribute mostly to spraying, but cultivation may be a factor.

All questions cheerfully answered through medium of this journal, or privately, when necessary.—Stanley Spillett, Gooseberry Experiment Station, Nantyr, in Canadian Horticulturist.

Questions on Berry Growing Answered.

A correspondent askes, "I have a fine looking strawberry bed that blooms nicely, but only bears a few little, knotty berries. What shall I do?" Your strawberries are pistillate varieties, and have to be fertilized with a perfect flowering sort. I would plow or dig up a row through the middle of the patch and set a row or more of good fertilizers, such as Michel's Early or Robison.

How can I tell perfect blooming strawberries from pistillate sort? I fear that I can't explain with pen and ink so you can distinguish their blossoms. All perfect bloomers have a little yellow stem about one-fourth of an inch long inside the bloom leaf, the part that makes the berry, while all pistillates are bare of stamens, or those little stems, and thus must have a perfect bloomer staminate sort within 16 feet.

Will wild strawberries grow large by cultivation? Yes. I selected the best that I could find growing wild, and planted and cultivated same as tame varieties. They yield about one-fourth as much in quantity as standard tame varieties of small berries, but in flavor no tame sorts are better.

Which are the four largest strawberries? Bubach, Robison Cumberland and Warfield. This may differ in localities. Windsor Chief would with me be the fifth largest of new varieties, but it is not sufficiently tested. Haverland, Belmont, Marshall, Shyster and Champion of England.

Do such and such varieties have to be fertilized with such and such? No, not as a rule; but some perfect bloomers will waste or drop their pollen before some of the pistillate sorts are ready to be fertilized, and thus not be sufficiently fertilized to produce a full crop.

Which are best to make others bear? Michel's Early, Captain Jack, Robison and others that have strong pollen will fertilize pistillate varieties farther than some weak staminate.

How many plants can be grown from one plant a season? Ten to 100, owing to varieties and season, distance of plants, fertility of soil, etc. Warfield, Crescent, Captain Jack and Robison are some of the best plant producers. Parker's Earle, one of the poorest, grows more to stool or crowns.

How far apart should strawberry plants be set? For field culture I set 12 to 15 inches apart in the rows, and rows about four feet apart, taking about 10,000 plants to the acre. For garden culture, 12 to 15 inches apart in rows, and rows 15 to 24 inches apart. The runners that will make plants should be cut off before they take root, thus the plants will grow to stool and make more fruit stems instead of exhausting themselves in making plants. With a few months cultivation, and then kept well mulched with old straw or like material, a bed will last for years without renewing.

Which is the safest and cheapest way to send strawberry plants, and what will they cost? Two hundred can be sent in one package by mail, weighing about four pounds (if leaves are trimmed, which should be even for home planting), and costing eight cents per pound. Two

dollars will bring by mail to your postoffice 200 the best varieties. By express in large quantities about one-fourth. I have sent by express 500 miles with good success.

Will strawberries run out? This and others about strawberries you will find answered in the Journal, June 20, 1895, on Horticultural page, under heading "Questions visitors ask in the berry patch."

Letters on file asking information on raspberries and blackberries, will be answered in my next. JACOB FAITH.

The Preservation of Vegetables.

As ordinarily kept, the root crops of the garden soon become shrivelled, and lose their flavor, or in some cases become "pithy" and "woody." This can to some extent be remedied if they are packed away in the fall in dry sandy soil. While the shrivelling is for the most part prevented, the flavor suffers to a considerable extent. Perhaps the best material in which to pack them, and one that is unequalled in retaining the vegetables in their normal condition, is found in the leaves of most of our forest and shade trees. Oak leaves are rather thick and coarse, but those of the maple, elm, poplar and other trees answer well. As they drop in the fall, they should be gathered and used at once. If allowed to become dry it will be well to rake them into piles, and either wet them down or leave them until wet by rain. As soon as the excess of water has drained off they can be used. Dry leaves will answer if the vegetable room is damp. The vegetables should be packed in alternate layers in the leaves, in either bins or boxes.

Onions, like other bulbs, can be easily preserved if kept dry, and although, if this is observed, they will stand a considerable range of temperature, it is desirable that they have a temperature of from 35 to 45 degrees. When in a damp room they start readily, especially if at a high temperature, and as a spring approaches the buds start even if kept comparatively cool. Care should be taken not to store onions in too large bulk, and to prevent heating they should be in shallow bins or in crates.

Although considerable trouble is experienced with the preserving winter squashes, they are among the easiest vegetables to carry through the winter. One source of trouble is that they are often left too long on the vines and subjected to severe frosts. Even if not quite ripe it is best to gather them (if the vines are thick it is generally safe to risk one frost) and place them in some sunny spot where

they can be covered at night. When freezing weather comes they should be carried to the house, and, unlike most of the other vegetables, should be placed in the warmest and driest place at hand. If one has a furnace and the squashes are packed around it, there will be little danger of their not keeping, even if no more than half grown.

The sweet potato is another vegetable that does not withstand a low temperature. They can often be bought cheaply in the fall and can be preserved, if packed in boxes, between layers of dry leaves and kept where the temperature does not fall much below 60°.

It is generally thought that there is some secret about the keeping of celery as well as in raising it. There will be no trouble in keeping it if it is placed in a room where the temperature ranges from 35 to 45 degrees, and if it is supplied with sufficient moisture to prevent wilting. It should have been blanched while growing in the garden, and should be placed in the cellar about the tenth of November. For family use it may be packed in boxes or in half-barrels, or other small receptacles that are a little deeper than the plants are high. Three or four inches of soil should be placed in the bottom, and the celery should then be packed in vertically, about as thick as it will stand, the soil being pressed firmly about the roots. If a large quantity is to be stored, it may be packed in the same way between boards placed on edge about 12 inches apart; but fully as good results will be obtained if it is packed in trenches in the open ground and covered so as to keep out the frost. As soon as packed, if kept in the house, it will be necessary to wet the soil about the roots, and at intervals during the winter, when it is found to be getting dry, the application should be repeated. In doing this care should be taken not to wet the stalks, as it is likely to cause them to rot. The water can be poured in from a watering pot through a short piece of tin or iron pipe, or a short hose may be attached to the end of the spout. Some have found small drain tiles inserted at intervals among the plants good for this purpose.

Cabbages and potatoes are too commonly wintered to require much attention here. The former should be put away with the outer leaves and stems attached to the heads. They will keep if left in thin layers in almost any way, in a cool room, but if placed in such a position that the roots can be covered with dry sand, they will be less likely to shrivel and lose their outer leaves. If many are to be wintered over for spring use, it will be best to select some well-drained spot out of doors and place them with their stems up, in furrows close enough together so that, when one has been filled with cabbages, the heads will be covered with soil when the next furrow is turned. When freez-

ing weather comes they should be covered with three or four inches of light litter. They are most likely to be injured from alternate freezing and thawing. Potatoes keep best in a moderately dry room at a temperature of from 35 to 45 degrees, but if kept dry will not suffer, except from shrivelling, even if the temperature reaches much higher. —L. R. Taft, in Orange Judd Farmer.

Furnish Profitable Work During the Winter Season to Horticulturists.

Prof. Bailey, at Cornell, has made a long study of the matter of winter forcing. He believes that it offers, in connection with outdoor gardening, the best opening not only for experiment, but for practical work. The business is yet in its infancy in America, as outside of lettuce, tomatoes, cucumbers, etc., few vegetables are grown under glass. There is a demand all through the winter for fresh vegetables. "Rural New Yorker" reports that of late string beans have proved a profitable crop, and almost any of our common vegetables will secure a good market if produced in fine quality out of the regular season. In every large town and city is a constantly growing class of people who always eat canned vegetables under protest. They would willingly pay large prices for fresh goods. Thousands of families now eat fresh lettuce in winter who never dreamed of eating it five years ago. So it would be with other vegetables if they were supplied.

Prof. Bailey has succeeded in growing muskmelons for the Christmas trade. Last year they were planted in the house Aug. 8. They were given lots of heat, and kept dry. The soil was one-third strong manure with plenty of bone flour added. There were 75 plants, and two fruits were left on a plant. The last were picked December 21, leaving the soil in ample time for a crop of lettuce or tomatoes to follow. A variety called Masterpiece succeeded well, as did Emerald Gem. Heat and sunshine make the flavor. Most of those who grew melons under glass have failed because they kept the house too cool. A well flavored melon four inches in diameter is worth money at Christmas time. Delmonico's servants will cut it in two, carefully clean the halves, and put them away on the ice to cool. It will be served later, each half filled with delicate ice cream, and worth $2 of the eater's money.

Another crop that is wanted fresh in winter, according to the authority quoted, is asparagus, which would find ready sale from January to May. This crop is already forced by some growers by building

a hot-bed over the outside patch and applying artificial heat. At Cornell such a bed 60 by 40 feet will be forced next winter. The list of vegetables suitable for forcing might be greatly extended. There is every prospect that within the next ten years this business will be wonderfully developed. That is why Prof. Bailey considers training in greenhouse work so important. It will be made a special feature of the horticultural course at Cornell.

Saving Vegetable Seed.

Vegetable seeds cannot be gathered at random and in a haphazard way and expect good results the next year.

In saving seeds on the earliest, fairest and most perfect specimens of each kind should be saved. This will give vegetables two or three weeks earlier and of the finest quality. It is best to take precautions in this matter early in the season, and then one can justly expect good returns the next spring.

Each kind of vegetable should be allowed to mature before gathering. Melons should be allowed to ripen thoroughly before taken from the vine, then the seeds may be taken directly from the fruit. Place the seeds in water a day or two and the pulp will easily wash off. Dry the seeds before storing them.

Squashes should be gathered before they are nipped by frost, but the seeds should not be removed for several weeks after taken from the vine. Rats and mice are very fond of melon and squash seeds; if the seeds are not kept in a rat-proof receptacle, place a piece of camphor gum in with the seeds.

Leave the tomatoes and cucumbers on the vines until they are well ripened; then gather and place in the sun a day or two; then mash them into a pulp and put in an earthen dish of water. After two or three days the pulp will all rise to the top leaving the seeds at the bottom. Remove the seeds and spread on a cloth in the sun to dry.

Save the best pods of beans and peas which mature first, and you will have vigorous, prolific plants next year. A row of beans 70 feet long will supply an average sized family, and it will require about one pint of seed for this amount of space. One pint of peas will sow a row 60 feet long. For family use, two rows each 60 feet long, an early and a late variety, are about the right amount.

When saving the seeds of beets, cabbage, turnips, etc., preserve only those which grow on the leading stem.

Seeds from vines are good for four or five years if kept in a warm, dry place. If allowed to freeze they are worthless. Carrot and beet seeds are good only one year after growth; radishes, two or three years. Onion seeds will germinate when two years old, but the plants are inferior.

After you have gathered your seeds much depends on keeping them from moisture and drying air. Corn should be kept in a dry, cool place, where the temperature is uniform. Most garden seeds keep best in a dry, warm place; a cupboard near a chimney is a suitable place. Do not attempt to keep seeds in the garret over the kitchen. The continued warmth from the stove below will destroy the germinative power of the seeds. The best receptacle for keeping seeds in are well corked bottles, having thick paper pasted around them to exclude the light air.—Dola Fay, Calmar, Iowa, in American Horticulturist.

Prevention of Potato Scab.

In a recent bulletin of the New Jersey Experiment Station is described a series of experiments with potatoes, an effort being made to prevent scab by the use of different strengths and methods of application of corrosive sublimate and Bordeaux mixture. In the cultural belts the plants were sprayed for the prevention of leaf diseases, but so little disease was present on the checks as to render these experiments of little value. At harvest the tubers were weighed and the weight of sound and scabbed potatoes ascertained. The author's conclusions as to the value of the treatment, as shown by his experiments are as follows:

Potatoes soaked in and sprayed in the open rows with quarter-strength corrosive sublimate gave a larger yield and a lower per cent of scab than did either of the belts treated with half and full-strength solutions of the same compound. Similar results followed the treatment of seed potatoes with quarter-strength Bordeaux mixture.

Although there was but little apparent difference in value between corrosive sublimate and Bordeaux mixture, the former is considered preferable on account of its being more easily prepared, and as it is of a uniform strength throughout admits of a much greater quantity of potatoes being treated at one time than does the Bordeaux mixture, which soon settles unless stirred.

The cutting of the "seed" before soaking in Bordeaux mixture showed very emphatically the importance of applying the fungicide to the uncut potatoes and preparing them afterward for planting.

Keeping Tomatoes.

Prof. Massey, of the North Carolina Experiment Station, writes the Garden and Forest that when frost is imminent he gathers the green tomatoes, wraps them separately in paper (old newspapers will answer) and packs them in boxes, which are stored in a place just warm enough to be secure from frost, the object being to keep them and not to ripen them. Then, as the fruits are wanted, a few are brought out at a time and placed in a warm position, where they will ripen in a few days. In this way he has kept his table supplied with sliced tomatoes up to midwinter.

Sweet Chestnuts.

The sweet chestnut is such a valuable timber tree, and bears such well-flavored and valued nuts that it is much sought for by those who desire to plant trees for profit. In Pennsylvania, where the native species is abundant, a good woods of them is looked upon as a valuable possession. Chestnut rails have been used nearly altogether for fencing, and are still put to the same use where wire has not superseded them. As fuel it has hardly an equal, save the oak and hickory. It has a habit of poping when burning, as most farmers of this State know, so that it does not do to burn it when no one is about, for the flying sparks may start a fire on the carpet. The nut of this tree is the best flavored of all the kinds, and there are two others, viz.: The Spanish and Japanese. Both of the two have larger nuts, but of inferior quality, and our native tree, too, makes the fastest and largest growth. It is an upright, straight grower, and a comparatively fast one, and it does not take more than about a dozen years from seed before it begins to bear nuts. After this it will last, for a hundred years or more, in good condition, rarely failing to produce fruit every year. There are trees here of fully this age, and four feet or more in diameter, which still bear large quantities of nuts annually.

The Spanish chestnut makes a large, spreading tree. It makes as large a trunk as the native one, but does not grow nearly so tall, consequently it is never planted for timber hereabouts. It succeeds in Pennsylvania, does well in Kansas generally, and is planted in Missouri. The young seedlings seem a little tender in this State, but after a few years they do not suffer. This occurs only with seedlings from imported seed. When the nuts are home grown, the seedlings are hardy

enough. The nuts of the Spanish are as large again as the native ones, and so find a ready sale in market. It is the old story of large size catching the popular eye in preference to the smaller but sweeter ones. By the one planting for a market this popular demand has to be recognized. Hence, efforts have been made to perpetuate varieties of the Spanish which have proved to be hardy or hardier than common, and we have the Numbo and the Paragon in consequence—two good, hardy varieties of the Spanish, which are now getting common in cultivation. It would be better to set out some of these than of seedlings of the common Spanish unless where the climate is somewhat milder than it is in this State. Were I planting simply for my own use, it would be of our native sort, for certainly the Spanish, large nut as it is, is not nearly of as good a flavor. There is another species, though, that I would want to plant some of, and that is the Japanese. This has large fruit, as large or larger than the Spanish, and perhaps of rather better flavor, while still being inferior to the native sort. But I would plant it for its early bearing qualities. I have seen burrs on seedlings but four years old, and on trees but five to six feet high; it is not at all uncommon to see them. These burrs are not abortive ones, but contain edible nuts. Besides these good qualities in its favor, it has also to its credit the fact that it is but a medium-sized tree when full grown. This enables it to be grown in quite small gardens, where neither of the other two could be attempted. It is my opinion that there is a great future for this chestnut. I have written of its merits several times, and hope some of those who are planting for a market for nuts will be alive to their interests and plant this. Let me add that it is far hardier than the Spanish. Just what part of Japan it occupies I do not know, probably the colder part of it. I have seen thousands of its seedlings raised here from seed sent from Japan. I have never seen one of them the least injured, nor have I yet heard that any of those sent to surrounding states have suffered in the least. As the public desire nuts of a large size and this sort gives them, and gives them quickly, it is the one to plant. Just how large a tree it makes in its native home I do not know, but it is evidently fitted to take its place in gardens which will accommodate the pear or the plum.

There is a fourth species of chestnut known to some persons. The Army of the Potomac knew of it, for the soldiers used to gather the nuts in Maryland and Virginia. It is the Chinquapin, a bushy sort, growing as a shrub, and which produces nuts of a black, shiny color of hull. The kernels are very sweet. It is perfectly hardy and can be grown either as a shrub or in groves in thicket shape. It bears fruit when but three feet in height. JOSEPH MEEHAN, Pennsylvania.

Nut Growing.

The destruction of timber and the pasturing of timber land has put an end to the old-time nutting excursions, as well as the winter fireside pleasure of eating the nuts. Horticultural societies, which are busying themselves with what seems to be weightier matters, appear to have overlooked this important branch of work. Why is it not just as good a thing to have a good nut grove as an orchard or a small fruit or vegetable garden? We know nuts only in their wild state without selection, planting or cultivation, but cultivation would greatly improve them as it has other horticultural products. Walnuts, butternuts, hickory nuts, chestnuts and hazelnuts all have a wide adaptation, and can be grown over a large scope of territory. Hardiness is assured, and in the wild state they grow and produce results without cultivation, but good fruiting is not so assured, nor are results so quick or certain. There is no reason, where land is plenty and largely devoted to field crops, why an acre or two should not be given up to the nut grove, or even several acres. If this subject were urged upon those interested, planting and the general cultivation of nuts would receive a decided impetus. The length of time required to reach the bearing period is the objection which is, at first thought, made to nut growing, but this, as in orcharding, is not so long if the work of planting and culture be properly done, and the cultivation continued until the trees have a sufficient hold on the soil to take care of themselves. The ground needs deep fall plowing and thorough cultivation, and will bear heavy enriching with manure. The nuts should be selected carefully from fresh gathered seed and mixed with ten times their measure of sand, which should be made slightly moist. Put the whole in a box and set away in a cool cellar. They should be placed in shallow trays not more than four inches deep, and should be kept cool and moist until hard freezing takes place, and they should then be taken out and made thoroughly wet and bedded in the ground the depth of the box. Moist trash should then be thrown over the box to keep it from drying out, and when frozen solid it should be covered with litter and kept frozen until spring. Then when the pits open of their own accord and the sprouts begin to start, plant them in holes in the grove plat. This needs marking out both ways four feet apart and then drop several nuts in a hill, tamping them slightly. Large nuts should be planted two or three inches and smaller ones half as deep. In the summer go over the plat and remove all but the

strongest in the hill, and two years after planting raise a mound around each tree. If some manure or trash is placed upon the mound, all the better. Seedling nut trees often freeze out because of lack of this care. The chestnut can be grown over a very large scope of territory. The reason for their failure generally is that too large trees are planted, and as a result they die. Almost any nut tree transplants easily if under two feet high, but they are harder to transplant when they are larger. Quite a number of chestnut groves can now be found throughout the central western states and we think the chestnut should be more widely planted. Careful cultivation for several years until the trees are established is necessary. Little pruning should be done. We like the idea of setting such trees in a series of belts over a field that is intended for use as pasture. This gives room for development and grass, as the trees increase in size, will take the ground, and the trees can both be used as stock shade and for their nut product.

"Brown October."

I wrote some sad verses about "Brown October,"
When into my room she wisked—mad as could be;
Her cheeks red and wrathful—her bright lips demanding,
"Now, pray, is there anything 'brown' about me?"

I sat there aghast, while she fixed her eyes on me—
Her blue, brilliant eyes, from soft mists coldly free,
She shook her long locks (they were yellow as sunshine)
With, "Pray, is there anything 'brown' about me?"

"It might do for March, or for poor washed out April,
And August, I'm sure, is as tanned as can be;
November deserves it—with all his bare branches;
But why should you choose 'Brown October' for me?"

"Just look at my skies; were there ever such blue ones?
See the far-flying gold of that great maple tree!
I've set the whole roadside ablaze with my sumachs—
Pray, where is the 'brownness' you speak of in me?"

"Perhaps," she continued, in accents quite cutting,
"Perhaps 'tis the tender young grass that you see,
Or the fringed purple asters, or rosy-streaked apples
Have fitted the name 'Brown October' to me"

"But there! I've no time to stand wrangling with scribblers;
I've woodbine to tint and the milkweed to free;
But this I will say—if you must scrawl poor verses,
Don't write any more 'Brown October' to me."

She swept from the room, and I followed her, meekly;
The gold leaves were flying as fast as could be;
The rich sumach blushed—and the wind echoed softly,
"Now, pray, is there anything 'brown' about me?"

I cried, "Dear October, forgive my dull blunder;
I'll dip a gold pen in a rainbow-hued sea
To wright your bright name—and if that doesn't soothe you—
Just think how uncommonly brown you've done me!

MARGARET GILMAN GEORGE.

Cut Worms vs. Grasshoppers.

The Agricultural Experiment Station at Morgantown, W. Va., announced that it had made a study of cut worms under glass cases, and found that they turned into grasshoppers. (?) The cut worms were very numerous on account of the scarcity for two years of quails and turkeys, and the station warned the farmers of that region that they would have to contend with a grasshopper pest this season.

Moral—Spare the pretty little quail.

Quails Eat Chinch Bugs.

A farmer relates that a few years ago he shot three quails on his farm. His wife, knowing his fondness for such sport, persuaded him to come to the house and have his supper before going further. "All right," he said, "I'll dress these birds and we'll have them for supper." His wife remarked upon the fullness of the craws of the birds, and on opening one it was found to be packed full of chinch bugs. Out of curiosity they counted, and found over 400 chinch bugs in the craw of one quail. Said the farmer: "I just cleaned up that gun and have not shot a bird since. No farmer should kill any bird that kills bugs."

The Advantage of Birds.

It is admitted by all who know anything of the subject that agriculture would be impossible without the aid of birds, as the larvæ and developed insects of all kinds would make a desert of the entire area of cultivated land. This is a well-known fact, yet all over the world the destruction of birds rages unchecked, and no attempt is made to protect them, to prohibit their public sale and to enable them to nest and rear their young in peace. The boys rob countless nests for their egg collections, and we keep silent.

A scientific writer has said that the destruction of the individual is unimportant, but the destruction of the type is a crime. As matters are going now, unless some stringent measures are taken, the birds of America will in the next century be extinct, as is now the dinoruis. Scientists tell us that already two classes of birds have become entirely extinct and other varieties are fast dying out. The ornitho-

logical societies of France and Switzerland have written here that unless birds be protected in Italy they must perish all over Europe, since so great a variety of races wing their way to the south in winter, and are ruthlessly murdered.

The craze for devouring birds of all kinds is a species of fury from the Alps to Ætna. They crunch the delicate bodies between their jaws with disgusting relish, and a lark represents to them a succulent morsel for the spit or pastry. The trade in larks all over the world is enormous, and it should at once be made penal by heavy fines on the trappers, the venders and the eaters, or ere long no more will the lark be heard in the land.

This has been a hard year for the birds, the cold waves in the South destroying great numbers of them. When that February cold wave went south and sent the thermometer in Georgia to ten degrees below freezing—the lowest record for cold that state has any record of—the birds, southern and northern, were found dead in door-yards and fields in countless numbers, among them many mocking-birds and orioles. The loss of the Florida orange orchards, with the oranges ready for market, though it amounts to many millions of dollars, can sometimes be repaired; but the loss of the birds will be felt throughout the northern country, and is one which it will take many years, perhaps, to make good.

A paper was recently read before the Biological Society of Washington, subject of which was the food of birds. So much has been said about birds being destructive to fruit and vegetation that an investigation of this kind is of the utmost importance. In the stomachs of some of the birds there were thousands of ants. Over six hundred stomachs were examined, and in almost all of them insects formed the greater part of the contents. Ants especially seem to be popular, and in almost every instance the other insects were of harmful sorts. In one of the reports of the agricultural department it is said that each bird has its favorite foods, but when these fail it casts about to find something that can be substituted. A number of scientists suggest that the woodpecker should be encouraged and protected in every possible way, as many circumstances seem to indicate that he would be the very best assistant in getting rid of the grubs that are destroying our elm trees all over the country. Dr. C. Hart Merriam, chief of the division of ornithology of the agricultural department, is authority for the following:

"For several years I have been engaged in examining and analyzing the contents of stomachs of hawks, owls, crows, blackbirds, meadow larks and other birds of North America, which are supposed to be

strikingly beneficial or injurious to the crops of farmers. The stomachs of over 7000 birds, taken at different seasons of the year, have been already analyzed and the contents determined, while some 12,000 are still unexamined. The results in some cases have been remarkable, showing in several notable instances that popular ideas regarding the injurious effects of certain birds were wholly mistaken, and that they have been the victims of an unjust persecution. This has been found to be especially the case with hawks and owls, for the slaughter of which many states give bounties. Pennsylvania in two years gave over $100,000 in hawk and owl bounties. Examination of the stomachs of these birds prove conclusively that 95 per cent of their food was field mice, grasshoppers, crickets, etc., which was infinitely more injurious to farm crops than they." It was found that only five kinds of hawks and owls ever touched poultry, and then only to a very limited extent.

He also says that the crow is not so black as he has been painted by the farmers. The charges against the crow are that he eats corn and destroys the eggs and poultry and wild birds. Examinations of their stomachs showed that they eat noxious insects and other animals, and that although 25 per cent of their food is corn it is mostly waste corn picked up in the fall and winter. With regard to eggs, it was found that the shells were eaten to a very limited extent for the lime. They eat ants, beetles, caterpillars, bugs, flies, etc., which do much damage. In many cases popular ideas are found to be untrue. In case of the king bird, killed by the farmer under the impression that it eats bees it was found he ate only drones and robber flies which themselves feed on bees and which destroy more bees in a day than the king bird does in a year. The cuckoos are also found to be very useful birds in this country. He is not depraved like his European namesake, but a very decent fellow who does much good in the destruction of insects.

Who has not noticed the disappearance of the little birds from our fields and berry bushes since the deadly Bordeaux and other similar mixtures have become so universally used. Surely our little friends are leaving us, and not only they but many of our insect friends that daily feast on the insects that destroy the products of our labor. The diligent and untiring search of these little birds in the trees set me to thinking whether or not we were not poisoning more of our friends than enemies. Sure it is that there is a rapid increase of noxious insects, and the time is already here when the chances for a paying crop hang very largely on the thoroughness with which we spread the deadly poison over the foliage of trees, vines, bushes and plants. Nothing escapes; everything has its enemies. It cannot be denied that the

precious little songsters that so delight us are eating the poisoned insects and picking it up on foliage and bark and are rapidly being sent 'where the good birdies go," and we turn longingly to the chemists and inquire if something cannot be produced that will kill the insects and spare our feathered friends.

Who is prepared to say the clover insects, scale and weevil and a long list of injurious insects once unknown to us, but now so general, are not the direct result of this wholesale distribution of poison? We cannot stop spraying. We have gone too far, and what the birds formerly so gladly and freely did for us (so much better than we can possibly do) we must now do ourselves. In conclusion I will say, at last there has been found a use for that much abused little English sparrow. He is to worm our cabbage in the future.

CARRIE E. HOWELL, Springfield, Mo.

Ornamental Planting.

"At the November meeting of the Summit (O.) county horticultural society, the committee on ornamental planting urged the more general planting of ornamental windbreaks for winter protection from prevailing winds," writes L. B. Pierce in Ohio Farmer. "Evergreens of small size could be purchased cheaply, and they soon grow to be a very striking and beautiful picture in the winter landscape. Very great comfort could be obtained for man and beast by planting groups so they would shut off the prevailing winter winds, which by their evaporating power lowered the temperature of living beings below the actual reading of the thermometer. He had visited a celebrated place near Boston, one raw autumnal day, and seen in the enclosure of arbor vitæ, children playing and nurse girls wheeling children, in perfert comfort, when overcoats were a luxury outside. There was hardly a breath of air in the play-ground with its evergreen protection, and the sun shone in on the clean gravel and green grass, and gave the climate more like Virginia than Boston at that time of year. There were several fine examples of valuable windbreaks in Summit county, and one had but to visit them on a bleak winter day and stand within their protection to be convinced that they were a very valuable improvement to any exposed home. At the Portage county meeting a week later, the same committee called attention to the value of some native trees and shrubs for autumn and winter decoration. We had a number of these with either showy bark or berries, that were at their best after flowers were killed by frost. One of the most beautiful though old-fashioned,

was the snowberry, with its wealth of white berries showy from August until spring. Its near relative, the coal berry, was also valuable, though less showy. Then there was the Wahoo, or burning bush. Its leaves were fiery red in early autumn, and it had a wealth of berries that were quite persistent. The black alder bore loads of scarlet berries that clung to the bushes nearly through December. One of the most beautiful of autumn shrubs or vines was the Staff tree, or bittersweet *(celastus scandens)*. Under cultivation this bore its yellow, showy, berries very profusely and maintained them far into the winter. The white dogwood, generally known as the red willow, was beautiful all winter for its brilliant scarlet bark, and the yellow willow for its equally showy yellow bark. The sycamore, with its white bark, was valuable in some situations, especially if it could be given a background of evergreens. These were all natives, and in northern Ohio could be procured without the outlay of any money."

A Hedge.

For a hedge which will be ornamental as well as capable of proving an obstacle to trespassers, partly thorny plants are used. The Pyrus Japonica, the common purple-leaved, and Japan barberries, and silver thorn are used. All of these, in the hands of skillful persons, can be made so compact that but few persons would care to attempt their passage. As in the case of farm hedges, the greatest care must be used at the start to prune to cause a bushy growth as close to the ground as possible. The Pyrus is a brilliant object in early spring, when full of its bright red flowers. Barberries are well-known shrubs. Their racemes of yellow flowers in spring and red berries in late summer make them much admired. The Japan species is a beauty. Its growth is spreading and dense—just what is required in a hedge plant. The leaves are small, numerous, and turn to a golden yellow color in autumn. In addition to all it bears hundreds of berries of the brightest scarlet which, during the late autumn months, are most beautiful.

Besides these, there are hedges formed of almost any shrub. The sweet briar, Spiræa, Athæa, snowball, Japan privet, buckthorn, weigelia, Deutzia and flowering almond are sometimes used. The Japan privet is an especial favorite, growing fast and bearing large bright green leaves, which do not fall till toward spring.

JOSEPH MEEHAN, Pennsylvania.

Why Not Fruit Trees?

Tell us, if you know any good reason for planting maples, elms and the like, along the roadsides, in place of the practically useful cherries, chestnuts, walnuts, and other fruit trees, especially out in the country where the depredations of fruit-hungry city boys are not much to be feared. Or if one must have forest trees, why not the linden that will after a while enable our bees to gather the choicest honey in abundance?

Fruit in Spain.

When a Spaniard eats a peach or pear by the roadside, wherever he is, he digs a hole in the ground with his foot and covers the seed. Consequently, all over Spain by the roadside and elesewhere, fruit in great abundance tempts the taste, and may be picked and eaten by anybody. This fruit is a great boon to tired and thirsty travelers.—The Garden.

Evergreens For Ornament.

We find the list for this purpose quite an extensive one. In addition to those named for shelter belts, I would particularly mention the arbor vitæs for low ornamental hedge purposes, of which the American justly takes the lead; the spruce, white and blue; the red cedars, Austrian pine, cluster pine and balsam fir, for its compact growth, beautiful color and symmetrical shape. I would place the blue spruce at the head of the list for single specimens in lawn planting. For grouping in parks and large grounds, the pines and Norway spruces are excellent. As a rule those single specimens have to be planted in the sod. If properly done this is all right, but it is a waste of time, effort and money to chuck an evergreen or any other tree, in fact, into a tough sod, where only a small hole has been dug barely large enough to receive the roots. The right way is to cut out a nice true circle, at least four feet across, peel off the sod and replace with nice mellow earth, spading the whole up together thoroughly and deeply, and plant

as before directed, keeping the ground with this circle well cultivated for two or three years and then allowing it to grass over.

Another excellent use for evergreens, especially suburban grounds, is for the screen of unsightly objects, such as out-buildings, and the unsightly back yards of adjacent lots. Here again the spruces are excellent, and should be planted about the same distance apart, as directed, for the shelter belt.

One word of caution to those who are planting in lawns and small grounds, and I will bring my paper on this subject to a close, and that is to carefully take into consideration the ultimate size and spread to which your trees will attain. Do not plant too thickly. A cluttered lawn or yard is an abomination, both unsightly and unwholesome. Few have the courage to take a tree out after they have grown it for years. Plant sparingly, and seek to develop perfect specimens.

W. D. Boynton, Wisconsin.

Vines Near Dwellings.

It is often a difficult task to get vines started which have been planted near dwellings. The plants stand still for a long time in many cases. It is frequently the case that the soil is poor in such locations. Excavations for the cellar have been placed there, often of sand or clay, in which no plant can thrive. This must be made right by digging out a barrowful or two of this rubbish and filling in with good soil. Another, and perhaps a greater reason for this poor growth is that the buildings keep away the rain from certain quarters, causing the soil to become so dry that nothing can grow in it. When this is the trouble it can be remedied to a great extent by procuring vines of some length of stem, that they may be placed some distance away from the wall. Let it be a Virginia creeper, for instance. Get a vine with a stem two feet or more in length. Plant it two feet from the wall, opening a trench from it to the wall in which the shoots are to be laid and covered over with earth. This will bring the point of the vine close to the wall, up which it will soon run. The roots being two feet away from the wall will meet with more moisture than if closer to it, and the shoots which have been carried along under ground will make root in time, pushing along growth fast. In this way, with the roots in good soil, many a vine has been given a good start, which otherwise would have grown but little or have died out completely. It is an excellent plan, and one not often thought of.

The Hardy Blue Chinese Shrubby Verbena.

Now we may tell our friends all we know of this novelty—a novelty, at least, to this country, though known in England and France since 1850. The leaves, which are coarsely serrate and somewhat downy are opposite, and from the axil of each grows a cyme of light blue flowers, each cyme consisting of about 50, about a quarter of an inch in diameter, with five blue stamens (tipped with a blue anther) twice as long as the petals themselves. The lower petals are provided with a hair-like fringe. The leaves are thick, dark green, of an ovate shape and, as we have said, coarsely toothed towards the apex, but entire (smooth) near the stem. When pressed, as one would press the leaves of a "Fish" geranium, they emit an agreeable resinously aromatic odor. The main stem of the plant becomes woody. The lateral stems are perfectly smooth, round and of a purplish color.

The following note was made October 1: "Not until now does this plant show its full beauty, though it has been in bloom for a month. The bushes are now bushes for feathery blue, though we have had frosts that killed corn, tomatoes and the like. The lowest umbels bloom first, but the flowers do not fade until those of the terminal umbel bloom. The flowers of cut stems, we have found, if placed in water, will last for at least two weeks."

When our friends consider that there are few really pretty flowers in bloom so late, the delicate beauty of the shrubby verbena will be more fully appreciated.

Its botanical name is Caryopteris Mastacanthus, the generic name meaning a winged nut, and the specific name moustache. Some authorities say that it is but a half-hardy herbacceous plant.

The Breeding of Plants.

The true method of improving the vegetable kingdom is that pursued by nature—the slow unfolding of one form into another, the carrying forward of the whole body of cultivated forms of any species. There are, probably, few varieties of plants which are habitually grown from seeds which retain their original forms more than a decade. Through the influence of selection and cultivation, the progeny constantly departs from the parent type, although we fancy that we still have the same variety, because we retain the same name for all the

descendants. The ignotum tomato, which Prof. Goff is kind enough to mention, was introduced by me in 1889; but the form which I introduced is probably nowhere in cultivation at the present time; it has passed out by variation into poorer and probably into better forms. Now, the person who centers his attention upon the mere production of new varieties, is likely to forget the importance of the underlying principles and forces which are capable of uplifting the vegetable kingdom. We need a general uplift more than an occasional spasm. We must make more of the varieties which we have, and by doing so, we push forward the pogeny year by year in a gradual and enduring evolution. We may not recognize the progress from year to year, and may not be able to give varietal names as freely as we should like to, but the grand and final result is to be attained thereby. I look upon new varieties as so many new starting points for still further development, not as final or permanent things in themselves.

The fact is, that our eyes are dazzled by the reports of creations in plants as they are by new and startling inventions. But one should be suspicious of the genesis of varieties which are said to have been produced outright by any foresight of the operator. Time will discover the merits of all pretensions; and it will forever enforce the undying principle that the amelioration of the vegetable kingdom is a slow unfolding of the new out of the old, through the simple and quiet agencies which man employs in cultivation and selection.—Garden and Forest.

Chrysanthemum Culture.

One of the pleasing features of the closing evening of the Kansas City chrysanthemum show was an address by Secretary Samuel Murray of the Florists club under whose auspices the show was held. During the address he said: "The cultivation of chrysanthemum, as compared with that of the rose, is of the simplest description, requiring only a rich soil, a sunny or a partially sunny position, and occasional waterings in extreme droughts. To obtain the big flowers the tops of the leading or strongest growths should be removed by pinching, after the shoots have grown four or five inches long, and this should be continued until the end of July, after which the entire plant should be allowed to grow. The flower buds begin to form about the end of August or beginning of September. If it is desirable to have them flower in the house or conservatory they should be dug up carefully about the first of October, and placed in pots according to the size of each plant. For the very largest plants, pots 10 or 12 inches

in diameter are required. The plants should be well drenched with water at once and set in some shady place for a few days, after which they can be exposed to the full sun. They must be protected before the appearance of frost, but should not be subjected to artificial heat, a temperature of 45 to 50 degrees Fahrenheit being quite high enough. Where they are intended to flower out-of-doors it is best either to plant them at first in some sheltered position, or to dig carefully and remove to such a place after the middle of October. Many of the varieties will endure the severest winter weather, provided they are slightly protected. Where plants are already in pots, a simple way of keeping them is to place them in any cool light cellar, a cool pit, or out-house, where the extreme weather is somewhat tempered. They begin to grow again in March.

In the case of outdoor plants, after cutting them down mulch them over with their own cut off tops, some strawy litter or some dry forest leaves, held in place by twigs or litter. This mulching may be removed before spring opens, say about the end of March.

The most interesting part of chrysanthemum culture to the amateur is the raising of seedlings, in which there are surprises, hopes and wonders. The young plants raised from division, side sprouts and cuttings continue to be identical in kind with their parents, but in seedlings we never expect to find anything closer than a family likeness, or any two alike. Indeed, from seed saved from any one plant we may raise flowers of the various classes and all the colors peculiar to the race, and while some may be very good, others may be very inferior.

Firm and healthy short-jointed shoots should be selected for cutting or sports. The cutting should be at least three inches long and cut horizontally with a sharp knife. From these sports the identical variety of the parent plant is produced. The pots to receive the cuttings should be filled with a rather fine mixture of equal parts of sand, leaf mold and loam, well drained, with a thin layer of sand on top. Water thoroughly and then place in the house or frame prepared, where they should be kept close and syringed lightly when dry until rooted, which will be usually indicated by the putting forth of the leaves, when air may be admitted gradually and more water applied. Grafting is performed simply to produce curio plants for public surprise.

Although the chrysanthemum is belittled artistically by the ease of its imitation in hideous paper flowers, it will more and more deserve the title of the "Star-eyed Daughter of the Fall."

Thornless Roses.

Thornlessness in roses is certainly a great point in their favor if such a thing is possible. It has been said that "every rose has a thorn," and while this may be true, or nearly so, there is some modifications to be added to the statement when some roses are taken into consideration. No one dislikes the thorns or prickers on bushes more than I do. None can appreciate their absence any better.

The other day when I picked up a withered rose on my office counter and was severely pricked by it I was prompted to write this article. Some of the best and most beautiful roses grown are very thorny and while they should by no means be discarded or objected to on account of this, we must, however, acknowledge it as a fault. We have been growing a number of choice Hybred perpetual roses on our trial grounds the past several years, and have had ample time and opportunity to note their peculiarities.

The Paul Neyron comes the nearest to being a thornless plant that we have. The canes or stalks, as well as their branches, are very free indeed, from prickers, and the wood is handsome, with a beautiful smooth finish. The leaves are large, clean and glossy, and the flower is perfectly magnificent. It is claimed that this rose is the largest rose in cultivation. Its color is a clear deep rose, and the fragrance is exquisite, and taking into consideration these many valuable points, we see that it is a grand rose; being perfectly hardy and vigorous, it can be safely recommended for general planting, and should be in the collection of every amateur and professional florist.

The beautiful English rose, Mrs. Laing, is very much like the Paul Neyron in this particularity, being free from briers or thorns, producing beautiful pink flowers on long stems in great profusion, continuously through the entire season. This is the purest perpetual rose we have even tried or heard of and pleases all who give it a fair trial.

JNO. M. WISE, Freeport, Ills.

The Corn.

A song of the corn, the sturdy corn, which brightens this land of ours!
Its tender green, in the early spring, is fairer than blossoming flowers;
Its amber silk, with glossy sheen, is fit for a fairy's loom.
And dearer its dimpled, golden ears than the rose of lily's bloom,
For they bear the promise of happy hours to the man who toils for bread,
When he need not fear that his little ones must go to their sleep unfed.
There are lovely flowers in this land of ours, wherever the foot may fall,
The tongue and the ear alike would tire should I try to tell them all,
From the arbutus on Atlantic shores to the poppy's gleams,
As bright as the metal which lies at its roots by Californian streams;
But never a flower such gifts has gained from the sun and dews of morn,
Or stands more fair in the summer air than the blessed, golden corn!

—Ninette M. Lowater, in Youth's Companion.

Growing Hyacinths in Water.

To be successful in the cultivation of hyacinths in glasses during the winter season, it is necessary to commence operations early in October, so as to give the bulbs an opportunity to properly develop their roots before they start into growth; and in order to obtain a continued succession of bloom, it is absolutely necessary to make successive plantings until the desired quality is secured. When the bulbs are procured they should be spread out in a dark, cool situation, and examined occasionally, so that as soon as they begin to throw out roots they can be placed in the glasses. By selecting them in this manner a continued succession of bloom may be enjoyed from January until May. In cultivating hyacinths in glasses the single varieties are mostly used, as they do better than the double varieties.

In purchasing glasses those known as Tyes pattern and those of a dark color are to be preferred. The bulbs should be placed therein as soon as they begin to form roots. In the bottom of each glass put a small piece of charcoal, then fill with rain water, so that it will barely touch the bottom of the bulb when placed on the top. Then remove to a dark, cool cellar—no other place will answer as well—for two or three months, after which they should be gradually brought to the light until they are placed in the lightest situation to be had, and given as much fresh air as possible. When the plants are growing it is advisable to turn them occasionally, and what water is lost by evaporation must be supplied.

The flowers will remain in perfection a long time if the plants are kept free from dust and placed in a cool temperature. As soon as the flowers begin to fade let the whole plant be thrown away, as bulbs

that have been grown and flowered in water are altogether useless for further growth. The twelve best single hyacinths for cultivation in glasses are Mimosa, Grand Gilas, Porcelain, Sceptre, Robert Steiger, Sultan's Favorite, Madame Hodgson, Norma, Madame Talleyrand, Themtocles, Alba Superbissima and Anna Caroline. The best double for the purpose are A la Mode, Bouquet Tendre, Blocksburg, Frederick the Great, Grand Sultan and Marie Louise.

CHARLES E. PARNELL.

Sweet Peas and Golden Rod.

Within the last month so many people have asked me, "How do you manage to grow sweet peas so plentifully?" that a word in the Express may not be out of place. There is no secret about the process that is in the least degree mysterious. Three simple directions will cover all the requisites to complete success. Plant early, not later than the first of March, water abundantly, and, each day, cut every flower that blooms, and you will be much more certain to be bountifully rewarded for your pains than if you were trying to raise potatoes; but don't forget that early planting and constant watering are indispensable. The cutting of the flowers is to prevent the plants from completing the cycle of their lives by maturing seeds. You may thus secure an abundance of the fragrant beauties from June to December, for the old vines endure a good deal of cold without damage, and the young plants, though puny and unpromising, are not injured by ordinary frosts.

For years the sweet pea has been the most popular flower with all classes, and it bids fair to continue in favor indefinitely, perhaps as long as woman continues to love the beautiful. Its cultivation, therefore ought to be increased a hundred fold, and it probably will be, for all who can command a strip of moderately rich soil a foot wide and a nickel to pay for the seed may have hundreds every evening for months.

The golden rod craze which originated with city people who probably saw it native heath once in five years, has nearly died out. From the first the popularity of that showy plant was more owing to the magic of an attractive name and the ignorance of the people who pushed it into notoriety than to any good quality except in good looks; but "all that glitters is not gold," and its three years of glory are gone. Yet soon along every roadside and hedgerow that flaunting beauty will burst into the most intense and gorgeous that nature herself can paint, but its magnificence is the kind that it is the most pru-

dent to worship at a distance. for before blooming it is an unsightly weed, and it is a very ill-smelling one afterward. The darling little sweet pea, however, is so faultless in every particular, is so fragrant and so pretty that you may take it into your room and into your heart without any misgivings. Some one ought to invent a pet name for it that would be as appropriate as Mignonette is to our Reseda Odorata. We have it on the authority of Ian Maclaren that in the Gaelic there are 50 words for darling. Let some Highlander send us a list of them that the prettiest may be given to the sweet pea.—M., in Kimmundy Express.

Sweet Peas.

Enthusiastic admirers of these dainty blossoms have so persistently and widely declared their beauties and merits that sweet peas have already attained to the dignity of a literature of their own, hence anything new upon the subject is not easily presented.

One ardent cultivator of these "new old" flowers rises to a climax by exclaiming, the sweet pea is the "coming flower," while we of less poetic fancy simply pronounce it is here, and here to stay. Not merely in America has its culture grown to be extensive, but England also has equal claims in bringing these blossoms to the front rank in floriculture. Mr. Eckford, a specialist of Shopshire, England, has devoted seventeen years to the improvement and development of this flower, and notwithstanding the rapid strides already made by hybridization toward perfection, it seems that the promise of color, form and substance is unlimited.

Even our cultured Bostonians despise not this plebian flower—quite the contrary, for the annual flower exhibit is never more interesting or better attended than on sweet pea day. To make an exhibit one must present not less than fifty stems each of thirty varieties.

The lathyrus odoratus, or sweet pea, is a native of Sicily, and made its appearance in the floral world in delicate tints of pink and white, quite like the variety known today as the painted lady. Both the garden and botanical names are suggestive of the charming fragrance which is not the least of the virtues of this popular flower. And the delicate grace and simplicity, coupled with its exquisite coloring, ranging from pure white to purple brown, at once gain the admiration of those who discriminate between nature's coarse, gaudier offerings.

It is marked by its climbing habit and its pinnate leaves ending in branching tendrils. The stem is simple and hairy, and produces its flowers two or three together on a long peduncle coming from the side

or end of the stem. The root is tap. Calyx, four to five green tube-shaped sepals. Coralla, many colored, butterfly-shaped, of five dissimilar petals, designated thus: The upper, largest and exterior petal is the "banner;" the two lateral half exterior ones are the "wings;" the two lower interior, often united at the margin, are the "keel." Pistil, one, single, and ovary one celled. Stamens numerous. Fruit, a pod containing from two to four seeds, nearly black.

As with all other plants, the first thing to be considered is location, soil and its preparation. If possible, choose a sunny situation with the rows running north and south, thus giving them the advantage of the morning and afternoon sunshine, yet avoiding some of the mid-day heat. All authorities agree that the proper soil for this plant is a loamy or clayey one. Begin by digging a trench 12 to 15 inches deep and about 12 inches wide—wide enough for a double row of seed—and pack in the bottom some well-rotted stable manure and a quantity of wood ashes. There should be about five or six inches of this rich compost. It is a vital importance that only well-rotted manure should be used, as sweet peas cannot thrive with any heating or fermenting matter near them. The potash supplied from the wood ashes will produce strong woody vines and stems.

Drop the seed thinly in the double row, allowing for a percentage of failure—two or three inches is about right after they are up. At first cover the seed with the soil only one inch deep. If the weather is freezing, a little deeper. Fill in little by little as they grow, but avoid covering the crowns. As the pea vine is best and strongest when germinated slowly and in a low temperature, the time to plant the seed is when the blue bird warbles the first measure of his song. This will be about the first of April. Autumn is said to be the best time for preparing the trench. Since slow germination is one of the secrets of success, it is a bad plan to soak the seed before planting. In the case of a very dry spring this can be done.

Careful attention must be paid to strong bushing. Some prefer brush like that commonly used for the garden peas, although that has a rather untidy, ragged appearance. A neater and quite as secure way is to get a 6-foot chicken wire and extend it from stout posts at either end of the row. Allow plenty of room for spreading.

The enemies of the sweet pea are few. In the early stages of growth it is necessary to keep careful watch for the cut worms. There is another mysterious foe which sometimes attacks and shrivels the stems here and there. Neither the cause nor remedy for this blight are clearly known.

After a good growth is begun they need an abundance of water applied to the roots. Bone flour is said to have a good effect upon the blossoms. When hot weather approaches it is wise to protect the roots by covering them with lawn rakings. If one wishes an abundance of continuous bloom no pods must be allowed to form. Cut the blossoms every day, and lo! a veritable widow's cruise for inexhaustibility.

The rules for the hot-house culture are not generally known, but the city florist who it successful in this line is generously rewarded, for the blossoms at Eastertide brings one dollar and fifty cents per dozen stems. One winter "your humble writer" experimented with growing them in a bow-window just off the sitting room. Instead of the floral beauties fondly anticipated a rank growth of vines was the result.

The varieties commonly grown are the Adonis, rosy pink; Blanch Ferry, pink and white; Boreatton, dark wine color; Cardinal, intense crimson scarlet; Queen of England, pure white; Mrs. Gladstone, soft pink, and Primrose, pale yellow.

MISS CROWLEY, Greene county.

The Strange Beauty of Orchids.

Collecting orchids is an especially interesting branch of floriculture. The orchid has a weird beauty all its own. Its strange shape, its fantastic method of growth (clinging to the rock on lofty mountain sides, and to the branches of trees in tropical countries), the fact that it is gathered in these countries often at great risk of life—these circumstances serve to enhance the interest that orchids would awaken of themselves, even if they were not difficult to procure. Then, too, orchids are not difficult to cultivate, a cool house answering the requirments of temperature—as they mostly come from the mountain lands of the tropics, and watering and cleaning being all they need in the way of care. Moreover, as above stated, it is an easy matter to have bloom all the year round with orchids. This is due to the great number of varieties and the long-flowering period of some varieties, the flowers on *Cattleya trianæ* and *Cypripedium insigne*, for instance, lasting through the autumn and winter, so that with only these two varieties bloom could be maintained throughout these seasons. And such bloom! No one who has ever seen a group of flowering Cattleyas can ever forget them. They are in appearance the most superb of all orchids.

The flower is not infrequently half a foot in diameter. Petals and sepals hang with a languid grace that is simply entrancing. The color in a single flower will shade off from a soft pink to a delicate creamy flesh tint, like the lining of a seashell, while in the lip there is a spot of gorgeous royal purple. They are the planets among the constellation of orchids—fairly glowing out from the deep shadows of their fronds, as if some of the hues of the sunset had taken shape and floated down to earth. Notably beautiful among Cattleyas are the fleecy white Albinos (the collector prides himself on these, as they are very rare, and are therefore more highly valued, a point holding good with all groups of orchids), and the *Cattleya speciossisdima,* the purple in whose lips is either mottled or streaked with white, and framed with a pure rich yellow. The *Cypripedium insigne*, which also blooms during autumn and winter, is a yellow flower with large brown spots, a quiet contrast to the elegance of the Cattleyas. Similar contrasts can be effected during any season of the year. It is an easy matter to vary plants of gorgeous bloom with those which with their subdued colors seem to love dusk and shadow. No other genus of flower can approach orchids in their combination of the riceest with the most delicate hues.

J. R. PITCHER, in Orange Judd Farmer.

INDEX.