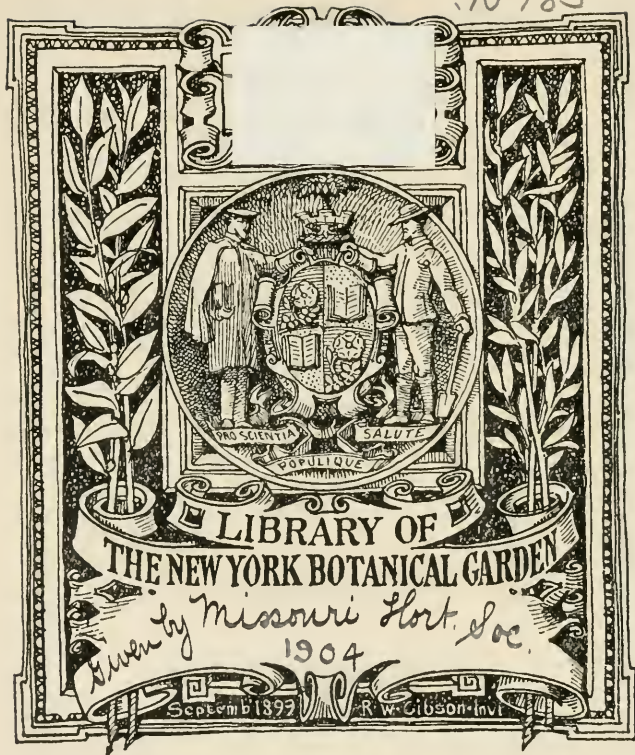
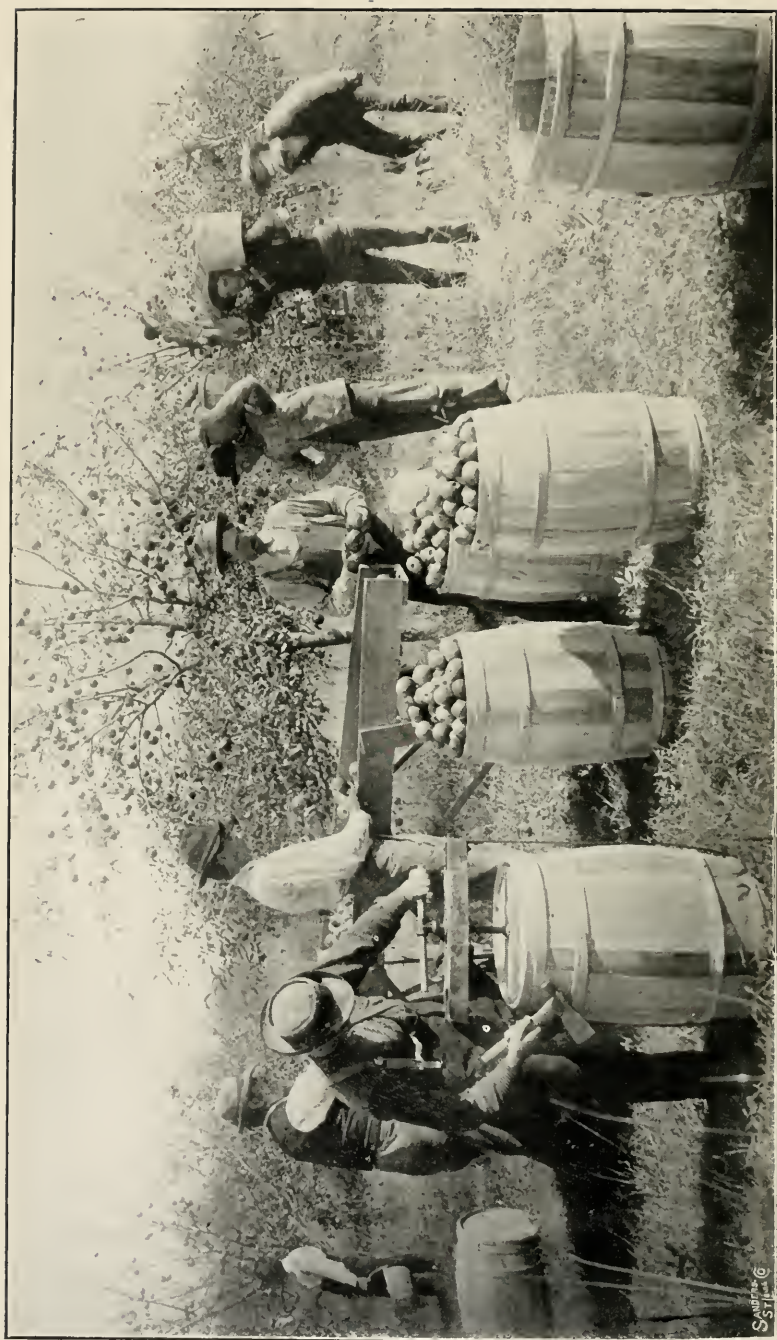


XA
N785





Barrelling apples in orchard. A. T. Nelson, Lebanon, Mo.

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FORTY-SIXTH ANNUAL REPORT

OF THE

State Horticultural Society
OF MISSOURI.

ORGANIZED 1859, INCORPORATED 1893.

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MEETINGS AT PERTLE SPRINGS, JUNE 3, 4, 5,
COLUMBIA, DECEMBER 8, 9, 10, 1903.

L. A. GOODMAN, Secretary,
KANSAS CITY, MO.



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



XA
N 785
v. 46
1903

MISSOURI STATE HORTICULTURAL SOCIETY.

To His Excellency, A. M. Dockery, Governor :

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 1903, is respectfully submitted.

L. A. GOODMAN, Secretary,
Kansas City, Mo.

City of Jefferson, January 12, 1904.

To the Commissioners of Public Printing :

I require for the use of my office five thousand copies of Missouri State Horticultural Society Report for 1903—three thousand to be bound in cloth and two thousand to be bound in paper—which I desire as per accompanying sample.

Respectfully,

L. A. GOODMAN, Secretary,
Kansas City, Mo.

Approved :

SAM B. COOK, Secretary of State.

ALBERT O. ALLEN, State Auditor.

R. P. WILLIAMS, State Treasurer.

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OFFICERS FOR THE YEAR 1903.

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L. A. GOODMAN, Secretary.....	Kansas City
W. G. GANO, Treasurer.....	Parkville
C. W. MURTFELDT, Third Vice-President for Life.....	Kirkwood

LIST OF HONORARY LIFE MEMBERS.

R. H. JESSE, President State University.....	Columbia
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PROF. J. T. STINSON.....	St. Louis
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M. L. GOODMAN.....	Kansas City
C. M. WILD.....	Sarcozie

LIFE MEMBERS.

[By virtue of resolution passed June 9th, 1902. See page 88.]

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C. CULP	Hannibal
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J. H. MARION	Fulton
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WM. McCRAY	Cowgill
J. E. MAY	LaPlata
J. N. MENIFEE	Oregon
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G. T. ODOR	Holt
E. A. PATTERSON	Kirksville
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H. R. WAYMAN	Princeton
J. B. WILD & BRO.	Sareoxie
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A. L. ZIMMERMAN	Weatherby

LIST OF MEMBERS.

G. A. AtwoodSpringfield
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 Anderson Tully Co.,.....Memphis, Tenn.
 B. C. AutenCarthage, Mo.

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 F. J. Buente.....Morrison
 A. G. Bonham.....King City
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 W. H. Benedict.....Richards
 Jos. Baumgartner.....Columbia
 Mrs. Jos. Baumgartner.....Columbia
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 Thos. Bolander.....Chillicothe
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 J. N. Brink.....Parkville
 J. E. Balmeyer.....McBaine
 C. E. Benson.....Columbia
 S. P. Bailey.....Versailles
 N. E. Barnes.....Vinland
 Th. E. Beazley.....Columbia
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P. V. Carey.....Marble Hill
 H. W. Cook.....Potosi
 F. W. Closs.....Allenton
 W. G. Campbell.....St. Joseph
 C. J. Croniger.....Vinita, Ind. Ter.
 A. Chandler.....Randolph
 M. B. Collins.....Glasgow
 M. O. Cole.....Springfield
 T. M. Culver.....Koshkonong
 C. F. Christensen.....Bells, Texas
 T. W. Choisser.....Bourbon

L. V. Dix.....Jefferson City
 C. H. Dutcher.....Warrensburg
 F. W. Dixon.....Holton, Kas.
 R. M. Davis.....Bismarck
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 B. H. Dunall.....Welch, Ind. Ter.
 J. A. Durkes.....Weston

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 R. H. Edwards.....Petree City
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6 Howard Row, Memphis, Tenn.
 Emory Estes.....Rolla
 Wm. Eckert.....Parkville
 J. D. Edwards.....Fairville
 J. Y. Elliott.....Rushville

Robt. Florsythe.....Farmington
 W. T. Flournoy.....Marionville
 Frank Fourt.....Fairfield

H. B. Francis.....Mulberry
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 J. L. Ferguson.....Warrensburg
 Theo. Funk.....Warrensburg
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 Jas. H. Foster.....Sarcoxie
 Prof. M. C. Finley.....Parkville

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 R. F. George.....Peirce City
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 W. D. Gibson.....Dixon
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 F. O. Gustafson.....Sarcoxie
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 T. Godfrey.....Eldon
 C. B. Green.....1196 East 5th, Sedalla

D. S. Helvern.....Mammoth Springs, Ark.
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 A. Hentoich.....Bismarck
 W. S. Huston.....Marshall
 Fred Howe.....Pacific
 J. S. Harmon.....Weston
 T. P. Halsey.....St. Joseph
 F. Horsfall.....Mt. Grove
 W. L. Howard.....Columbia
 Jas. Harmon.....Kearney
 C. W. Halliburton.....Moberly
 S. A. Hoover.....Warrensburg
 J. A. Hamerick.....Warrensburg
 L. T. Hoover.....Conklyn
 L. O. Howell.....Chillicothe
 S. A. Hazeltine.....Springfield
 Earl B. Hopkins.....Springfield
 S. J. Hickerson.....Louisiana
 G. L. Holsinger.....Rosedale, Kas.
 C. V. Holsinger.....Rosedale, Kas.
 W. T. Hawkins.....Stafford
 W. W. Higgins.....Parkville
 J. R. Helfrich.....Eldon
 J. E. Hitchcock.....Oberlin, Ohio
 V. M. Hampton.....Centralla
 Jack Horner.....Ashley
 L. J. Hartman.....F. D. No. 3, St. Joseph
 G. S. Homan.....Easton

W. A. Irvine.....Springfield
 J. M. Irvine.....St. Joseph

J. H. Jenkins.....Sapp
 H. W. Jenkins.....Plattsburg
 E. C. Jenkins.....Troy
 H. H. Johnson.....Parkville
 F. L. Johnson.....Parkville
 J. H. G. Jenkins.....Spring Garden

Wm. Kiehl.....Potosi
 Ed. Kemper.....Hermann
 T. H. King.....Springfield

LIST OF MEMBERS—Continued.

- J. H. Karnes.....St. Joseph
W. P. Keith.....Mayview
R. T. Kingsbury.....Estill
J. R. Kelly.....Warrensburg
R. F. Kincaid.....Blackwater
Wm. Kinling.....Highlandville
E. S. Katherman.....Warrensburg
C. H. Knighton.....Parkville
Philip Kalemán.....Parkville
- E. H. Leggett.....
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B. Logan.....Logan, Mo.
Danl. Lowmiller.....Parkville
W. H. Litson.....Nevada
Alonzo Lewis.....Sapp
J. D. Lyle.....Warrensburg
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J. H. Murray.....Oregon
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D. McNalle.....Sarcoxie
A. B. Mathews.....Mayview
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H. B. McAfee.....Parkville
W. T. Maddox.....Waverly
G. R. Murray.....Parkville
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Robt. Montgomery.....Oregon
F. M. Merritt.....Pilot Grove
- J. E. Newton.....Warrersburg
Albert Newhouse.....Smithville
W. M. Norwood.....Rhea, Ark.
W. C. Nash.....Springfield
A. T. Nelson.....Lebanon
O. F. Neal.....Hannibal
- C. H. Ogden.....Warrensburg
Chas. O. Ozias.....Warrensburg
J. A. Orr.....Mt. Vernon
John Osborne.....Sarcoxie
Albert Owen.....Warrensburg
W. H. Otto.....New Haven
- T. R. Peyton.....Mexico
H. H. Park.....Springfield
H. M. Page.....Breckenridge
W. A. Patton.....Jane
N. H. Perkins.....Quincy, Ill.
Millard Parker.....Warrensburg
Harvey E. Patton.....Nichols
H. C. Porter.....Fayetteville, Ark.
Ed. Picquet.....Dixon
Emma Piercon.....Lockwood
- G. Raupp.....Monett
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August Reese.....2516 N. 14th, St. Louis
D. W. Reid.....Slater
O. C. Roby.....Rocheport
Ezra Roop.....Warrensburg
M. L. Reynolds.....Nichols
Homer Reed.....Louisiana
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W. Riehl.....Potosi
J. H. Ruddick.....Bourbon
Mrs. Laura B. Robnett.....Columbia
H. C. Richardson.....Neosho
- G. A. Smith.....Chillicothe
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P. K. Sylvester.....Sunlight
A. V. Schermerhorn.....Kinmundy, Ill.
J. W. Stanton.....Richview, Ill.
G. L. Sessen.....West Plains
Chas. W. Steiman.....Dalton
H. Schnell.....Glasgow
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J. T. Snodgrass.....
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B. F. Stuart.....Rushville
B. L. Seawell.....Warrensburg
J. Ovid Stark.....Stark
J. L. Scott.....Gravel Point
W. H. Strong.....Seligman
E. E. Smith.....4029 McGee, K. C., Mo.
N. J. Shepherd.....Eldon
A. G. Samuel.....St. Joseph
J. P. Sinnock.....Moberly
Andrew Strumm.....Brunswick
Zeno Stocks.....Columbia
O. H. Treadway.....Paynesville
S. Y. Thornton.....Blackwater
Geo. S. Townsend.....Troy
J. W. Tippin.....Nichols
T. H. Todd.....New Franklin
D. A. Turner.....South St. Joseph
J. M. Titus.....Coffeyville, Kas.
Geo. E. Tippie.....Lee's Summit
J. A. Taylor.....Wynewood, Ind. Ter.
J. N. Todd.....Fulton
B. B. Thurman.....Auxvasse
- P. A. Van Vranken.....
.....Grain Valley, R. D. 21
H. Earnest Vaughn.....Lockwood
A. Van Buskirk.....Oregon
W. H. Vaughn.....Marshall
B. van Herff.....
.....93 Nassau St., New York, N. Y.
- C. W. Wilmeroth.....Chicago, Ill.
Carl Wallace.....Jackson
E. J. Winter.....Mexico
Henry Wallis.....Wellston
C. H. Wittenback.....Morrison
John Ware.....Wappapello
J. M. Withoil.....Nichols
C. R. Woodson.....St. Joseph
S. R. Walker.....Liberty
H. Waterman.....Nichols
W. H. Watts.....Glasgow
L. C. Wilson.....Station D. St., St. Joseph
W. J. Wilson.....St. Joseph
A. C. Woolfolk.....Troy
K. B. Wilkerson.....Mexico
H. J. Waters.....Columbia
G. W. Williams.....Humansville
Roy Withoil.....Nichols
Robt. E. Williams.....Louisiana
S. D. Williamson.....Miller

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J. B. Wagner.....	Sarcoxie	T. C. Wilson.....	Hannibal
W. S. Wade.....	Springfield	L. A. Willis.....	
Arthur O. Wild.....	Sarcoxie403 15th Ave, Milwaukee, Wis.	
Frank H. Wild.....	Sarcoxie	C. M. Williams	Laclede
G. H. Wilds	Sarcoxie		
Wm. H. Woods.....	Sarcoxie	C. T. Zeitinger.....	Zeitonia
Chas. Wilson	Sarcoxie	W. T. Zink.....	Nichols
S. A. Waters	Nadine	A. W. Zimmerman.....	Amazonia

LIST OF COUNTY SOCIETIES.

- Adair County Horticultural Society—
R. M. Brasher, president, Kirksville.
A. Patterson, secretary, Kirksville.
- Audrain County Horticultural Society—
M. B. Guthrie, president, Mexico.
K. B. Wilgerson, vice-president, Mexico.
R. A. Ramsey, secretary, Mexico.
W. G. Hutton, ass't secretary, Mexico.
Wm. Eagan, ass't secretary, Mexico.
W. M. Pearson, treasurer, Mexico.
- Barry County Horticultural Society—
W. W. Witt, president, Exeter.
E. B. Utter, vice-president, Butterfield.
G. G. James, secretary, Hailey.
J. C. Crane, treasurer, Exeter.
- Barton County Horticultural Society—
B. D. Hayes, secretary, Lamar.
- Billings Fruit Growers' Association—
J. W. Washam, president, Billings.
Wm. Watkinson, vice-president, Billings.
C. E. Purdy, secretary, Billings.
H. H. Stone, treasurer, Billings.
Members, 25.
- Birch Tree Fruit Growers' Association,
Shannon County—
V. H. Kirkendal, president, Birch Tree.
F. Anderson, secretary, Birch Tree.
- Bismarck Fruit Growers' Association, St.
Francois County—
C. J. Tullock, president, Bismarck.
M. H. Dowling, secretary, Bismarck.
- Boone County Horticultural Society—
D. A. Robnett, president, Columbia.
D. M. Hulen, vice-president, Hallsville.
Jas. Baumgartner, secretary, Columbia.
Samu'l Baker, treasurer, Columbia.
Members, 46.
- Butterfield Local, Barry County—
Morris Bayless, vice-president, Butterfield.
I. R. Crane, secretary, Butterfield.
G. D. Bethune, treasurer, Butterfield.
Members, 12.
- Benton County (Ark.) Horticultural Society—
C. J. Eld, president, Bentonville.
I. Henthorn, vice-president, Bentonville.
I. B. Lawton, secretary, Bentonville.
L. H. McGill, treasurer, Bentonville.
Members, 60.
- Callaway County Horticultural Society—
D. M. Dunlap, president, Fulton.
R. E. Bailey, secretary, Fulton.
- Central Missouri Horticultural Association—
A. Tuttle, president, Boonville.
Dr. Chas. Dawie, 1st vice-president,
Boonville.
- Mrs. Jas. Gault, 2nd vice-president,
Boonville.
Hugh Roberts, secretary, Boonville.
W. A. Smiley, treasurer, Boonville.
Members, 20.
- Clay County Horticultural Society—
F. M. Williams, president, Gashland.
F. P. Chedister, secretary, Linden.
- Berry Growers' Association—
J. I. Sparks, president, Gashland.
- Conway Horticultural Society,aclede
County—
W. H. Getty, president, Conway.
R. O. Hardy, secretary, Conway.
- Cole County Horticultural Society—
W. A. Maddox, president, Jefferson City.
Henry Hentges, vice-president, Scruggs
Station.
A. J. Davis, Secretary, Jefferson City.
C. A. Dix, treasurer, Jefferson City.
Members, 20.
- Everton (Dade County) Fruit Growers'
Association—
J. E. Gyles, president, Everton.
L. L. Gibson, vice-president, Everton.
W. S. Wilson, secretary, Everton.
Members, 23.
- Exeter Berry Growers, Barry County—
T. G. Johnson, president, Exeter.
K. Armstrong, vice-president, Exeter.
J. Armstrong, secretary, Exeter.
Jess Talbert, treasurer, Exeter.
- Gandy Berry Growers' Association—
J. P. Boyd, president, Sarcouxie.
J. McMahon, vice-president, Sarcouxie.
H. H. Bean, secretary, Sarcouxie.
Joc Dodson, treasurer, Sarcouxie.
Members, 100.
- The Grafters—
E. H. Favor, president, Columbia.
J. B. Hill, vice-president, Columbia.
J. Lee Hewitt, secretary, Columbia.
Members, 17.
- Greene County Horticultural Society—
Theodore H. King, president.
George A. Atwood, vice-president.
Earl B. Hopkins, secretary.
H. H. Park, treasurer.
- Henry County Horticultural Society—
M. L. Bonham, president, Clinton.
M. G. Conden, vice-president, Clinton.
J. M. Prezinger, secretary, Clinton.
H. T. Burris, treasurer, Clinton.
- Holt County Horticultural Society—
N. F. Murray, president, Oregon.
J. N. Menitee, vice-president, Oregon.
Wm. Kaucher, secretary and treasurer,
Oregon.

LIST OF COUNTY SOCIETIES—Continued.

- Koshkonong Horticultural Society—**
T. M. Culver, president, Koshkonong.
C. M. Alderson, secretary, Koshkonong.
H. C. Huxley, treasurer, Thayer.
- Laclede County Horticultural Society—**
Phil Donnelly, president, Lebanon.
W. R. McIlvane, vice-pres., Lebanon.
B. H. Cowgill, secretary, Lebanon.
M. W. Serl, treasurer, Lebanon.
Members, 50.
- Logan Fruit Growers' Association—**
Prof. A. Stark, president, Logan.
G. N. Boyd, vice-president, Logan.
B. Logan, secretary, Logan.
N. Beckner, treasurer, Logan.
Members, 65.
- Leasbury Fruit Growers' Association (Crawford County)—**
H. N. Lyon, president, Leasbury.
C. P. Lindsey, vice-president, Leasbury.
J. L. Fulton, secretary, Leasbury.
- Lincoln County Horticultural Society—**
A. H. Kercheval, president, Elsberry.
T. O. Mayes, vice-president, New Hope.
B. C. Benedict, secretary, Moscow Mills.
C. F. Wallace, treasurer, Brussels.
- Linn County Horticultural Society—**
A. P. Swau, president, Marceline.
I. D. Porter, vice-president, Marceline.
H. Long, secretary, Marceline.
J. W. Porter, treasurer, Marceline.
- Livingston County Horticultural Society—**
F. K. Thompson, Chillicothe.
D. A. French, Chillicothe.
J. T. Jackson, secretary, Chillicothe.
J. W. Bird, treasurer, Chillicothe.
Members, 59.
- Madison County Horticultural Society—**
A. A. Blumer, president, Fredericktown.
H. M. Whitner, sec'y, Fredericktown.
- Meramec Horticultural Ass'n, Crawford County—**
E. R. Bowen, president, Steelville.
Jas. T. Marsh, secretary, Steelville.
C. D. Norval, treasurer, Steelville.
- Mercer County Horticultural Society—**
Martin Read, president, Princeton.
J. F. Stanley, vice-president, Princeton.
H. S. Wayman, secretary, Alvord.
John Gearhart, treasurer, Princeton.
Members, 60.
- Miller County Horticultural Society—**
J. R. Helfrich, president, Eldon.
T. G. Henley, vice-president, Spring Garden.
N. J. Shepherd, secretary, Eldon.
Henry Phillips, treasurer, Eldon.
Members, 18.
- Missouri-Arkansas Horticultural Society—**
D. S. Helvern, pres., Mammoth Springs, Ark.
P. B. P. Hynson, secretary, Mammoth Springs, Ark.
- Missouri State University Agricultural Club—**
L. W. Thieman, president, Aullville.
- C. H. Hechler, vice-pres., Dalton.
J. Lee Ilwitt, secretary, Columbia.
J. C. Foulds, treasurer, Columbia.
Members, 26.
- Missouri Valley Horticultural Society—**
Geo. W. Holsinger, president, Argentine, Kas.
Howard B. McAfee, vice-president, Parkville, Mo.
Mrs. H. E. Chandler, secretary, Argentine, Kas.
G. F. Espenlaub, treasurer, Rosedale, Kas.
Members, 40.
- Monett Local—Barry County—**
R. D. Creed, president, Monett.
E. O. Snyder, vice-president, Monett.
Geo. Raupp, secretary, Monett.
L. C. Ferguson, treasurer, Monett.
- Monteer Horticultural Society—**
C. F. Adams, president, Monteer.
R. Boram, treasurer, Monteer.
- Mayview (Lafayette County) Horticultural Society—**
Edw. S. Rutt, president, Mayview.
J. W. Gladish, vice-president, Higginsville.
G. H. Robius, secretary, Mayview.
Members, 28.
- Mt. Vernon Fruit Growers' Association—Lawrence County—**
R. C. Sedwick, president, Mt. Vernon.
A. Wont, vice-president, Mt. Vernon.
W. E. Hickman, secretary, Mt. Vernon.
Geo. A. McCause, treas., Mt. Vernon.
Members, 25.
- Neosho Fruit Growers' and Shippers Association—Newton County—**
R. P. Liles, president, Neosho.
M. F. Thomas, vice-president, Neosho.
J. H. Richardson, secretary, Neosho.
W. H. L. Stewart, treasurer, Neosho.
F. H. Speakman, business mgr., Neosho.
Members, 15.
- Nevada Fruit Growers' Association—**
S. V. Mitchem, president, Nevada.
J. S. McClenney, vice-president, Nevada.
W. H. Litson, secretary, Nevada.
J. N. Shipley, treasurer, Nevada.
Members, 20.
- Norwood Horticultural Society—**
J. W. Hollenbeck, president, Norwood.
J. E. Hart, vice-president, Norwood.
W. S. Calhoun, secretary, Norwood.
Dan. Twohig, treasurer, Norwood.
Members, 30.
- Ozark Fruit Growers' Association—**
G. A. Atwood, secretary, Springfield.
- Pettis County Fruit and Dairy Club—**
Ed Brown, president, Sedalia.
Chas. H. Green, vice-president, Sedalia.
G. B. Lamm, secretary, Sedalia.
Earnest Thompson, treasurer, Sedalia.
Members, 20.
- Peirce City Fruit Growers' Association—**
W. F. Brendlinger, pres., Peirce City.
C. O. Grimes, vice-pres., Peirce City.

LIST OF COUNTY SOCIETIES—Continued.

- R. F. George, secretary, Peirce City.
W. A. Rhea, treasurer, Peirce City.
Members, 116.
- Phelps County Horticultural Society—
Robert Merriwether, president, Rolla.
Albert Newman, secretary, Rolla.
- Polk County Horticultural and Agricultural Association—
G. W. Williams, president, Humansville.
G. M. Briggs, secretary, Humansville.
A. H. Schofield, treasurer, Humansville.
- Polk County (Ark.) Horticultural Society—
A. W. St. John, president, Mena, Ark.
F. S. Poster, secretary, Mena, Ark.
G. S. Graham, treasurer, Dallas, Ark.
Members, 50.
- Richland (Pulaski County) Fruit Growers' Association—
John C. Evans, president, Richland.
W. W. Hillhouse, vice-president, Stoutland.
H. W. Rausch, secretary, Richland.
L. C. McCully, treasurer, Richland.
Members, 25.
- Purdy (Barry County) Horticultural Society—
U. S. Lane, president, Purdy.
H. W. Marshall, vice-president, Purdy.
C. M. Bennett, secretary, Purdy.
M. Roller, treasurer, Purdy.
Members, 65.
- Randolph County Horticultural Society—
B. R. Boucher, president, Cairo.
G. N. Ratliff, secretary, Moberly.
J. W. Dorsey, treasurer, Moberly.
Members, 48.
- Ray County Horticultural Society—
A. Maitland, president, Richmond.
G. A. Stone, vice-president, Richmond.
R. Williams, secretary, Richmond.
Members, 20.
- Republic Horticultural Society, Greene County—
J. E. Davis, president, Republic.
Dr. E. L. Beal, secretary and treasurer, Republic.
Members, 40.
- Ripley County Horticultural Society—
J. G. Hancock, president, Doniphan.
S. S. Hancock, secretary, Doniphan.
- Saline County Horticultural Society—
W. S. Huston, president, Marshall.
W. C. Gower, vice-president, Marshall.
Thos. Adams, secretary, Marshall.
Members, 9.
- St. Francois County Agricultural Association—
P. V. Ashburn, president, Farmington.
J. B. Highley, vice-president, Farmington.
Maurice Highley, secretary, Farmington.
J. R. Pratt, treasurer, Farmington.
Members, 23.
- St. Joseph (Buchanan County) Horticultural and Agricultural Society—
W. D. Maxwell, president, St. Joseph.
R. E. Lee Utz, vice-president, South St. Joseph.
Jas. M. Irvine, secretary, St. Joseph.
Robt. Onstot, treasurer, South St. Joseph.
Members, 45.
- St. Louis County Horticultural Society—
H. Meyer, president, Bridgeton.
Geo. Wiegand, vice-president, Bridgeton.
E. W. Terry, secretary, Bridgeton.
B. J. Koenig, treasurer, Normandy.
Members, 17.
- Sarcoxie Horticultural Association—
Henry Foster, president, Sarcoxie.
J. F. Wagner, vice-president, Sarcoxie.
J. C. Reynolds, trustee, Sarcoxie.
Andy Seneker, trustee, Sarcoxie.
- St. Charles County Horticultural Society—
Dr. J. E. Edwards, president, O'Fallon.
Jacob Schaeffer, vice-president, O'Fallon.
Tony Moser, secretary, O'Fallon.
J. S. Keithly, treasurer, O'Fallon.
- Seymour Fruit Growers' Association—
Webster County—
T. C. Love, president, Seymour.
G. L. Childress, vice-pres., Seymour.
L. S. Witmer, rec., secretary, Seymour.
F. A. Williams, cor. secretary, Seymour.
T. J. Smith, treasurer, Seymour.
Members, 38.
- South Missouri Fruit Growers' Association, Howell County—
Geo. Comley, president, Willow Springs.
J. Lovewell, secretary, Willow Springs.
- South Missouri Horticultural Association, Howell County—
D. J. Nichols, president, West Plains.
J. W. Hitt, vice-president, West Plains.
- Stoutland (Camden County) Fruit Growers' Society—
J. W. Burhans, president, Stoutland.
Henry Evans, vice-president, Stoutland.
Janie W. Burhaus, secretary, Stoutland.
P. C. Kennedy, treasurer, Stoutland.
Members, 41.
- Vernon County Fruit Growers' Association—
S. V. Mitchem, president, Nevada.
F. C. Huston, vice-president, Nevada.
W. H. Litson, Jr., secretary, Nevada.
I. N. Shipley, treasurer, Nevada.
- Washburn Local—Barry County—
P. R. Moffatt, president, Washburn.
John Hoog, vice-president, Washburn.
W. B. Adock, secretary, Washburn.
G. K. Hurd, treasurer, Washburn.
Members, 50.
- Willow Springs (Howell County) Horticultural Society.
W. H. Thomas, president, Willow Springs.

LIST OF COUNTY SOCIETIES—Continued.

G. H. Johnson, vice-president, Willow Springs.	Wm. Howell, treas., Wappapello.
E. Brown, secretary, Willow Springs.	Members, 25.
Members, 60.	
Wayne County Horticultural Society—	Wright County Horticultural Society—
Chris. Richman, pres., Lowndes.	Frank Horsfall, president, Mt. Grove.
Jas. Wilson, vice-pres., Wappapello.	R. R. Titus, vice-president, Mt. Grove.
John Ware, secretary, Wappapello.	L. M. Reese, secretary, Mt. Grove.
	John Thielman, treasurer, Mt. Grove.

STANDING COMMITTEES.

Orchards.

M. BUTTERFIELD, Farmington. W. T. FLOURNOY, Marionville.
N. F. MURRAY, Oregon.

Vineyards.

M. OLIVER COLE, Springfield. ED KEMPER, Hermann. RALPH BUSH, Bushberg

Small Fruits.

F. V. CAREY, Marble Hill. HENRY SCINELL, Glasgow. B. LOGAN, Logan, Mo

Stone Fruits

G. L. SESSEN, West Plains. J. H. KARNES, St. Joseph. HENRY WILD, Sarcoxie.

Vegetables.

J. E. MAY, Wilson. J. K. SAUNDERS, Peirce City. J. P. SINNOCK, Moberly.

Flowers.

Mrs. G. E. DUGAN, Sedalia. E. L. MASON, Trenton. W. L. HOWARD, Columbia.

Ornamentals.

PROF. H. C. IRISH, St. Louis. R. E. BAILEY, Fulton. H. S. WAYMAN, Alvord.

Entomology.

MISS M. E. MURTFELDT, Kirkwood. PROF. J. M. STEDMAN, Columbia.

Botany.

B. F. BUSH, Independence. GEO. R. RAUPP, Monett. H. W. JENKINS, Plattsburg

Nomenclature.

J. C. EVANS, Harlem. W. G. GANO, Parkville. J. T. STINSON, St. Louis.

New Fruits.

C. H. DUTCHER, Warrensburg. K. B. WILKERSON, Mexico.
R. J. BAGBY, New Haven.

Ornithology.

G. WIDMAN, Old Orchard. A. H. GILKESON, Warrensburg.
C. W. MURTFELDT, Kirkwood.

Injurious Fungi.

PROF. J. C. WHITTEN, Columbia. DR. HERMAN VON SCHRENK, St. Louis.

Packing and Marketing Fruits.

F. H. SPEAKMAN, Neosho. T. R. PEYTON, Mexico. D. McNALLIE, Sarcoxie.

Transportation.

G. T. TIPPIN, Nichols. C. C. BELL, Boonville. A. T. NELSON, Lebanon.

Horticultural Education.

Chairman, G. B. LAMM, Sedalia. L. A. GOODMAN, Kansas City.
MRS. G. E. DUGAN, Sedalia. MISS M. E. MURTFELDT, Kirkwood.
DR. WM. TRELEASE, St. Louis. PROF. J. R. KIRK, Kirksville.
PROF. J. C. WHITTEN, Columbia.

Missouri State Horticultural Society.

Organized January 5, 1859, at Jefferson City.

Incorporated 1893, at Jefferson City.

INCORPORATION AND REORGANIZATION OF THE HORTICULTURAL SOCIETY BY AN ACT OF THE GENERAL ASSEMBLY IN 1893.

The following law was passed by the 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. Life membership, \$10.

L. A. GOODMAN, Secretary.

ACT OF THE GENERAL ASSEMBLY.

The Missouri 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 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 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 400 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: Provided, however, that no person shall be allowed to vote on a question of a change of the constitution or the election of officers of this Society until after he has been a member for a period of one year preceding the time of election, except in case of a life member.

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 President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall be for one year, beginning on the first day of June, following their election. The President, Vice-Presidents and Treasurer shall be eligible to but one successive re-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 in 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.

SUMMER MEETING

AT PERTLE SPRINGS, JUNE 3, 4, 5, 1903.

SUMMER MEETING.

At Pertle Springs, June 3, 4, 5, 1903.

The prospects for the June meeting were never better up to June 1st; but at that time we found the Missouri river and most of other rivers carrying down their streams and over their banks, the largest flood of water ever known in the history of our State, excepting, probably, that of the year 1844.

This tremendous flood in the Missouri was so great that only two or three persons succeeded in crossing and were in attendance from north of the river. Many people living south of the river were afraid to leave their homes, fearing they might be unable to return.

The meeting was a very pleasant and profitable one in spite of the fact that there was the smallest attendance that we have had for many years.

Many persons failing to be present, their papers were read and discussed fully, as usual. A display of apples, which were at the winter meeting, were on the tables in a very fair state of preservation, showing that a good cold storage can easily hold good apples until the next summer. These apples were held in the cold storage at Springfield.

The discussions were never better and were fully enjoyed by every one present, because, probably, of the fact that there was ample time for full and free expression of views.

Pertle Springs was an ideal place to hold the meeting, for every one could be at the same hotel and the beautiful grove and house for meeting place was only a few steps away.

The spring at Pertle is an attraction, the beautiful park is another, the fine lakes and boating add others, if we only had time to use them. But even then it is delightful to meet in such a beautiful place and have only those present who are interested in what you are interested in.

Taking the meeting as a whole, therefore, it was a successful and profitable one long to be remembered.

Secretary.

WEDNESDAY, JUNE 3, 1903.

The meeting was called to order by President Robnett.

Committees were appointed as follows:

Finance—B. C. Auten, T. H. Todd, Ed. Kemper.

Fruit—G. T. Tippin, J. S. Butterfield, A. T. Nelson.

World's Fair—L. A. Goodman, J. T. Stinson.

Final Resolutions—R. J. Bagby, M. Butterfield, C. H. Dutcher,
Mrs. G. E. Dugan.

The report of the treasurer was the next item of business.

TREASURER'S REPORT, JUNE 3-5, 1903.

W. G. Gano, Treasurer, Parkville, Mo.

Balance on hand January 1, 1903.....	\$398.31
January 30 received from State Treasurer.....	810.34
April 18, received from State Treasurer.....	686.02
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Total receipts	\$1,894.67
Total paid out	1,443.86
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Balance	\$450.81
Amount paid out Jan. 30, 1903—	
Express, freight: \$1.50, \$18.05, \$1.75.....	\$21.30
Expense Executive Committee:	
C. H. Dutcher.....	3.60
D. A. Robnett.....	10.30
G. T. Tippin.....	11.35
W. G. Gano.....	7.70
Salary of Secretary for January.....	66.66
Salary of Typewriter for January.....	20.00
	<hr/>
Warrant No. 520.....	\$140.91
Feb. 26, American Gardening	\$1.50
Floral Life	1.00
Forestry Assn.	2.00
Express, Dray: 15c, 50c, 75c.....	1.40
Scotford 7 half tones.....	29.00
Salary of Sec'y for February.....	66.66
Salary of Typewriter	20.00
	<hr/>
Warrant No. 521	121.56

Mar. 23,	Express, \$1.12, \$4.50, \$4.65.....	\$10.27	
	P. O. stamps, \$2.00, \$5.00.....	7.00	
	Insurance on reports.....	12.00	
	Printing and P. O. Cards, 2,000.....	44.50	
	Telegrams, \$1.84, \$1.05, \$0.40, \$0.25, \$0.70..	4.24	
	Salary of Sec'y for March.....	66.66	
	Salary of Typewriter for March.....	20.00	
		<hr/>	
	Warrant No. 522.....		164.67
Mar. 24,	D. A. Robnett to St. Louis and return.....	\$10.83	
	C. H. Dutcher to St. Louis and return.....	17.50	
	C. H. Dutcher, Green Forest and return.....	15.80	
		<hr/>	
	Warrant No. 523.....		44.13
Mar. 23,	G. T. Tippin to Arkansas meeting and return and express	\$10.00	
	W. F. Flournoy to Washington, D. C., and re- turn	79.75	
		<hr/>	
	Warrant No. 524.....		89.75
Mar. 31,	Rand McNally and Co. 5,000 Mo. State Maps.	\$125.00	
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	Warrant No. 525.....		125.00
Apr. 3,	W. G. Gano, Treas., expenses.....	\$5.00	
	Class Photos	1.25	
	Hudson and Kimberly, 5,700 letter heads....	32.60	
	5,500 Envelopes	19.25	
	Life membership in Audubon Society of Mo..	10.00	
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	Warrant No. 526.....		68.10
Apr. 18,	E. W. Stephens, 2,000 folders; 2,000 blanks..	\$30.00	
	Expense J. C. Evans trip to Washington and return	81.30	
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	Warrant No. 527.....		111.30
Apr. 30,	Tribune Printing Co., Jefferson City, express on reports, wrapping and shipping as per bill	\$272.43	
		<hr/>	
	Warrant No. 528.....		272.43
Apr. 30,	P. O. bill.....	\$34.00	
	Freight on reports.....	9.50	
	Freight on reports.....	.50	
	Freight on reports.....	2.50	
	Freight on reports.....	2.05	

Apr. 30,	Freight on reports	\$2.05	
	Freight on reports.....	1.35	
	Freight on reports.....	1.50	
	Salary of Sec'y for April.....	66.66	
	Salary of Typewriter.....	20.00	
	Express .....	.87	
	Warrant No. 529.....		140.98
May 30,	Tribune Printing Co., express.....	\$10.72	
	Scotford S. and S. Co., type holder.....	2.75	
	Pencils, paper, file.....	4.65	
	1,500 programes	9.50	
	1,000 folders	4.50	
	1,000 large envelopes (reports).....	12.50	
	Warrant No. 530.....		44.62
May 30,	P. O. bill.....	\$10.00	
	P. O. bill.....	3.00	
	P. O. bill.....	20.00	
	Drayage .....	.75	
	Salary of Sec'y for May.....	66.66	
	Salary of Typewriter for May.....	20.00	
	Warrant No. 531.....		120.41
	Total disbursements		\$1,443.86

Pertle Springs, Mo., June 4, 1903.

The Finance Committee have examined the Secretary's copy of the Treasurer's report, showing a balance on hand Jan. 1, 1903, of \$398.31; receipts to date of \$1,496.36 and disbursements of \$1,443.86, leaving a balance now on hand of \$450.81.

Owing to the unavoidable absence of the Treasurer, and the impossibility of getting the bills and warrants to the meeting, the committee were unable to pass on them or compare the report with them.

The Secretary certifies to the committee that the reported list of receipts and expenditures is correct, and that he learned upon inquiry that there is with the National Bank of Commerce in Kansas City a credit of \$450.81 to the society.

BENJAMIN C. AUTEN,
ED. KEMPER,
T. H. TODD,
Committee.

WHAT IS THE MATTER WITH THE BIRD LAW?

(Hon. N. M. Bradley, Warrensburg, Mo.)

On the 28th day of April, 1893, I was requested by your Secretary to prepare a paper upon the subject, "What is the Matter with the Bird Law?"

Why I should be asked to treat this question, I am at a loss to understand; however, I am satisfied that the idea originated from our mutual friend, Prof. C. H. Dutcher, who is, by the way, your second Vice President. He, knowing that I was a member of the last Senate which has become famous in the history of Missouri Senates, and whose experience will probably tend to drive thousand dollar bills from the channels of circulation, possibly thought that if I were induced to say a few words upon the subject suggested, the missing link in the history of the late game law—now being so earnestly sought by Mr. Folk and the St. Louis grand jury—would possibly be supplied. I have been induced to say a few words upon this subject, but in the outset, I want to inform you that I have constitutional rights and propose to stand upon them.

If by the question assigned me you desire that I discuss the game law that was before the last Senate and tell if possible why it failed to pass and become a law, then I must suggest that the subject assigned me is hardly broad enough. The subject assigned me inquires only, what is the matter with the bird law; while the bill before the last Senate sought to regulate the killing not only of birds, but of animals all the way from deer to raccoons. The first section in that law referring to the animals protected, reads as follows:

No person shall catch, take or kill, or attempt to catch, take or kill, by means of steel traps, traps or pits or other device of any kind, any raccoon, mink, otter, beaver or muskrat between the first day of February and the first day of November of each year, etc.

This section of course interests the trapper. The next section seeks to regulate the killing of squirrels, and of course interests every country boy and gray-haired nimrod who handles a rifle. The next section seeks to regulate the killing of deer and has a clause in it which reads like this: "It is further declared unlawful to make use of a dog or dogs in hunting, pursuing or killing deer." This part of this section is very distasteful to the owner of old Buck and Drive, who say that they can have more sport and kill fewer deer than the city sport who chooses to resort to lead propelled by smokeless powder. It was this clause that kindled

the ire of Ex-Governor Coleman and caused him to come to Jefferson City and labor to defeat the whole bill if necessary to defeat this clause.

The next section seeks to prevent and regulate the killing of birds, including wild turkey, prairie chicken, quail, plover and, by the way, the restriction placed upon the killing of the last named bird brought protests from almost every portion of the State, as I remember it—ducks and geese.

Section 17 of the proposed law declares it unlawful to hunt on Sunday—there is a better law upon the statutes now than the one proposed. Section 18 makes it a misdemeanor to hunt within another person's inclosure. The same law, only stronger, is now upon the statutes. Section 19 declares that it shall be against the law to hunt rabbits with ferrets or weasels. I don't know anything about this class of sport, but I suppose there are people who do indulge, or the law would not be proposed, and it is probable that some of these people have a friend or friends in the Senate whose vote would be cast against the bill before he would permit this clause to stand and become the law. Sections 20, 21, 22, 23 and 24 refer to and attempt to regulate the catching of fish, and without going into details there were more protests made to me concerning this part of the law by my constituents than to any other law while I was in the legislature. Of course I felt compelled to heed their desires. What I have said, in substance, covers the scope of the law and taken as a whole is far reaching in its scope and effect. It affects every part of Missouri. It affects the occupant of the palace and the hut. It affects the owner of the gun and the hound. It affects the person who visits his traps each morning as well as the person who follows the bird dog. A bill so broad in its scope as this must necessarily meet much opposition. You must remember that all parts of such a bill do not affect all parts of the state and hence there can be no common understanding and no common interest. It meets my opposition and fails to get my vote because there are provisions in there—not about the birds—but about the fish that meets the opposition of my people. This is not only true in my case, but is true with every other senator on the floor.

Hence you can understand why it was that this bill when brought onto the floor of the Senate, brought forth an amendment from almost every senator. There was actually more than thirty amendments to this bill, adopted by a majority vote of those present and voting, and there would have been more if the chairman of the special committee had not begged that it be permitted to come back to the committee and let them revise it in accordance with the views and wishes of the various senators as had just been expressed. It went back to the committee—never

to be heard of again, except to be printed for information. There is where your bird law died, not because any person wanted to see the bird law proper killed, but because this society and the Audubon Society. I believe it is called, permitted the section referring to birds to get into bad company, and the merits of the bird law were not sufficient to carry the demerits of the game law through. Let me suggest that the next time you try to pass a bird law, you go it alone and let the game law remain as it is, if the bird law already upon the statutes does not suit you. The present bird law seems to me to be a very good law, but I have not studied the subject as you have and probably there are deficiencies that have not suggested themselves to me.

Again it is possible that this society and the friends of the bird are attached to and look with great favor upon another feature of the bill that was presented to the last Senate. I might add another, and say two features. Section 1 of that bill provides for a game warden and gives him a salary of two thousand dollars a year, and I sometimes think that the man who wanted to be game warden wrote that bill, because it seems to provide amply for his salary and gives him the power of a king. Listen to a few of these provisions: "The game warden shall, upon probable cause being shown for believing that there is concealed any animal, bird or fish, caught, taken or killed, or had in possession, or shipped contrary to the laws of this State, search in any place, and to that end may enter any building, inclosure, car or apartment and break open any chest, box, locker, crate, basket or package and examine the contents thereof," and further it says "Said game warden shall not be liable for damages on account of any search, examination or seizure made in accordance with the provisions of this act." This law, you will notice, gives the game warden more power than a sheriff has in seeking stolen property and then exempts him from liability if he abuses this power. Section 4, reads as follows: "In any case where the prosecuting attorney neglects or refuses to prosecute any person for the violation of any of the provisions of this act, the game warden may prosecute for such offense without the sanction of such prosecuting attorney, and he is hereby authorized and empowered to procure the services of an attorney at law to prosecute or assist in prosecuting on behalf of the State, any person charged with violation of any of the game, bird or fish laws of this State; and the game warden shall allow such attorney at law a reasonable compensation for his services, which shall be taxed as necessary expenses of the office of game warden." It looks like some attorney might be interested in having this law passed. As for myself, I would prefer to leave this power in the hands of the prosecuting attorney, where it now belongs, who has to

answer to his people for his deeds, rather than to give it into the hands of a game warden and an attorney of his own choosing.

Section 5 is as follows: "Said game warden shall have the same power to serve criminal process as sheriffs or marshals and shall have the same right as sheriffs or marshals to require aid in the execution of such process; said game warden may arrest, without warrant, any person caught by him in the act of violating any of the laws of this State, for the protection or propagation of birds, game or fish, and take such person forthwith before a justice of the peace or any court having jurisdiction who shall proceed without delay to hear, try and determine the matter, the same as in other criminal cases." And this power is not only given to the game warden but is given to each of his deputies and he is given power to appoint as many as he pleases, and whom he pleases.

Now of course, if the game warden to be, prepared this law or had anything to do with it, he would provide a method for getting his pay of course. Well, he is provided for in this bill and this to me is the most obnoxious part of the bill. It is a wellknown fact that no legislature would not vote to pay him out of the general revenue, so another method must be devised. So some scheme must be devised that will pass the legislature and still get the money. They have found it and section 27 provides and says: "It is hereby declared unlawful for any person to hunt or kill any game animal or bird in this State off his own property at any season of the year, without first having obtained a hunter's license." Each person procuring a resident hunter's license, shall, when the same is issued, pay to the county clerk a license fee of one dollar. Each person procuring a non-resident hunter's license shall, when the same is issued, pay to the county clerk a license fee of twenty-five dollars. In addition to the license fees herein mentioned, each person procuring either a resident or non-resident hunter's license shall pay to the county clerk for his services in taking the affidavit and issuing the license, a fee of fifty cents. It shall be the duty of the county clerk on the first of each month to remit all fees collected for hunter's licenses to the game warden. By other sections of this law the game warden is empowered to issue other and various permits for other and various purposes and charge for the same, all of which goes into and is set apart for the pay of the game warden and his deputies.

This feature of the bill I can not stand for. I am not yet ready to say that every boy within my district who shall kill a quail on the land of another, who permits him to go there, without first paying to the game warden and his deputies and the county clerk a dollar and a half, shall be guilty of a crime. I would prefer to pass any laws protecting game,

fish or birds and permit the authorities whose duty it now is to enforce the criminal laws of this State, to enforce them. And it has been my observation that the game laws of this State have so far been liberally observed, and when the farmers throughout the country are made to believe that the insect birds and all other birds that this society are seeking to protect, should be protected and there is a law placed upon the statutes for their protection, these laws will be observed without the aid of a game warden or a deputy and without this one dollar and fifty cents tax that is assessed against every person who wants to shoot a mink, that has been catching his chickens, across the line on his neighbor's land.

So my advice to you is, if it is worth anything, frame a law protecting the birds proper—birds within the meaning of your society—and trust to the good people of the state and the prosecuting officers now provided for to enforce it, and you will have no trouble in securing its passage.

HUSTLING TO MAKE THE ORCHARD PAY.

(T. H. Todd, New Franklin.)

This subject gives me a great deal of latitude but I shall not undertake to cover the whole ground, for I think it would take too much of your time. I shall only touch along the lines of this great enterprise in which we are all very much interested. You understand this subject is on the financial part of the entire growth and culture of growing apples.

You will agree with me when I say there would be no orchard planting, no horticultural societies, no worrying about crops or failures if there were no money in sight in this business. I would say then first let us get down to our work and start right, for you know in any business it is very important to start right. If you start in this way you have gained almost half the victory.

Then I would say plant a line of good varieties, not over six or eight kinds, such as your experience has taught you will do well in your vicinity. After planting our orchards our work commences. You understand when a great many plant orchards they imagine their work is done and go off after other pursuits of life; but you will follow me, please, after the orchard is planted and see what we can find to do. We will begin now to cultivate this orchard. If the land is strong, plant in corn and cultivate three or four years. Plow the rows of trees well both

ways, just like you would plow a row of corn, with a one-horse double-shovel plow, with a short single-tree muffled on each end and leather tugs. Then follow with hoe, work the ground level for two or three feet around the tree. Commence spraying the first year the trees are set. Run over the trees with a hand dust sprayer, commencing as soon as the little trees begin to bud out. Do this some three or four times during the season. This gives them a fine growth and fine foliage. You will find the little trees will hold their leaves very late and give them a fine protection to go through the winter.

Lime is a fine fertilizing agent as well as a cleanser and a protector from any insects. In June we will run over young trees with a wash of lime, soap, sulphur and carbolic acid. Put this on the trees up in the little branches with a small brush. This is a fine protection against borers or any other insects that may bother the root of the trees. See that there is no grass around your trees before going into the winter quarters. Wash the trees again with the same preparation late in winter to keep the rabbits off. You will keep this work up until your trees commence to bear. If you cannot plant your young orchard in corn on account of thin soil on tired land, when you plant your trees mulch them and sow the land in clover, and continue to mulch them every year. After your land has been in clover three or four years break the land with a turning plow, and cultivate in corn two years. After the land is broken with the plow and cultivating corn, we will stop mulching as we do in any other cultivation.

You will bear in mind, please, that you must keep your orchard replanted, where the trees have died out. Every year mulch them as soon as planted. We have arrived now at the time our orchard is beginning to pay, say five years old, when we find we have apples for sale. First know what you have. If you have a fine quality of apples you should know it. You should know what there is in the country. If they are inferior you should know it. You should be well posted all along the lines of what apples are worth.

When the buyer comes around you should kindly meet him at the depot, take him to your home, and through your orchard. Give him a good dinner and treat him nicely. See him back to the train, etc. Don't look upon him as a man slipping around through the country trying to rob you. When he proposes to buy your fruit, talk to him and give him an intelligent answer. Do not try to get all out of your fruit that is in it and more too. If you should sell your apples to a packer or shipper, do just what you agreed to do with him. If you agree to sell him a certain grade of apples do just what you promise him to do.

Make the grade of apples good, do not try to force apples on him that are not in line with what you agreed to sell him. There is no money in this sort of work. When you put your name on a barrel of No. 1 apples be sure they are No. 1's or any other grade that you may undertake to make. Handle your apples nicely from the trees. After your shipping apples are all picked out, keep your cider apples all worked up, throw your pummace up in a hopper or tank with all other refused apples. Do not have any apples, not even a rotten apple, under the tree, throw them in with the cider pomace into your vinegar tanks and let them ferment, by doing this you will save everything; also have a fine lot of vinegar, from the refuse stuff that is thrown away. I had last year some sixty barrels of fine vinegar. It was all saved in this way and is bringing me from \$7 to \$8 a barrel.

When you have cleaned up the apples, from all of your trees, then commence to prepare your orchard for winter quarters. Take a hoe, and scrape all the dead grass away from the trunk of the tree, for two or three feet around. Whenever we have dead or broken limbs we saw them off, this is all the pruning we do, after we have headed and started our young trees. You will find by doing this you will have no water sprouts. As we go over our orchard, when we come to a dead tree or one that is dying, we tag it so the man that follows may know what to take out. Every tree then that is dead or dying is tagged when we go over the first time. We then follow with dynamite, by boring a hole under the roots of the trees with an auger, slip in a stick or half stick as you may determine by the looks of the tree, and blow them out. By doing this the tree is blown out, all the dead roots and ground is thoroughly blown up where the tree stands, this cleanses the place and kills the insects by the next spring. You will find the ground where the tree has been blown out in fine shape to reset another tree.

Last, but not least in the way of preparing our orchard for winter quarters, we go over the orchard with a preparation of lime, sulphur and carbolic acid. Commencing in the forks of the tree we take a long bladed knife and clean out the forks of the trees thoroughly. You will find a great many leaves have lodged there and a great many insects have gone there for their winter quarters. We then have all the grass taken from the trees, the forks cleaned out nicely, and the broken and dead limbs sawed off. The tree is now ready to apply the wash. Take a brush and apply it well, putting all you can down in the forks of the tree with your brush and then on down to the ground. All the settlings in our bucket that we carry our wash in we empty that out around the roots of the trees.

We use a great deal of salt and lime around under the trees through the summer if any tree should be inclined to have bitter rot.

We use for spraying altogether two or three of the cyclone dust sprayers. We find this means of spraying a great success. We can spray in windy weather, before or after a rain, never have to stop for land being too muddy in orchards, but can go right along at any time without any hindrances.

Allow me, if you please, to go back where we spoke of blowing out dead trees. You will find this to be a great success. There is no trouble in keeping these spaces all filled in with growing trees. When we adopt this method, when we set the spaces, we mulch these trees for three or four years. I have five acres of an old family orchard that we do not connect with our commercial orchard, that has been filled in with young trees and kept up by the rules mentioned. I have some winesap trees in this orchard from which I gathered last year from five to six barrels of good apples per tree. They are 42 years old and full of apples this year. In this line of work I flatter myself knowing I have made my orchard pay.

I have apple trees from five to forty-three years old. They have apples on them and are looking well. I have a good crop on this orchard and they have all been handled in the way I mentioned.

HOW TO HAVE A GOOD OLD ORCHARD.

(W. H. Benedict, Richards, Mo.)

To have a good old orchard one should have a good young orchard. If good trees not over two years old have been well planted in good productive soil, and well cared for for 8 or 10 years you have laid the foundation for a good old orchard. Up to this time the orchardist has lived mainly on hope and southwest wind as far as the orchard is concerned, and returns have not been just exactly what he had a right to expect. Our own orchards at this age met with several reverses. For two or three years in succession we had continuous cold rains, at and after blooming time, that so affected the crop that our income from the orchard in three years was practically nothing. These wet springs were followed by dry hot summers and then late fall rains and most orchardists realize what destruction and trouble it wrought. To add to our troubles, about this time our trees were attacked by bag worms and canker worms. We sprayed about the first of June for bag worms, which were much the worst, and so missed the canker worms. For the past

four years we have been fighting canker worms and fungi, or rather playing at it. Early in the spring of 1902 we bought a power sprayer and went at it right; canker worms, leaf rollers, etc., are done up, but we quit too soon to keep down all the scab fungi. The contrast in the appearance of our orchard now and three years ago is very marked.

Why are so many of our orchards unprofitable and short-lived, in these days of books and horticultural journals of the first class, when there are so many to exploit their methods of planting which range from crowbars to dynamite, their methods of culture which range from clean cultivation through the summer to a blue grass sod? When we have steam engines and dust machines galore to spray our trees with and even galvanic batteries to give the poor insects an electric shock if they attempt to crawl up the tree, it would seem as though the orchardist would have no trouble in getting rich and prolonging the life of his trees to a good old age.

During the war a certain preacher was expatiating on power, resources, moral right and providence all being on the side of the north, and dramatically exclaimed, "If these things be for us, who can be against us?" Up jumped a little Irishman and shouted, "Jeff. Davis and the Devil, bedad!" The man who raises apples for a living has many things against him. Within four miles of our place there are five twenty-acre orchards planted about the same time as ours in the spring of 1883, just twenty years ago. Three have been in timothy sod and mowed. One in clover and mowed, and the other in weeds. These five orchards have never paid the interest and taxes on the land, and under present treatment are not likely to do so. Two of the owners of these orchards say they don't believe in breaking up the roots of an orchard. Neither do we, except to a limited extent; we use the disc and common harrow and they answer all requirements for cultivating an orchard.

We are not an advocate of continuous yearly cultivation till late in the summer. It defeats one of the objects of tillage, which is to add fertility as well as to hold moisture. Another cause why an orchard is not good when it is old is lack of pruning. I know many people boast of never having put a knife in an orchard, and others go to the distressing extreme of the tree butcher. I am inclined to think that most of our orchard trees carry entirely too much wood to be productive, especially on our rich prairie soils. Slow-growing trees in sod are injured worse by pruning than thrifty trees under cultivation, but pruning should be done regularly, moderately, with good judgment and common sense. We much prefer the dormant season for pruning. Too close planting is an error too often made. In one of our orchards the trees are set

twenty by forty feet, the other thirty-four by thirty-six. We much prefer the latter distance.

Another reason why orchards are not good when they are old is the lack of protection from insects and fungi. From several years observation I am led to believe that more trees are lost and rendered unproductive from the destructive effects of fungi, in its various forms than from all other causes combined. I once went to a celebrated oculist, thinking I had something in my eyes. He remarked, "Oh, no; there is nothing in your eyes, they are just inflamed;" but I insisted that there must be something in them, but he insisted there was not, and the physician knows.

How many of us know what fungus is and how to combat it? How many of us could tell the truth and the whole truth about it if placed upon the witness stand? How many professors are agreed upon it? One tells us the spores of scab fungi do not live on the trees over winter. One member of this society recommended that we thoroughly spray the ground under the trees, but suppose the leaves had been burned in the fall and the ground plowed, would the spores wiggle through the ground and climb into the tree? A certain colored brother in Alabama was explaining to his congregation the theory of the creation of man. He went on to say, "And de Lawd, he made Adam out ob de clay ob de garden, an' he set him up agin de palin' ter dry." At this point a young brother arose and enquired: "Uncle Peter, who made de palin'" "Set down dar, you nigah, any such questions as that would spile any system of theology." A man has a good crop or two and he at once sets up an elaborate theory about cultivation, bud developments, etc., only to have his pet theories demolished by next year's failures. Who can tell us why this good old orchard of ours that bloomed so full the past spring failed to set a big crop of apples. Was it because they were not properly pruned, cultivated, sprayed, etc? Nearly all of these things we have done from their youth up. Some men could walk into the orchard, look up wisely at the trees and tell us instantly. "Frost killed them," says one, "Too many of one variety, self sterile," says another; "Need some compound medicated tree vitalizer," says a third. There is, however, one obscure cause often overlooked. Some pesky nurseryman some twenty years ago may have palmed trees on us whose pedigrees were a little shaky.

On general principles it may be stated that those who love the business of fruit-growing and give it their best thought and closest attention should, and generally do, succeed best, yet we are compelled to admit even then there is much truth in that unique poem called "Homeopathic

Soup." the closing lines of which, if applied to apple trees, would read thus :

"If they chance to fail, say that Nature did it,
If they chance to bear, give the care the credit."

DISCUSSION—ORCHARDS.

Mr. Goodman.—I would ask Mr. Todd what proportions of carbolic acid, water, lime, sulphur and soap he used in the wash he speaks of.

Mr. Todd.—We make the wash in three gallon buckets usually, but when going over the large orchards, we make it by the barrel. We make it by the bucket for the young trees. We put in each three gallons, one and a half table spoons of carbolic acid. We use hard or soft soap made of concentrated lye. We use a lump about 5x4 and put it in a vessel of warm water; enough to dilute the soap, and when diluted we put in as much sulphur as will mix well. I suppose at least a quart in a three gallon bucket. We put in this preparation, mix thoroughly and then put in the lime and water until we have a thick white wash, but not thick enough to scale off. You can tell by this what proportion to use. I prefer using the unslacked lime, as it keeps up the warmth until thoroughly mixed. After it is thoroughly mixed, I have no trouble. It does not take a large quantity when going over the young trees and it is not expensive. When I go over the large orchards, I make it in barrels. This wash will stay on through an ordinarily wet winter. We put it on after gathering the apples last fall. If it gets off, I go over it again next month. I have gone over them twice a year.

Mr. Gilkeson.—Is there any danger of the fresh lime burning the bark?

T. H. Todd.—No.

A. H. Gilkeson.—Should it be mixed a day or two before putting on?

Mr. Todd.—No; mix it fresh so that it will be warm. You understand sulphur is hard to mix, but it will mix with the soft soap and sulphur before going in with the lime water. We have, with the soap after diluting, nearly a gallon of sulphur and soft soap, then fill up with lime and water in the three gallon bucket. You will have no trouble with burning and there will be no borers if applied well. Rabbits will not touch the trees. I have a fine place for rabbits and I went away last winter, leaving word to wrap the trees. I was a little afraid to trust the wash, as I was to be away. The hands left a good many of the trees unwrapped where they needed it the most, but they had been washed and I was surprised to find that none of the trees were touched by rabbits.

Hard soap will do if you cannot get the soft soap. You can make a soft soap and not make it so strong. We put in just enough lime to make a good white wash. Keep the mixture well stirred when putting on the trees. Keep using it until you have nothing but dregs in the bottom and then throw that around the roots of the trees.

I think lime is one of the greatest agencies to fight insects. We throw it around and under the trees and when we find a tree going back, we throw lime about the roots. Do not be sparing with it; it will not hurt anything and the next year you will have fruit and fine foliage. I use unslacked lime or any kind of waste lime. If I run out of the unslacked lime, I throw quick lime under the trees.

W. P. Keith.—Do you use only one and a half spoonfuls of carbolic acid in the water?

Mr. Todd.—That's all. We may get a little more than that, but I would be afraid to get much more in.

Mr. Keith.—I use three times more than that and found good effect by using at least twice as much as you did.

Mr. Todd.—I was afraid to use more than that. It does not take much of the crude acid to make it strong.

Mr. Keith.—This spring I used one half gallon to the barrel of whitewash, and I can endorse what he said about the rabbits, and I found not a single borer in five-year-old trees.

Dr. Chas. O. Ozias, Warrensburg, Mo.—I would say I have used a wash similar to that one for about fourteen years. I can testify to the good it has done my orchard. I use the unslacked lime, because it sticks better, and I always made it a rule to use seventy-five cents worth of crude carbolic acid to the barrel, never had an injurious effect on the trees, and kept the bark smooth and clean. Of late years I added fire clay to make it stick better. If you get the white wash too thick, it will not stick well and will scale off.

Tree Wash.—To a barrel of whitewash add one gallon of crude carbolic acid, two gallons of soft soap, ten pounds of sulphur. In making, put a peck of unslacked lime in a barrel, with your soap and sulphur, add water to cover whole to slack the lime and keep from burning. Cover well to keep in steam as it all boils together. Then add water to make sufficiently thin to spread well.

DR. CHAS. O. OZIAS.

Mr. Morrill, Macon, Ga.—I can testify that this wash keeps the borers out. That is what we use in Georgia. It will keep out peach borers. We use one-half pint of crude carbolic acid to every five gallons of whitewash. We use one quart of soft soap, one pound of sulphur and half a pound of salt is still used in Georgia, for the reason

that it seems to keep the borers out. I have peach trees sixteen years old and have used this wash since they were set out, and they are just as sound as when set out. Three years ago I looked over my orchard and out of possibly one hundred trees that I examined, I found but one or two worms on the trees. We use this just before the trees bloom and put the whitewash on thick around the roots of the tree. With the per cent. of the crude carbolic acid used in this preparation will last three months. Every time I have used it I have not been troubled with wormy peaches. What is injurious to the human family might also be to the insects and possibly the scent would keep them off. One year I did not use it and had wormy peaches. I do not think that three times the amount of one and a half spoonfuls is sufficient. I would not use less than one-half pint to five gallons. I mix the sulphur and soft soap, then add the crude carbolic acid, one pint to every eight gallons. It certainly will keep the borers out.

Mr Todd.—I have been afraid to use more than that, but I use enough to tell that it is carbolic acid. Sometimes we can overdo, and I do not like to get beyond judgment. But I suppose he knows, for he has tried it.

D. A. Robnett.—Why do you have to put the potash in the form of soap before dissolving. Could you not put the ingredients in without making soap and then melting it back? My wash is made with concentrated lye. We put the wash in barrels and use hose to spray the trees. We do not put it on to stay all winter, but put it on two or three times. We spray from each side of the tree and get it on evener. We get on faster if we do not put in the soap. We use concentrated lye instead.

Mr. Todd.—The making of the soap is a small matter. As far as using brushes is concerned, I do not use more than half a dozen a year. I clean them off as soon as I am through using them. A brush will get into the crevices where the work should be done, as that is where the insects go for the winter. I see your point for throwing the wash through the nozzle. I do not think it would stick. I think putting on with a brush makes it stick.

Dr. Ozias.—In your application of the potash preparation do you get in all the crevices, etc., that you would in using a brush? Two fifteen cent brushes will go over a forty acre orchard once. If this is kept up, the bark is smooth and you do not wear the brush out. It occurred to me that you would not get the smooth bark if you did not use the brush.

Pres. Robnett.—I have tried brushes and paid \$1.25 apiece for them and they did not last long. Brushing and putting them into the strong whitewash, they would soon be gone. The cheap ones did not last long

at all. When I put soap in the wash, it clogged in the force pump. Mine does not stay on like yours.

Secretary Goodman.—I think these papers are worth a good deal to us. The expression "tired land" is one of the best expressions I have heard used. I would ask the gentleman who made that expression what he means by "tired land." It occurred to me that a great deal of the land I saw in South Missouri was tired land. While the land was good enough to produce a good crop, it was not good enough to produce a good crop of apples.

Mr. Todd.—I mean land that has been in any one crop too long. I believe any upland that would bring a good crop of corn would do to plant trees in. If it would not grow a good crop of corn, I would consider it tired and would put the land in clover.

Secy. Goodman.—It is just as necessary to have rotation of crops in orchards as anywhere else. The farmer has more sense about that than we have. So many of our fruit growers do not do this. We need one year with clover, one year with cowpeas and one year with corn.

J. E. Mohler, Warrensburg.—How long may I grow small fruits without injury to the trees? Who has tried this?

Secy. Goodman.—If you can give it good care and attention, I do not think anything is better than growing small fruit. Some of my very poorest land I had, I put in pear trees and blackberries. I made money from the blackberries and pear orchard, and the land was better than when I first planted.

I think we ought to use lime and fertilizer. I am glad to hear so much about lime, I think it one of the best and cheapest fertilizers we can get. Last winter I used seven car loads. I had two men in a wagon and they threw a large scoop shovel of lime under each tree. I use it in the berry patch and in the orchard. In our large orchards, we do not grow any small fruits, because it makes too much trouble in getting around to gather the apples. I grew small fruits in my orchards at Westport. If a person will use lime and cowpeas, you can grow as much small fruit in the orchard as on other land.

There is one thing that we must be sure about in this business and I think both the papers failed to touch on this point. That is, you want to locate in good subsoil. It is more important that you have a proper subsoil than a good top soil. The man who says good corn, means a good orchard, is mistaken. If you have a good subsoil you can make the top soil.

G. T. Tippin.—In regard to growing small fruits, I have noticed a bad effect, but it can easily be overcome. In growing strawberries with young growing trees, some of the large strawberry growers have lost

in the growing of their young trees by not cultivating the trees in the spring. Strawberries are never cultivated until the berry crops are taken off and the young trees need cultivating in the spring. So those who have this idea, should go around the young trees in the spring several times. If this is done, you will lose nothing by growing strawberries, as well as other small fruits. I have noticed more bad results from this in Arkansas than anywhere else. I own an orchard of thirty-five acres of peach trees set out in strawberry field and only received the cultivation the strawberries did. Adjoining this, I had peach trees planted with corn, receiving the same cultivation the corn received and they are three times as large as the others and in the same kind of ground. All due to the fact that the ones with the strawberries were not cultivated at the right time.

Mr. Morrill.—In regard to plant food, do you not have to supply the plant food the crop derives from the soil?

Secy. Goodman.—This rotation of crops I give you will furnish all the plant food necessary. You take cowpeas, clover and corn, growing them in this order and this supplies all the plant food the land will need. In fact, it will make the soil better year by year. We have a hundred acres of land in the Ozarks which had been in corn for ten or twelve years and would not grow corn. The land has been planted to the orchard and this rotation of crops used and the land is better than when we began.

Pres. Robnett.—About corn being good to raise apples, if you say clover you would get nearer the point. Any land that grows good clover I believe will grow good orchard.

A. V. Schermerhorn, Illinois.—We have land that will not grow clover, but we can grow apples. We have to add manure to most of our land. I do not believe that any land that grows good corn will grow good orchards. I think that is a mistake. I think the rich, heavy soil we have in Central, though they raise fine corn there, is not suitable for orchards. We notice that the Central Illinois people invest in our land for orchards. Orchards do not do so well in the heavy soil as they do in our section. We must study our soils. We must not judge from what it produces in corn or clover. In fact, I think we do not know just what kind of soil we do want. There is such a large difference of opinion about this.

Mr. Keith.—What about subsoil? Our soil is a joint clay and I think our land is too rich for trees. It is not hard pan, it is very porous and full of seams. We never use fertilizer. I never use any and think our trees compare favorably with a great majority of trees in the State. We think they grow too much wood. We generally have a good fruit

crop and sometimes above the average. I think it is good to have clover in the orchard for the first five years, but sometimes clover has been in for fifteen years. We never mulch. We have a very light soil.

Mr. Schermerhorn.—We have a heavy clay subsoil, which some people call hard pan. We have all kinds of subsoil. I can't see a very marked difference in the orchards. We have land that will grow clover as well as it does here. It seems to me that the hard pan is as good orchard land as we have there.

Mr. Gilkeson.—How far is the hard pan from the top soil?

Mr. Schermerhorn.—It is sometimes very near the top.

Secy. Goodman.—Do you consider the hard pan land good orchard land?

Mr. Schermerhorn.—I do not see much difference in our locality. It seems to produce just as well. We do not dig through the hard pan; it runs down about one foot from the surface. In some places the water stands in basins. In one ten-acre orchard there was a basin in the center and the trees have all died out around this.

Mr. Gilkeson.—Is it not true that where the hard pan holds the water that it kills the trees? You will find it in little patches where the trees will die and about ten feet away the trees will be good.

A. T. Nelson.—We have some rocky subsoil and the trees seem to do well. I pick from twenty-five to thirty thousand bushels of apples every fall and not over ten per cent. are cultivated at all. I have been in a great many orchards that have never seen a plow. Five thousand acres were sold to Iowa people. We dug holes and found the red clay subsoil all over the tract. Prof. Wragg was with us and he claimed that that was the best orchard land in the country. They were out eight weeks looking for orchard locations and were better satisfied with the red clay subsoil than anything they found. It appears from twelve to twenty-four inches under the surface of the ground. We haul dirt to cover the roots of the trees. On some land the dirt doesn't cover the roots and the trees are doing well.

Mr. Tippin.—Before touching on this, I think our friend Mr. Todd is open to criticism. I take it that he meant that soil that would produce a good corn crop would produce a good orchard.

Mr. Todd.—I stated that upland that would produce good corn would produce good orchards. Mr. Goodman struck the key note about the subsoil. Our friend Schermerhorn is right about the hard pan, but I do not think they have the kind of hard pan we have.

Mr. Schermerhorn.—Clay county has more hard pan than any other county in the State, and it is called the banner county for apples.

Mr. Tippin.—I think we need a soil that retains moisture, but not a soil that retains water like a basin. It is what we have to have in our State.

Secy. Goodman.—I think the best subsoil is soil mixed with gravel, and when we have these extensive rains, the rain sinks through the gravel and in the dry weather the water comes up. The trees in this soil do not suffer in dry weather, while the trees in the upland and in the river bottoms suffer and have to be cut over and over to be saved. A joint clay which will allow the water to sink through and in the dry weather to come up is the best. The low places that hold water are not fit to plant orchards in.

Mr. Nelson.—During the drought I set out four thousand trees. We hauled dirt to plant these trees in. I planted in May and they had no water until October, and out of the four thousand I did not lose two hundred trees. I planted in the red clay subsoil.

C. H. Dutcher.—From what county did Mr. Nelson ship his dirt?

Mr. Nelson.—From Laclede county, the banner county of the State.

Mrs. Dugan.—Do you consider rolling land superior to prairie land as a rule?

Secy. Goodman.—Yes, much better.

N. Engle.—I have trouble with blight. I do not know what it is. Sometimes it starts on the body; sometimes on the limb and eventually the tree dies. Will this preparation that the gentleman spoke of have any effect on the disease, or is the disease known? Will it do to plant trees where these trees have died?

W. H. Benedict.—I do not whitewash that way. I use a spray pump. I do not think that such diseases would be cured by this. It comes from the soil.

Mr. Engle.—I have it in good soil; has good under drainage, gravel underneath. Still, my trees died. The bark turned black. Sometimes it begins on the side of the tree and get larger and larger until it kills the tree.

Mr. Todd.—In regard to this blight, we have concluded that it is nothing more than what is called sun scald. A hard winter will cause the bark to crack and the blight comes around the crack when the sun shines on it. It hardly ever occurs high up in the branches. I do not think the tree is susceptible to this when this preparation is used.

Pres. Robnett.—The whitewash will no doubt help the tree resist the sun. Are your trees headed high?

Mr. Engle.—My trees are headed about the height of a man.

Secy. Goodman.—I think he has two troubles. One the body blight, the same as the pear blight. It is the result of injury, perhaps, or the

result of a crack and the sun overheating the sap. But it is a body blight and differs from the sun scald. To prevent these troubles head the tree low, not over eighteen inches from the ground if the trees come out there. This body blight is something that we cannot prevent. It generally occurs to trees headed high.

Mr. Engle.—How do you keep the limbs from the ground?

Secy. Goodman.—You don't want them off the ground. Let them go without cultivation under these limbs. They have the very best of care.

Mr. Gilkeson.—Cultivate with Clark's extension harrow.

Mr. Todd.—Cultivate with the harrow before loaded with fruit.

Pres. Robnett.—Cut the limb if it tends toward the ground and that will tend to turn the limb up.

WEDNESDAY—JUNE 3, 8 P. M.

President Robnett called the session to order and the following papers made the program of the evening:

THE RELATION OF BIOLOGY TO HORTICULTURE.

(Prof. B. L. Seawell, Warrensburg, Mo.)

The term biology may be used to signify a scientific study of living organisms. The term horticulture, while it originally was used to mean the practical care of a garden, has, in recent times, come to signify the scientific study and practical culture of all plants which bear what are known commercially as fruits. He who would circumscribe his study and practice of horticulture by the iron paling of custom house definition, can engage in the culture of strawberries whose botanical fruits are as dry as those of the dandelion, but if he cultivates Ponderosa tomatoes, whose fruits at least are as luscious as dried prunes, then he falls to the level of a vegetable garden, or, if he grows wheat, whose golden fields of ripened fruits are richer than pomegranates and figs, he rises to the lofty dignity of an agriculturist.

Biology has no boundaries within the limits of the kingdoms of animals and plants. The universal biologist, if such a scholar could exist, would take the same keen interest in the subjects for study of the vegetable gardener as of the horticulturist; of the chicken raiser as of the fine stock breeder; and of the plain "hayseed" as of the agriculturist.

Biology bears about the same relation to horticulture as North America does to Missouri, or as an elephant does to his liver. An elephant's

liver could not live without the elephant, nor could there be a healthy, live elephant without a liver. Horticulture could not be a successful science without biology, nor could biology be a complete science without comprehending horticulture.

No purely physical labor, without wise mental guidance can ever accomplish desirable results. The would-be fruit grower may thrust the finest fruit trees into post holes dug in a swamp, or elsewhere, and await patiently his income, but his patience will be changed to impatience, and his income transformed into disappointment and poverty.

The would-be practical horticulturist (?) abounding in "horse sense," but eschewing all "book-farming" ideas, may successfully grow fine fruit trees, say pears and apples. He suffers no anxiety about the few scattering fire-blighted twigs and blossoms during the first few years of fruiting. He begins to get faint vision-peeps at the shimmering heaps of gold, glinting beyond the snowy blossoms and rich foliage of the first "full-crop" year. Suddenly, after a few warm spring rains, nearly every new-grown twig of blossoms and leaves blackens before the awful fire-blight, and in vain he drives his tree trunks full of nails, at the suggestion of his neighbor's horse sense, thus postponing his hopes for the gold heaps for another year. Another year the suffering tree trunks may not grow a twig sufficiently juicy for the bactrium of fire-blight.

The practical horticulturist has probably found no disease of fruit trees so thoroughly destructive as fire-blight, nor so completely baffling to all attempts to find a satisfactory remedy. All spraying was found a useless waste of money, time and energy. All cutting and burning of blighted twigs was practically in vain so long as the orchardist remained in *ignorance* of the *real biological nature* of the *cause* of the disease. Mr. M. B. Waite, of the Bureau of Vegetable Pathology and Physiology, United States Department of Agriculture, in his study of "The Cause and Prevention of Pear Blight," proposed, some years ago (Year Book, United States Department of Agriculture, 1895) a method of cure and prevention which is absolute, if followed out with absolute thoroughness and completeness. In speaking of the method of curing and preventing fire-blight Mr. Waite says: "In the process now proposed, there are three vital points, namely, the thoroughness and completeness with which the work is carried out, the time when the cutting should be done, and a *thorough knowledge of the disease so as to know how to cut*. The method of holding the blight in check was discovered through a careful scientific investigation of the life history of the microbe which causes it." Mr. Waite made this careful scientific investigation in the early nineties, though the microbe itself was discovered in 1879 by Prof. T. J. Burrill. Mr. Waite established the fol-

lowing proofs, that this microbe (*Bacillus amylovorus*) causes the disease; "(1) The microbes are found in immense numbers in freshly blighted twigs; (2) they can be taken from an affected tree and cultivated in pure cultures (and in this way can be kept for months at a time); (3) by inoculating a suitable healthful tree with these cultures the disease is produced; (4) in a tree so inoculated the microbes are again found in abundance." Mr. Waite further established by his researches that the microbe does not survive the winter in the soil as was once guessed, but rather in its native medium and habitat, the inner bark and cambium layer of the twig stems, where, under conditions of heat and excess of moisture in the early spring, they begin to multiply. Their activity, combined with other causes stimulates an excess of exuding gum in which they thrive. This gum, being visited by insects which also frequent flowers, becomes the source of inoculation for the flowers, and the flower nectar affords the best possible culture medium from which they spread again into the inner bark and cambium of the young, juicy twig stems. In this way the entire orchard may become infested in a few days. Fortunately, the period of excessive activity of this microbe is short, so that in late summer and through the winter its life is barely maintained, and at these periods man may attack the enemy. Generally there are a few living, but inactive, germs during these seasons, to be found a few inches toward the trunk from the blackened portion of the twig, and if the twigs are *all* pruned a *sufficient distance* from the blighted portion, and *burned*, the future spread of the disease may be checked or absolutely prevented.

In this way if the practical horticulturist will supplement the researches of the practical biologist with his intelligent study and persistent labor, he may some day possess the gleaming gold beyond the unblighted blossoms, and the biologist will come in for his taste of the luscious pears and apples.

No department of human knowledge can stand to itself alone. Blot out the world's knowledge of astronomy, and every map of the globe or any part of it, would vanish, and every traveler upon the land, and every steamship upon the seas would be lost in the bewilderment of darkness. Obliterate the science of physics and chemistry, and every mechanical invention, every precious metal and its thousands of useful combinations, every wheel of commerce and every fabric of manufacture would be resolved in to that elemental state of nature that could be likened unto the "virgin forest" and defined as the place where "the hand of man has never set foot." Shut out from the human mind all knowledge of biology, horticulture and agriculture, and the human race would lapse to the low level of primeval savagery, and stand upon the

same footing in the struggle for existence as the teeming millions of other organisms whose right and power to dominate could probably not be denied nor prevented. The eye cannot say to the ear, "I have no need of thee." The horticulturist cannot say to the astronomer, nor the physicist, nor the chemist, nor the biologist, "I have no need of thee."

Horticulture is related in a thousand ways on every hand to every department of human knowledge, and the horticulturist should seek to know of these relations. How can he better seek to know than by studying all the sciences, though their relation be remote and scarcely perceptible. He cannot most effectually study while he plants, and prunes, and plows, hence the necessity for broad, general education in early life preparatory to this great and profitable vocation whose highest success is coincident with the highest culture of the mind.

Fortunately our best horticulturists are themselves biologists, at least within the limits of their time for study, and have themselves contributed much of the biological knowledge necessary for the most effectual cultivation of horticultural products.

But perhaps the chief biological contributions to horticulture have come from biologists who have given their entire energy, using strictly scientific methods, to the study of living organisms, regardless of their relation to horticulture. Pasteur studied bacteria with a view to knowing their nature, and the nature of their products, not thinking, perhaps, how the knowledge acquired might afterwards be used in the successful struggle against the ravages upon the plants and products of the horticulturist.

The biologist whose researches upon the physiological functions of plants proved that most plants must have atmospheric oxygen in contact with all parts of their surfaces for purposes of respiration, was not searching for an explanation of the practical necessity of planting fruit trees in well drained soil.

The biologists who have so carefully determined the life history of so many parasitic fungi, and so many noxious insects, were seeking primarily to know the interesting characteristics of such organisms. But upon this knowledge the practical horticulturist has based his methods of dealing with them as enemies to his cultivated plants.

Wallace and Darwin, in collecting their vast volumes of data, and formulating the remarkable theory of evolution, were probably seeking a rational system of philosophy upon which to base an explanation of the marvelous diversities and affinities among organisms, rather than a practical, working basis, founded upon natural laws, upon which successful horticulturists build all modern methods of plant breeding, with

a view to developing new and successful varieties, for profitable cultivation.

The leading men of our government, supported by public opinion, have not failed to catch the spirit of this intimate relation between the pure science of biology and the practical science of horticulture, and related sciences, and accordingly have wisely established the many departments of special biological study and research in the United States Department of Agriculture. The expert biologists who have taken charge of these special researches have applied every resource of biological science, sustained by all necessary financial support, to the practical solution of the many perplexing problems which the busy horticulturist might never solve.

Every up-to-date horticulturist who is in close touch with the United States Department of Agriculture, has received volumes upon volumes in which are published the biological researches upon the economic phases of such organisms as the codling moth, the apple borers, the canker worm, the San Jose scale, the bark louse, the army worm, the bean weevil, the cabbage worm, the potato beetle, cut worms, leaf rollers, apple aphid, and the hosts of the parasitic fungi without common names; and such plant diseases as fire-blight, powdery mildew, downy mildew, black-knot, strawberry spot disease, apple scab, peach curl, peach yellows, bitter rot, strawberry rust, etc., etc.; and such subjects as "Spraying for Codling Moth," "Black-rot of the Grape," "Black-rot of the Sweet Potato," "The Forest in Relation to the Orchard," "The Theory of Fungicides," "Experiments in Treatment of Diseases of Plants," "Fungicides and their Application," "What to do with Peach Yellows," "Bacteria and Plant Diseases," "Does it pay to Spray," and so on through the horticulturist's library.

Not only has the general government recognized this important relation of biology to horticulture, but the State experiment stations are publishing whole libraries of biologico-horticultural literature, so much indeed, that if the horticulturist would take time to read it all, his orchards and gardens would fast revert to primeval forest conditions for want of pruning and cultivation.

The pure *culture value* of an extended scientific study and knowledge of animals and plants, is as great as that of a study of mathematics, history or literature, and herein, in *very truth*, lies the most important relation of biology to horticulture.

The horticulturist who does not see more *beauty*, and have a greater source of *happiness* in a *great thought*, or a *lofty conception* of the Infinite as manifested in the *marvelous works of nature*, than in the gold for

which he sells his hard-earned fruits, has failed in the highest purpose of life. The *richest* and *most practical* horticulturist is he who, not only intelligently and successfully cultivates his own gardens and orchards, and enjoys the comforts and pleasures of his well-earned prosperity, but who *unselfishly* takes *pleasure* in his *neighbor's prosperity*, and through the broad scope of his intellectual and spiritual vision *sees the marvelous forces and laws* of the *Infinite*, as they are shown forth in the countless forms of animals and plants, whether found in his garden or orchard, as friends or enemies, or found in the remotest lands or seas.

Secy. Goodman asks for information in regard to blight, and whether pear blight and twig blight are the same.

Prof. Seawell.—Blight is a bacterial disease, and the same blight affects apples, pears, hawthorns and other members of the Rose family. If it be allowed to live near by the orchard in hawthorn trees, it is likely to spread to orchard soon afterwards.

Secy. Goodman.—There seems to be one class that runs way down in the branches and we were led to suppose twig blight was different.

Prof. Seawell.—They are caused by the same bacteria. Sometimes goes down the trunk. It may be checked by a change in conditions. If the wet, warm season passes away, it may be stopped. Bacteria does not live in the inner bark. It survives the whole year in the tree in what is called the resting spore in its life history. The bacteria was discovered in 1879 and researches were made between 1890 and 1895.

A PLEA FOR HARDY PLANTS.

(Mrs. G. E. Dugan, Sedalia, Mo.)

Have you ever tried to imagine what a desolate and gloomy place this world would be without flowers?

I have sometimes found myself thinking that if women and girls waged such a relentless warfare against the flowers, as is persisted in by many thoughtless men and foolish boys against the birds, we should either cease to exist because of the devastations made by insect life, or else become ruthless barbarians.

Few persons, comparatively, ever estimate the refining influences of flowers. They come to us with their message of love, and their wealth of beauty, so simply, so unostentatiously that we do not fully appreciate

them, but accept them with unthinking indifference. I thank God often that He permitted me to realize the persuasive, silent mission of these messengers from paradise.

"I love the flowers that come about with spring,
 And whether they be scarlet, white, or blue,
 It mattereth to me not anything;
 For when I see them bright with sun and dew,
 My heart doth overflow with such delight,
 I know not blue from red, nor red from white."

Every garden, however small it may be, has within it something of paradise. When the sweet procession of beautiful blossoms comes tripping along so gaily in the early springtime, how our hearts rejoice, how glad we are that winter's reign is over, and that we have sunshine, verdure, and the flower-scented atmosphere again.

Each sentient and sensitive soul feels renewed in spirit, and wonders how it is that the world seems to be growing annually more fascinating, and thinks that the eternal gardens cannot be much fairer than are those here which a beneficent Father has given to his children.

Nature is very kind to us, much more so than we are to ourselves, or to each other. We ignore her lessons, disobey her laws, and receive her benefits with careless, unthankful hearts.

With little expense, not a great deal of care, and with no trouble, we can have gardens of hardy plants blooming annually, and bringing joy to our hearts, blessing to our souls, and happiness to every friend who visits us. A judicious selection of perennials will assure more satisfaction than any other form of floriculture.

When the sun of our life begins to decline, and the hills of light are growing nearer, we begin to care more for the hardy plants, which require little attention, after they are once established, and when we have them we appreciate their value more and more as the years go by. Have you ever noticed how persistently the memory of some beautiful garden or lawn will cling to you until after many years you can close your eyes, and by some occult spiritual sight, see again the beautiful plants you were enraptured with, so many years ago.

Fully twenty years ago, I was going north from our little city, and saw just at the top of a long hill, a large, old-fashioned southern house, with its wide verandas, and railed-in galleries, over which rioted a profusion of vines, including roses and honey-suckles. The house was set well back from the road, and was reached by a wide driveway which wound between a double row of lilac bushes. The month was April—one of those smiling sunny Aprils we used to have in the long ago—and those bushes were in full flower; each had been trained and trimmed up

to a perfect tree and each tree was a faithful copy of the other. The air for some distance was full of fragrance. Taken altogether that picture is one of the most interesting in the large scrap-book of nature studies held tenaciously in my memory.

To me, one of the most interesting of all the many admirable traits of the hardy plant is its constancy and its few requirements. When once it is established, it will grow and blossom with annual regularity, often improving with the years, and always hiding away in its life a wealth of perennial surprises.

"Oh, the snow drops are in bloom!" cries some enthusiast who has been searching the garden borders for early treasure.

A few days later from the direction of the bulb-bed comes a rapture-full voice, fraught with the importance of a great discovery, crying out, "Did you know the crocus blossoms were out?" You hurry away to behold this vision, and sure enough there they are, more beautiful you imagine, than ever they were before, so that you have a sensation, somewhat, I suppose, like that which thrills the gold seeker's heart when after weary years of prospecting, he suddenly strikes a vein of rich ore.

There is something to admire, to create enthusiasm, even to cause a feeling of awe, in beholding the great variety, and marvelous beauty of the hardy plants. One Easter day some years ago, while visiting a friend in Kansas, I saw a front door-yard actually glorious with its decoration of snow-white Bermuda lilies. There were hundreds of them in full bloom, and thousands of buds. I have never seen a more impressive floral spectacle. This recalls one of my pet ideas concerning flowers; perhaps I may have exploited it before this Society on a previous occasion, but I will crave the privilege of saying again, that each individual should courageously express his own tastes and preferences in the plants he cultivates; and the manner of arranging them on the lawn, or in the garden.

Since the paper read at a horticultural meeting several years ago, on "Individual Expression in Flowers," the opinions therein expressed have returned to me in various journals and magazines, but no matter if they were better dressed, or more fancifully decorated, I knew them at once for my own original ideas, and congratulated myself that I had had the courage to express them, disregarding the fact that they were new, and might be unpopular.

Emerson once said, "God will not have his work made manifest by cowards," therefore in horticulture, or in ideas, let us be faithful to ourselves, and original in our work.

A correspondent writing for *Current Literature* declares that "simple ideas, with every idea well planned and well carried out, result in the best

gardens. The garden must be yours, if it is another's, it is not worth while to you. A good garden is the one that gives the most pleasure to the owner. He may grow orchids or thistles. The measure of success in a garden is the sensitive mind, not the plants. A garden is for the affections."

Many persons have I known who cultivated gardens because they loved them. In Sedalia there is a practicing physician, a refined, courteous gentleman, who is a rose specialist. I often drive past his home to look at the roses. They are not hidden behind an unsightly fence, nor concealed in any way; they flaunt their beauty right out in the front yard, for every passerby to enjoy. Personally, I dislike selfish gardens; they always seem to belong either to foolish or selfish people.

Its permanence is a strong plea for the hardy plant. In thinking of England, I often wish I might wander in one of those old gardens, the magnificent heritage of that land; gardens which can boast of a continuous existence and history, reaching back to the Tudor period. Who that really cares for gardens, would not wish to see those in England?

In some of the eastern states are gardens of hardy plants, over a century old, whose histories would be very interesting could they be given.

In our own state are a few gardens with pleasing, if brief, histories. A friend wrote me in February, from near St. Louis, of a garden which I have ever since wished to see. "There is," she says, "a spot near here that I would like to have you visit. It is where I had my flower garden in girlhood. Great clumps of lilac bushes and clusters of maiden blush roses, set out by my mother, who has been dead thirty-four years, flourish and blossom there. The year before she died, she brought a few sprigs of trailing myrtle and planted them in a flower bed. They have spread over the whole garden site, and it is now carpeted with the pretty evergreen vines. Today in the midst of a snow storm, I went over to the myrtle grove and gathered a big bunch of myrtle blossoms and white violets. The house in which we lived has fallen down and been carted away, and that old garden in the middle of a field makes sensible people often remark, 'Why don't you cut down those trees and grub up those bushes? Aren't they in the way when you cultivate? Of course they are, but—well, the more sense people have, the less they understand. It is only sentimental people who understand such things as that solitary old garden in the field.'"

That last remark contains the gist of the whole matter. Those who care for flowers must be classed with the sentimental people, and I rejoice that this company is rapidly increasing in numbers.

There is a growing taste for gardening, especially among women, and to all who love to plant and cultivate flowers, I would urgently recommend a generous invoice of the hardy varieties. It is true that they bloom but once a year, but they make up in radiance what they lack in continuity, and by careful attention to selection, one may have a succession of flowers of pleasing variation, superior to the monotony of perpetually blooming plants. After July, I am always disinterested in geranium blossoms, and have a feeling that I never want to see another.

It is now a fad for women to cultivate plants, and for once the fadist has something useful to occupy her brain. The Hon. Mrs. Anstruther, writing for the Cornhill Magazine, says, "She who would now be modish, must cease to be a housewife, and become a garden wife." She says also that "the housewife is a social incubus, while the garden wife is a social success." In America the two occupations go together, and she who is the best housewife is usually the most interested in floriculture. You might wish to ask me what hardy plants to cultivate. I should reply by saying "Those you most admire." Make your selection carefully. Among the hardy plants that I have found satisfactory, are the lilacs, syringas, spireas, honey suckles, altheas, California yellowbells, japonicas, weigelas, and as many hardy roses as one has room for, including the polyantha group. Also the snowballs, especially the new Japanese variety. For climbers, I like roses, the Seven Sisters, Prairie Queen, and Baltimore Belle, I also like the Clematis, and the Dutchman's Pipe vine.

In bulbs, if you cannot have them in all varieties, you may choose from this list; Snowdrops, ixias, spiraxis, grape hyacinth, crocus, lily of the valley, tulips, hyacinths, narcissi, jonquills, all of the family of lilies, the iris in variety, the peonies and daffodils. Then plant all the trees that you admire and have a place for. I omitted the hardy phlox, which is very pretty and effective, either in clumps or hedges; the Bleeding Heart, the Columbine and hardy Chrysanthemums. Plant from any of this list carefully at the proper time of year, be sure that soil conditions are right, and you can have each spring a succession of flowers that will be a continuous surprise and delight throughout the season.

Any honest florist from whom you buy your plants, will tell you how to plant them. Never do any garden work in a haphazard way, because you will, in so doing, simply waste your time, and brew for yourself a bitter cup of disappointment. Everything planted in my garden from a pine tree to a crocus bulb, is either done by my own hands, or under direct

supervision, a supervision so direct, positive and insistent, that it is difficult for me to hire masculine labor. I have the name of being very hard to please. I rather glory in this name, except when I need the strong hand of a man to assist with the work. This spring I planted out a dozen trees, and as many grape vines. The colored gentleman who condescended to do the digging, kept up a fire of comment something like this: "That hole's plenty big enough for that tree." But the roots will be cramped, I tell him. Dig out the corners more. "Law'see" says Mr. Dark-man, "what if they is crowded? I'se planted out apple trees many a time, big orchards of 'em, and dug leetle holes, jest big enough to crowd 'em into, that's the way I allus did plant trees before." "Do the trees you plant all live?" I questioned. "No, of c'ose not every one of 'em; some allus does die." "Not when I plant them," I said with emphasis, and he manifested incredulity by a grunt of disapproval, which said as plainly as words, "I don't believe it."

He was to come back the next day and do some more spading, but he did not appear. I went after him, and found him leaning against his cabin, smoking a cob pipe. "Why didn't you come back this morning, as you promised?" I indignantly demanded. He replied with that aggravating slowness, that makes one long to hurry speech with a stout club, "Wa'll, ye see, I'se jest waitin here for Mr. D. to send for me. I'se goin' to carry hod for his masons."

"Do you call that easier work than gardening?" I asked. "No'm," he drawled, "'taint no easier and it ain't no harder, when folks is as hard to please as you-all is." "You-all" was only myself, but he politely included my husband, who was down town, the hired girl, who was in the kitchen, and the cat asleep in the barn loft.

The point is, one *must* be particular if he wishes the things he plants to survive, and grow in loveliness from year to year, and from generation to generation. I have never found that it made much difference whether one plants trees and shrubs in the fall or spring, if the work is done right, but it would be better not to plant at all, than to do the work in a slipshod way.

I must confess to a special liking for the homely, old-fashioned plants; I like the great clumps of those old-fashioned yellow lilies, the columbine and hollyhocks; even the tiger lily is a welcome member of my large collection of hardy plants. It may be that I like them because they were in my grandmother's garden, and so grew a place for themselves in my heart when I was very young.

Is it not something fine to be able to do even a little towards beautifying the world, and to make happier and better a few human hearts?

Nor is this a small insignificant ambition; a good garden of hardy plants may be a heritage left to children and grandchildren that will bless and benefit them far more than a legacy of mere gold. Whatever helps a life to grow upward into a purer light, a clearer atmosphere, or causes the finer feelings to take root and climb up to a more healthful place, is surely something worthy of notice and is an aspiration both noble and unselfish.

Mentioning my grandmother's garden recalls to mind an article written by Geneva Lane for a St. Louis paper last month. She says: "Grandmother's garden was the spot to which the sweetest memories cling. It was enclosed by a hedge and lay open to the southern sky; even the beds of homely vegetables were surrounded by boxed borders of flowers, and the walks were edged with rows of old-fashioned pinks, with their pale green leaves and soft, feathery blossoms, whose sweetness all the odors of Araby the Blest could not surpass. From the hedge leaned out great red roses with loose flopping petals and flaming hollyhocks lifted their stiff spikes of bloom. Such big gorgeous butterflies came to that garden, and such a saucy wren nested in a knot-hole of the grape arbor, and such a bonnie bluebird built in a gourd nailed to a tree, and such cheery, chattering martins accepted the little house set for them atop a pole; and they all lived in peace, for no quarrelsome feathered alien had then come to spoil their Eden."

In sentiments like these is hidden one of the strongest pleas for the hardy plants, for a garden around which clings such fragrant and tender memories, is something very sacred, and well worth cultivating.

J. Horace McFarland, in the April number of the *Household*, declares that we Americans do not care enough for the beautiful plants of our country, but that we continually neglect them to cultivate assiduously a few foreign introductions, so, while I am making this plea for hardy plants, let me include a special one for those belonging to our own country, and climate. This writer tells of a wonderful old garden on the Hudson, in which, he says "the quaint roses of generations ago are neighbors to exquisite Peonies and Iris, and where the grass goes to seed untouched by the lawn mower, and where the Honeysuckle and matrimony vine clamber at will over the portico, and where a black locust with more than three centuries of bloom, is flanked by mock orange and lilac bushes." He declares that this garden is always lovely, and almost cares for itself. There is no annual florist's bill to pay.

This last item is one that appealed to me with considerable force, for the florist's bill is no small matter, when one yields to the temptation to buy the exotics which so seductively adorn every greenhouse. I have

often thought that persons of weak will and limited means, ought never to trust themselves inside the florist's domain, which is surely enchanted ground in the spring time. I speak this from personal experience.

However, we may, if we will, have lovely gardens without the exotics, or the greenhouse either, for that matter. I have in my garden many hardy wild things growing, which are a source of pleasure to all of us. My list includes great clumps of Verbena, Sweet William, Solomon's Seal, Bleeding Heart, Blue Bells, Hyacinth, and Larkspur, Wild Violets in lavender, deep purple, pure white and yellow, the Little Johnny Jump-ups, and Pansies, Dogtooth Violets and Collinsia, both the blue and white, and pink and white, which come up each year self-grown and bloom beautifully.

This fall I shall plant out a Redbud and a wild Crabapple tree. Some relatives from Penna. who visited us in April were greatly pleased with the Redbud, and I was fascinated by an avenue of wild Crabapple trees that I came across during a country drive about the middle of April. They had been pruned up until only a full top was left, and at the time I saw them, these symmetrical trees were in blossom, perfuming the air for a long distance, and making me wish that I owned a Crabapple grove. Like Nesbit, I love wild flowers and can endorse all he says in this quaint old-fashioned poem which he calls

SERMONS IN FLOWERS.

The common kind o' flowers, Lord, you made a lot o' them;

The daisy in the medder is as clean as any gem;

The wild rose in the thicket is the ripest kind o' red—

It's purty, and it's happy—look at how it holds its head.

Them little dutchmen's breeches is a favorite o' mine;

I like to stumble on 'em with my eyes, an' catch their shine.

An', then, the johnny-jump-ups, noddin' soft when I go by,

An' as blue an' glad an' helpful as the ca'm midsummer sky.

The blazin' dogwood blossoms—how they flash along the road—

Come a-bloomin' in a minute, till a feller thinks it's snowed:

Lord, the hawthorne holds a sermon that is sent direct from you

An' the bendin' cherry branches, an' the elder bushes, too.

There's the perky dandelion bobbin' up so fresh an' bold.

Till the whole enduring hillside has its polkydots of gold;

An' the blossomin' May apple, hidin' underneath the trees,

Sends a tingin' sort o' flower till it coaxes out the bees.

The common kind o' flowers! Lord, I guess they like to grow

An' to fill the air with gladness just because you love them so.

Lord, I try to understand them an' my heart beats in accord

When I bend an' whisper to 'em: "For this blessing, thank the Lord."

In conclusion, let me urge you to make a selection of hardy plants, which includes all perennial things from grass up through smaller plants, then bulbs, shrubs and trees. With a judicious planting of hardy things,

and a dozen packets of annuals, you may have a garden that will be a delight to everyone who sees it.

Only a little energy, a few dollars in cash, and a determination to make plants grow, and almost anyone can have a garden, not only to enjoy himself, but to leave as a heritage to coming generations. What worthier ambition could one have than this?

Then plant sweet flowers! Hardy flowers,
That will grow and bloom from year to year;
Grow and bloom when these hearts of ours,
True hearts, that loved them, are not here.

HORTICULTURE A BUSINESS, SUCCESS ITS AIM.

(Prof. H. B. McAfee—Park College, Parkville, Mo.)

An agriculturist has been defined as a sort of farmer with no calouses on his hand. The same superficial view might consider the life of a horticulturist one continued picnic. Horticulture is undoubtedly a fascinating occupation; but for most of us its fascination depends, in some measure at least, upon our success from a financial standpoint. There are a few devotees of science who find sufficient compensation in the joy of studying nature's laws, but most of us are not satisfied until we have succeeded in transmuting our knowledge of nature's laws into the coin of the realm. Horticulture is a business and success is its aim. I would not be understood as stating that money and money alone is the goal of the horticulturist—such a statement would prove me out of harmony with the noble men and women who have constituted the advance guard in fruit growing in our grand state. They are men at whose feet I delight to sit and from whom some of my most valuable lessons have been learned. Success has crowned their efforts. They have not all gotten rich, but they have laid the foundation of one of the greatest industries of our state and the public is richer for their services.

The man to whom fruit raising is a mere pastime is a peril to the business. How many young aspirants for success in this field have been hopelessly swamped and finally discouraged by trying to follow the advice of such people. They break into our papers with wonderful theories and startling results of so-called careful experiments, all of which are valueless and misleading. They are not all as wild as the editor who wrote elaborate instructions for the planting of the seed and the cultivation of an oyster bed, but generally they are as innocent of any valuable knowledge of the subject treated. A careful student always looks first at the title page of a book to learn the author's name; so a wise student of the problems of horticulture will first ask for the credentials of the

writer or speaker. If he is a theorist only, or one whose experiences have not borne the fruit of success, he is not a safe adviser.

I employed a man once to take care of our dairy cattle. Within a few days a valuable cow showed signs of discomfort and there were signs of fever about the head. He proceeded to cut a slit in her tail near the bushy end and insert salt, binding up the wound full of salt. I am often reminded of this remedy by some of the articles I read regarding fruit raising; results attributed to causes which have absolutely no relation. The young horticulturist, and, indeed, all of us who are trying to be progressive, are constantly in danger from the advice of these theorists.

There is perhaps no other business, unless it be in the practice of medicine, in which there is so much room for rank guessing. In spite of this condition horticulture is a business and to be successful must be conducted as such. That is simply saying that we must use our judgment, carefully considering and weighing every advice and selecting from the mass of possibilities with the best wisdom at our command.

The merchant must study his markets both in buying and selling and has a wide field, but it does not compare with the field that is open for the horticulturist. If he masters his business he must study the laws of nature as governing soil conditions, effect of atmospheric changes, plant life, insect life, processes of growth and ripening, fertilization both of bloom and soil, and when he has covered all these fields of knowledge he is just where the merchant is when he starts in—he has still all the problems of market which the merchant has. He must know what to produce and where and how to dispose of his production. All honor to the man who has mastered the intricacies of such a business sufficiently to make a success of it.

THURSDAY, JUNE 4, 9 A. M.—BERRY GROWING.

MY EXPERIENCE IN GROWING STRAWBERRIES.

(J. R. Helfrich, Eldon.)

Our Vice-President, George T. Tippin, in his response to the address of welcome at our meeting last summer said: "One of the greatest sources of learning is the failures of others, engaged in horticulture." If this be true (and I believe it is) my experience in growing strawberries will surely be a great source of learning, for it has been more of a failure than a success.

It is an old saying, "bought wit is the best wit if you don't pay to dear for it;" but there are different ways to buy it, one way is by experimenting, another by reading and taking the experience of others, and I have come to the conclusion the latter is by far the cheaper.

As far back as I can remember any thing about strawberries, about the year 1870 or 1871, my mother planted a small patch in the garden, and when it came time for them to bear they had a nice crop of bloom, but very few berries, so she thought she had planted them in the wrong sign, and the next spring she took some plants from this same patch and planted another bed; taking special care to plant them in the right sign, and the result being the same as the first patch she gave up trying to grow strawberries. I don't remember of ever seeing strawberries on my father's table. I would be ashamed to tell this if there were not hundreds and thousands of families all over our land just the same. No wonder so many of our farmer boys want to go to the towns and cities. After I was married and had a home of my own, I concluded I would grow some strawberries; and being told to plant them in the light of the moon, I thought I would make it doubly sure, so waited until the night the moon full, and planted them by moonlight, but it happened to be a dry moon and my berries all died. Then, after I came to Missouri—the land of big red apples, where strawberries can be raised by planting them in the ground, instead of the moon, I thought now I will grow strawberries; so about the first of August I prepared the ground, and the latter part of the month we had a good rain, then I drove 20 miles to a nursery and bought two thousand plants, 1,000 Crescents, 500 Greenville, 200 Warfield, 200 Parker Earl, 100 Miner's Prolific. I commenced on the west side of the patch and planted four rows of Crescents, then the next four rows I planted half through with Greenville, and finished out with the Parker Earl, Warfield and Miner's Prolific; then I had thirteen rows left, so I went to a neighbor that had an old patch that he intended plowing up, and got plants enough to finish the patch. Then the work began. I soon found the ground was pretty foul, and I had a tussle with the weeds, but it was not my first experience with weeds. I knew what to do with them, and I succeeded in getting a fair growth of vines that fall. I became interested and began to read up some and soon found I had made one serious mistake in setting each variety separate without some fertilizers with them, but fortunately they were considerably mixed and had enough perfect flowering varieties with them to fertilize them. As stated above, I planted in August. The next spring we picked a few messes, the following spring we had a fair prospect, but on the 19th of May, just as the berries began to ripen a hail storm

in connection with almost a cyclone, struck them and after the storm the patch looked like it had been mowed and everything raked off—a little discouraging but I did not give up. I began cultivating again, thinned them out some and by fall I had a very respectable looking strawberry patch again.

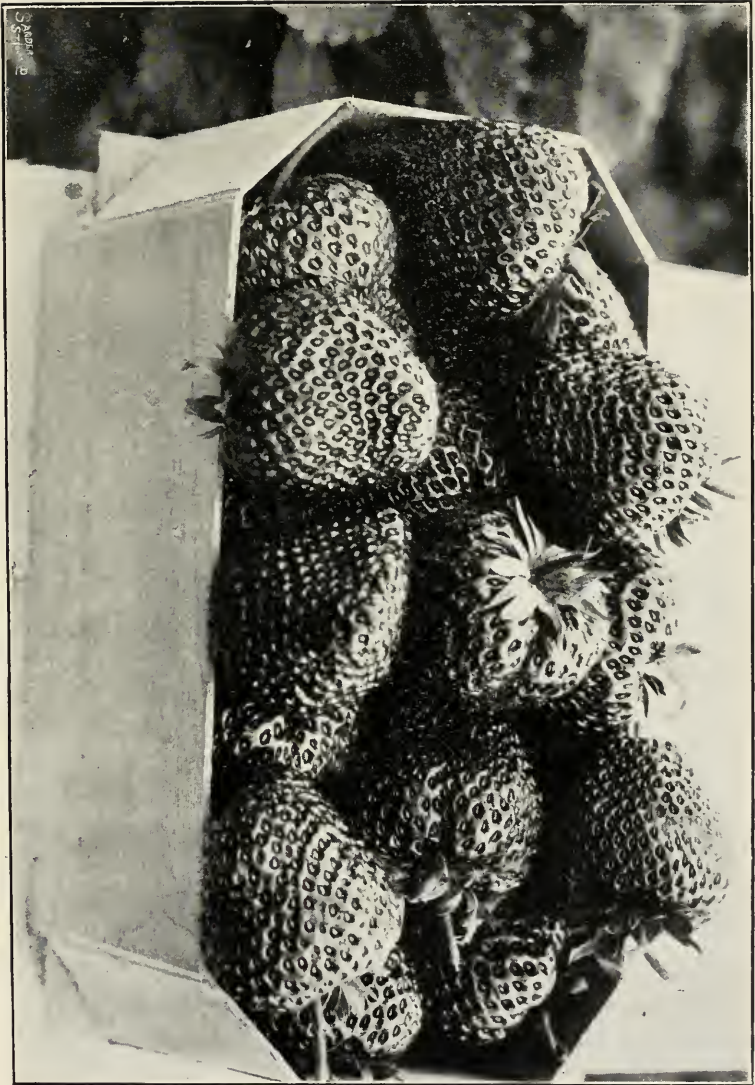
The next spring we picked about 200 gallons, the four rows of Crescents yielded about as much as all the balance of the patch, the thirteen rows taken from the old patch hardly paid for picking, the vines were nice, but berries were small and imperfect. Since that time I have tested a good many different varieties. I am now growing Crescent, Warfield, Haverland and Bubach, with Bederwood, Brandywine and Glen Mary as fertilizers. Then Crescent has been my favorite from the first, but the Warfield, Bubach and Haverland are much larger and this year they are about as full; the Brandywine is my favorite for a late fertilizer. The Glen Mary has not proved to be what it was recommended. I plant a new patch every two years. I expect to plant another patch next spring. I will plow under a patch of cowpeas this fall; next spring as early as possible I will plant them in rows four feet apart, setting plants eighteen inches apart in the row; give them thorough cultivation, keep in matted rows about 18 inches wide, after the ground freezes will mulch lightly with straw (I have tried bagoss and sawdust, but prefer straw) the next spring I will remove only the thickest bunches of straw.

I expect to plant largely of the Bubach, Warfield and Haverland, but will not give up the old Crescent, and for fertilizers will plant Brandywine and Bederwood, but will select some other variety in place of the Glen Mary. I have never used commercial fertilizer until this spring. I sowed it broadcast over my patch about the time they commenced blooming at the rate of about 200 pounds per acre. After they are through fruiting I expect to thin them out and give another liberal dressing of fertilizer. Will also use some unbleached wood ashes. As stated above, I have never used commercial fertilizer before, but have seen it used with good result.

STRAWBERRIES—DISCUSSION.

A. T. Nelson.—For early berries, I like the Cumberland, Haverland and Bubach.

Mr. Markey.—I have not had much experience with strawberries, but I will say this spring the Haverland and Warfield have been the best crop with the Crescent next. We use Michell's Early to fertilize the Crescent.



Box of Aroma. F. H. Speakman, Neosho, Mo.

Pres. Robnett.—Can any one tell which is the better bearer—Excelsior or Michell's Early?

J. E. Mohler.—I planted five hundred of each a few days ago. The Excelsior is a sure bearer. The Mitchell is not so large, but is good. The Excelsior is a dark red, slick berry.

Mr. Markey.—I would like to ask about the Aroma. I notice in South Missouri and Arkansas it is grown quite extensively and is spoken well of.

G. T. Tippin.—The Aroma has been very satisfactory in South Missouri ever since planted. In fact, I believe it has more friends than any other variety. It is not so good this year, as it was injured by the frost. Still, it has proven to be the best commercial berry we have in South Missouri. The Haverland and Gandy will give the largest yield this year, having escaped the frost. In naming varieties to plant, I don't know what is best. I think the locality should govern that. At Springfield I would plant Warfield, Haverland, Aroma and Gandy. We plant for only home use, as we are in the middle of the strawberry region. I believe those are the best four varieties. I would plant largely of the Aroma. A good many plant the Excelsior, but they do not plant the Michell to amount to anything. The Excelsior is a very sour berry.

J. B. Wild.—For the early berries we plant the Michell's and Johnson's Early. This year Johnson's Early was better than last. The Aroma is largely planted. The Gandy did not do well this year. The Warfield is planted a good deal; the Crescent not as much as formerly, but still planted to a large extent.

Mrs. Moore.—We are making heavy planting at Mountain Grove of the Aroma and the Gandy.

Mr. Markey.—What about Parker's Earle?

M. Tippin.—Parker Earle in rich soil is a success. It has to have strong soil and plenty of moisture.

Mr. Markey.—I want to plant a good many berries next spring. I have some bottom land and wonder if the Parker Earle would be a good variety to plant there.

Secy. Goodman.—About Kansas City the Parker Earle is considered the leading variety as much there as the Aroma in South Missouri.

B. C. Auten.—I would like to know what is the best berry for home use.

J. E. Mohler.—I have a good many varieties. We have some that are good one year and not good the next, but among those I am acquainted with, I think the Crescent, Warfield and Haverland are the best three varieties, and of course, pollinizers. The Bubach is a fine berry but we do not know when we are going to get a crop.

C. H. Dutcher.—What is the best fertilizer for the Haverland?

A. V. Schermerhorn.—The Clyde in Illinions.

Prof. Dutcher.—How about the Lady Thompson?

J. T. Stinson.—If you used the Lady Thompson and the Clyde, they would do all right.

Mr. Markey.—The Wolverton is used by some.

Prof. Dutcher.—Last year I got good out of the Cumberland.

Mr. Schermerhorn.—Do you not think it better to fertilize with large berries? In my experience it is much better to use something larger to fertilize large berries with.

Prof. Stinson.—In a large commercial field, we find it to be a bad proposition. It is a bad thing to have berries not similar to put in a car load. You find it an advantage to have similar berries. The Wolverton is a good thing as a fertilizer. It is a bad scheme to have a berry like the Michell's Early in a Flaverland bed, because they are gone before the Haverlands come in. If you can arrange it, it is a good scheme to have berries that ripen near the same time.

Mr. Gilkeson shows specimens of twigs which are blighted and asks for information. Pronounced twig blight by Prof. Stinson. Secy. Goodman contended that it was different from pear blight. Prof. Stinson, however, contended that twig and pear blight were one and the same. Referred to Prof. Whitten.

VARIETIES OF STRAWBERRIES.

(H. W. Jenkins, Boonville.)

Solomon said "That of making many books there is no end; and much study is a weariness of the flesh." Had Solomon lived in this day and age of gaudy pictured nursery catalogues he might well have said there is no end to the new varieties of strawberries and much study over the catalogues in the selection of varieties to plant is a weariness of the flesh. For each spring comes on a new crop of novelties and wonders. Larger, better colored, more productive, hardier, in fact each new comer that comes forth for public recognition is the acme of perfection, produced by scientific methods of cross fertilization. A royal thoroughbred and of course with a pedigree and generally backed by a testimonial from a Ohio man or the other fellow from Michigan.

With each annual crop of these scientific wonders comes a crop of suckers ready to purchase them at fabulous prices. For in every fruit grower's heart is a desire for better things and he allows his cupidity to

overrule his better judgment, so the promoters of paper colored berries find ready sale for their prodigies, and the merry war continues from year to year.

The present spring the writer read a circular from the introducer of a new variety—"The Lazy Man's Berry," for the man who belonged to the No Sweat Club. This he claimed would do no good if cultivated, but should be grown only in fence corners, blue grass pastures or any place where it should be left to its own way of growing when it would completely and utterly kill out all grass, weeds, buck brush, etc., and produce berries so profusely that you could simply scoop up the berries by the bushel. I did not purchase, because our Boonville market can only consume so many, no more.

But enough of this—I think it a good plan to get a few plants of these new varieties each season and test and try them, as that is the only way any one can determine their value. Of course all of you know that strawberries are divided into two general classes; perfect bloomers or staminate and imperfect or pistillate; the latter class I regard as the most productive when properly fertilized and some of our best varieties are found in this class. To my mind a perfect berry should have, first—vigor in plant growth, strong, healthy foliage and good system of roots. The fruit should have size, color, good flavor, good shape, be smooth, firm, and productive. But alas, how many possess all these good qualities? Nearly every one is lacking in one or more of these essential points, some have size and color, but not productive, others poor color, not attractive to the eye, etc. At the same time, soil and surroundings have a great deal to do with making perfect berries and what does well in one locality fails in another. For example, the famous Hood River berry of Oregon, 'tis said, will do no good in any other valley or place except its native home. To enter into a minute description of each variety that has been grown or tested by the writer in the past 20 years would consume too much time and space. I will say here that more new varieties have proved disappointments, some highly recommended are utter failures, so that the only safe plan for any one in making a selection of varieties is to plant and test for themselves and when a variety is found that succeeds, then stick to it.

I am fruiting the following varieties, the present season: Aroma, Bubach, Bederwood, Brandywine, Clyde, Excelsior, Gandy, Greenville, Haverland, Klondyke, Michell's Early, Monitor, Parker Earle, Robinson, Ridgeway, Seaford, Splendid, Up-to-Date, Warfield and an early variety, don't know the name and pass my opinion.

Aroma, vigorous plant, large, soft, not productive; Bubach, vigorous plant, healthy, large, good color, productive; Bederwood, small plant,

rusts, small, poor color, productive; Brandywine, vigorous plant, large, poor color, fine flavor, not productive; Clyde, poor plant, large, poor color and flavor, very productive; Excelsior, vigorous plant, medium size, good color, very sour, not productive; Gandy, vigorous plant, large size, fair color, late, not productive; Greenville, vigorous healthy plant, large berry, fair color and soft, very productive; Haverland, vigorous plant, large berry, well colored and very productive; Klondyke, vigorous plant, medium berry, pale color, productive; Michell's Early, vigorous plant, small, inferior, soft, not productive; Monitor, resembles the Clyde, is very productive; Parker Earle, vigorous plant, medium berry, good color, very productive; Robinson, vigorous plant, medium berry, fine color and flavor, not productive; Ridgeway, fine plant, medium berry, fine color and flavor, not productive; Seaford, same as Bubach; Splendid, poor plant, large, good color, not productive; Up-to-Date, failure in nearly every respect; Warfield, poor plant, medium berry, good color, very productive.

The Haverland, all things considered, well deserves to be crowned queen of strawberries; comes early and stays to the end, "is no quitter," and if I could only find a staminate with as many good points, I would discard all others and grow only the two varieties, as that would be all I would need for either home use or for market.

LIST OF BEST VARIETIES OF STRAWBERRIES.

A. T. Nelson, Laclede—Cumberland, Haverland, Bubach, Gandy.
Mohler, Johnson—Michell, Excelsior, Sower.

J. B. Wild, Jasper county—Michell, Excelsior, Haverland, Aroma, Ridgeway, Lady T., Warfield.

E. C. Markey, Johnson county—Haverland, Wolverton, Crescent, Michell Early.

G. T. Tippin, Greene county—Aroma, Haverland, Gandy, Warfield.
Mrs. Moore, Webster—Aroma, Gandy.

C. H. Dutcher, Johnson county—Crescent, Haverland, Bubach.

J. T. Stinson, Webster county—Aroma, Haverland, Gandy, Mooley, Crescent, Warfield, Haverland.

M. Butterfield, St. Francois county—Lady Rusk, Clyde, Ruby, Gardner.

RASPBERRIES.

(Samuel D. Gregg, Independence, Mo.)

To the members of State Horticultural Society:—I have been notified that I am on the program for a paper on raspberries. To begin with, the raspberry is one of the best, yes the very best, fruits we have in its season, usually from June the 12th, until July the 10th.

How to Set Out Raspberries—Procure tips of the Black Cap varieties, in the spring, set in rows six feet apart, and three feet in the row.

How to Cultivate—The first year keep clean top, 15 inches high; cultivate level until about middle of July, then cultivate so as to leave a drain in the center of the row. The second and third years, top 18 inches to 2 feet, but do not make the mistake of most raisers of topping too high, for the wind will have a greater purchase on them in summer, and storms and heavy snows will break them down worse in the winter if too tall.

Spring Pruning—This should be done not too early, as a subsequent freeze would kill them back and necessitate another clipping, but do it about the time the buds begin to swell in the spring. Do not make the mistake of cutting the canes too long as many do—thinking they will get more berries by so doing, and if they do they are small, but prune according to vigor of plant or number of canes left, say about eight inches from main stalk; commence the cultivation and keep it up until berries are all gathered, then finish with a center drain, as the bushes will not stand much water.

Manuring—Scatter well-rotted barn-yard manure, in small amounts, as too much is liable to create fungus; for berries, wood ashes is the best I have tried, and new fresh dirt from the forest is better than barn-yard manure.

Of Pests—Some seasons, early in spring, the cut-worm does a great deal of harm by cutting off the earliest canes which are the best—this last spring a small worm would get into the center of the cane and kill it down within three or four inches of the ground, these would better be cut out and let new ones come, for the cane so killed by worm throws up too many small canes from the stool which is left. Pull out surplus canes to four or five, then in spring pruning thin out to three canes, then the berries are larger, and the best plan for increasing the yield is to increase the size of the berries, by so doing you increase the market value and have quicker sales.

Diseases of Raspberries—I believe that the red rust a fungus is the principal one or about the only one that has come under my knowledge. This, if taken in time, can be controlled by using fungicide, but better dig up and burn all infected plants.

Varieties—Doolittle is an early but very good one, the Hopkins is also an early berry and more productive than the Doolittle. The Miami is a very good berry, called by some Mammoth Cluster. The Kansas is a larger berry and a good bearer. The Gregg originated in Ohio and is the largest berry of which the plants are on the market. The Missouri is the largest of all, often measuring an inch to one and one-fourth inches in diameter. Merchants of Independence have given them the preference of all other berries. Plants not on the market. Berries will be on exhibition at St. Louis Fair, 1904.

RASPBERRY—DISCUSSION.

E. B. Katherman.—We have tried something like ten varieties of raspberries and have dropped everything but the Kansas. No variety stands frost like the Kansas. The Kansas will bear if any variety bears.

Secy. Goodman.—What kind of soil have you?

Mr. Katherman.—We set out raspberries in a dry, sandy soil, three to four and a half feet apart.

Secy. Goodman.—Do you set them in hills?

Mr. Katherman.—Yes, sir; we do not plow both ways, except to cut the weeds in the spring.

Secy. Goodman.—Does not that seem close before fall comes?

Mr. Katherman.—No, sir; we always keep them cut close. We top them once a week during the summer, letting the laterals grow till fall. If we want tops, we cut them, if not, we let them grow until spring. To get good plants, they should be topped.

Mr. Markey.—I find that if we want the best plants, the best plan is to keep it low and keep the laterals trimmed within seven or eight inches from the main vine. In that way they are not mashed down. We put three or four stalks in the hill.

Secy. Goodman.—The Kansas raspberry with us grows so that we plant the rows eight feet apart and four feet apart in the row. Even then the branch covers the ground so that we have to cut in the fall and they grow thick enough to keep the weeds down and have little trouble with them. If they top, head them back. We leave the tops until spring. Never prune in the fall. Seems to keep the plant in better shape and

condition. We prune about April the next year. I believe in pruning rather closely.

Mr. Gilkeson.—How long does the old stock last?

Secy. Goodman.—One year. While one is bearing, we are raising another for the next year. We prune from six to fifteen inches and then sometimes the branch bends. We find it easier to cultivate and take care of large quantities in that way. The plants grow in the summer, bear the next spring and then die. Some people remove the old canes as soon as they die. I believe this is wrong. We should leave these until the next spring when we trim the laterals, then cut the old canes away. They are a protection to the new canes.

Pres. Robnett.—If you leave the old canes until spring, when the laterals are cut you can get at them better.

HISTORY AND PUBLICATIONS OF THE STATE HORTICULTURAL SOCIETY.

Second Paper (T. A. Sampson, Secretary State Historical Society, Columbia, Mo.)

Without repeating all of the facts stated in a former paper on the History and Publications of the State Horticultural Society, which was published in the 33d annual report of the Society, it might be well to recall the organization of the Society in 1859, under the name of the Missouri Fruit Growers' Association, which name was changed at the meeting of January, 1862, to that which it still bears.

The first president was Norman Colman, afterwards Lieut-Governor of the State, and later a member of President Cleveland's cabinet as Secretary of Agriculture, and still an active member of this and similar societies. George Husmann, Professor Swallow, General Minor, General Edwards and other prominent and well known men took part in the organization.

The Society has been fortunate in having men that it could retain in office a long time. Among these may be mentioned Henry T. Mudd, Governor Colman, S. M. Tracy, L. D. Morse, William Muir, John C. Tice, D. S. Holman, N. F. Murray, J. C. Evans, A. Nelson and L. A. Goodman, the present efficient Secretary, who has filled that office since 1882. Mr. Evans was president for nearly the same length of time.

It has been stated that the Society became dormant during the Civil War, and was afterwards re-organized, but such is not the case. Annual meetings were held in 1861, 1862, 1863 and 1864, and officers have been regularly elected each year from the beginning.

At the meeting in June, 1902, the Society decided that all who had paid their membership fee for ten years should be declared life members. Under this resolution, twenty-eight persons became life members, making the total number of these at the date of the last report forty-six.

The Society has accomplished an untold amount of good for the State by exhibits of fruits at its annual and semi-annual meetings, at the meetings of the American Pomological Society, of the Mississippi Valley Horticultural Society, at the St. Louis Fair and St. Louis Expositions, and at the Expositions held at New Orleans, Chicago, Omaha, Buffalo and Charleston.

Through the influence of the Society the Governor appointed a day to be called "Arbor Day," for the planting of trees and ornamentals, and for the ornamentation of the grounds of the State Institutions and of the public schools.

The benefit from the publications of the Society has not been as great as it should be. Unfortunately there are some farmers who do not read anything, and there are others who think that because the annual reports of the Horticultural Society and of the Board of Agriculture are published for free distribution that they are of no value. If a law could be passed to compel every farmer to read these books through each year, it would return one hundred fold the cost of their publication. The subjects treated in these publications are varied, and of interest to many outside of the farmer and horticultural classes. The subjects of ornamentals, flowers, small fruits, nuts, entomology by Miss Mary E. Murtfeldt and Professor J. M. Stedman, mushrooms by Professor Trelease, and other similar subjects are treated, while the student of history will find in the 37th report an interesting account by Mrs. H. E. Shepard of the early explorations in Southern Missouri by DeSoto, Joliet and Marquette, Hennepin and La Salle, Pike, Schoolcraft, Catlin and Featherstonhaugh.

The history of the Society before mentioned brought the data to 1890, and meetings have been held each year since in June and December. The following table gives the three principal officers who were elected at each December meeting for the year following:

OFFICIAL REPORT OF THE MISSOURI STATE HORTICULTURAL SOCIETY.

Year.	President.	Secretary.	Treasurer	Report No.
1890.	J. C. Evans.	L. A. Goodman.	D. S. Holman.	33
1891.	"	"	A. Nelson.	34
1892.	"	"	"	35
1893.	"	"	"	36
1894.	"	"	"	37
1895.	"	"	"	38
1896.	"	"	"	39
1897.	"	"	"	40
1898.	N. F. Murray.	"	"	41
1899.	"	"	"	42
1900.	"	"	"	43
1901.	D. A. Robnett.	"	W. G. Gano.	44
1902.	"	"	"	45

The following is the list of Honorary Life Members at the time of the beginning of the present annual meeting:

R. H. Jesse	Columbia
A. A. Lesueur	Kansas City
J. C. Evans	Harlem
Miss M. E. Murtfeldt	Kirkwood
C. W. Murtfeldt	Kirkwood
N. J. Colman	St. Louis
M. G. Kern	St. Louis
B. T. Bush	Independence
B. T. Galloway	Washington, D. C.
Conrad Hartzell	St. Joseph
H. E. Van Deman	Parksley, Va.
J. T. Stinson	Mountain Grove
Frank Holsinger	Rosedale, Kas.
William H. Barnes	Topeka, Kas.

The numbering of the reports perhaps needs some explanation. The meeting for the organization was in January, 1859, and the meeting in December of the same year was called the first annual meeting, and this numbering was kept up until the 18th meeting in December, 1876. The next meeting was in January, 1878, and the report of this meeting was

not printed until 1893, and the meeting of January, 1879, was called the 21st, there being two numbers omitted for the one meeting not printed. When this was printed in 1893 it was called the 20th, still leaving one vacant number. There is, however, an apparent gain of one number since that time resulting from the change of time of meeting from January to December, by which two meetings were held in 1880. So the present numbering is correct if we include the meeting for the organization, the present meeting being the 46th including that one.

In the paper in the 33d report I gave my experience in trying to find certain annual reports of the Society in some of the leading libraries of the State, and among others named the State Historical Society. The State Society was not then in existence, and the reference should have been to the Missouri Historical Society of St. Louis, which is not a State society but a local one of the City of St. Louis. The State Historical Society of Missouri, located at Columbia, has all of the reports of the Society except the original pamphlet copy of the meeting of January, 1874, of which I do not know of a single copy in existence. The reprint can easily be obtained. It was published in 1894, but the title page does not show that it is a reprint, and like the original bears the date 1873, although the meeting was actually held in January, 1874.

The following bibliography is a continuation of that of the 33d report. The 15th report, January, 1874, was reprinted in 1893, as before mentioned. The 25th report, 1882, was also reprinted the same year, the reprint bearing the date 1883, although issued in 1894.

Twentieth annual meeting of the Missouri State Horticultural Society for 1877, held in Sedalia, Mo., January 29, 30, 31, 1878. J. C. Evans, President, Harlem. D. L. Hall, Secretary, Kansas City. Jefferson City, Mo., 1893; 19 pages.

Note.—This was also included in the 35th annual report.

Thirty-third annual report of the State Horticultural Society of Missouri, 1890. Held at Clinton, Mo., Dec. 2, 3 and 4, 1890. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1891. 582, V. p.

Thirty-fourth annual report of the State Horticultural Society, 1891. Meeting at St. Joseph, June 2, 3, 4, and Sedalia, Dec. 1, 2, 3, 1891. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, Mo., Tribune Printing Company, 1892. 399, II p.

Thirty-fifth annual report of the State Horticultural Society of the State of Missouri, 1892. Meetings at Chillicothe, June 7, 8, 9, and Carthage, Dec. 6, 7, 8, 9, 1892. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1893. 323, II p.

Note.—This also contained the report of the 20th annual meeting of January, 1878.

Thirty-sixth annual report of the State Horticultural Society of Missouri, 1893. Meetings at Columbia, June 6, 7, 8, and Fulton, Dec. 6, 7, 8, 1893. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1894. 384, VII p.

Thirty-seventh annual report of the State Horticultural Society of Missouri. Meetings at Harrisonville, June 5, 6, 7, and Trenton, December 4, 5, 6, 1894. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1895. 393, V, III p.

Thirty-eighth 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, 1896. 428, III p.

Thirty-ninth annual report of the State Horticultural Society of Missouri. Meetings at Jefferson City, June 2, 3, 4, and Marceline, December 8, 9, 10, 1896. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1897. 404, III p.

Fortieth annual report of the State Horticultural Society of Missouri. Meetings at Springfield, June 8, 9, 10, and Moberly, December 7, 8, 9, 1897. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1898. 409, III p.

Forty-first annual report of the State Horticultural Society of Missouri. Meetings at West Plains, June 7, 8, 9, and Columbia, December 6, 7, 8, 1898. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1898. 416, IV p.

Forty-second annual report of the State Horticultural Society of Missouri. Meetings at Peirce City, June 6, 7, 8, and Princeton, December 5, 6, 7, 1899. L. A. Goodman, Secretary, Westport, Mo. Jefferson City, 1900. 480 p.

Forty-third annual report of the State Horticultural Society of Missouri. Organized 1859. Incorporated 1893. Meetings at Chillicothe, June 5, 6, 7, and Farmington, December 4, 5, 6, 1900. L. A. Goodman, Secretary, Kansas City (Westport). Jefferson City, 1901. 432 p.

Forty-fourth annual report of the State Horticultural Society of Missouri. Organized 1859. Incorporated 1893. Meetings at New Haven, June 4, 5, and 6; St. Joseph, December 3, 4 and 5, 1901. L. A. Goodman, Secretary, Kansas City (Westport), Missouri. Jefferson City, 1902. 407 p.

Forty-fifth annual report of the State Horticultural Society of Missouri. Meetings at Eldon, June 10, 11 and 12, Springfield, December 2, 3 and 4, 1902. L. A. Goodman, Secretary. Jefferson City. n. d. 416 p.

BLACKBERRIES.

(J. E. May, LaPlata, Mo.)

Mr. President—As our Secretary has assigned me a paper on "Blackberries" for our Summer Meeting, I shall have to beg of you and those present here to bear with me a short time while I tell something of the way we prepare our ground, varieties planted and cultivation given. It would be presumption on my part to try to tell our members how to grow blackberries, but if I may succeed in telling the farmer that may be here who does not have a liberal supply of fruit for his family how to provide one of the most delicious and healthful fruits for them, and, incidentally to get a discussion on best methods of growing the blackberry, I shall feel that this paper has not been in vain.

We use land for blackberries that would produce 40 to 50 bushels of corn per acre, plow it about seven inches deep, and see that it is well pulverized before planting. Use a diamond plow to lay off rows with, setting our plants 4x8 feet, and we find this plenty close. The first year we cultivate well with a five-shovel cultivator or a common small shovel corn cultivator, followed by a Planet, Jr., 14-tooth harrow. The idea being to keep down all weeds and grass and to conserve the moisture by having a dust mulch during the dry spells. After the canes reach a height of 2 feet the first year we pinch out the terminal bud. The second year and ever after we cultivate as the first year, except we cannot use corn cultivator, and allow canes to grow until 3 to 4 feet high before pinching back. The pinching out the terminal bud causes them to throw out laterals, and cutting these back to about 18 inches of the cane in early spring leaves your rows in good shape to cultivate, and also a chance to get the berries. Can't many of you here remember of seeing some farmer's blackberry patch a regular wilderness, owing to their being left to their own sweet will? It would be impossible to cultivate them and a person would need a suit of buckskin clothes if he picked the fruit, should there happen to be any to pick. This man says blackberries don't pay, and that he can buy them cheaper than to raise them. Nine chances to one his family goes without the fruit. I hold that a man with a farm or place large enough owes it to himself and family to raise enough fruit of the various kinds to supply them the whole year. As to varieties the farmer will do well to plant only the Snyder. For commercial planting we have the Snyder, Early Harvest

and Taylor Prolific. Our last planting has been Early Harvest, on account of its earliness and being a prolific bearer. It is somewhat tender, and we lose a crop occasionally, but find it profitable. No more rust than in Snyder. The drouth is the worst enemy to successful blackberry culture, and for that reason will discard the Taylor. We grow our blackberries between our apple trees and can see no bad effects as yet; in fact, our trees are best where we cultivate small fruits. The bushes keep the winds from blowing away the leaves from trees and bushes, and they make the soil like forest soil when worked in. There is a disadvantage, however, in growing them in the orchard, as they are in the way of spraying and gathering the apples.

Pres. Robnett.—I have a blackberry patch and get a good deal of pleasure out of it. I do not cultivate them. I have a good many leaves in my yard and mulch the vines with leaves and grass. Blackberry patches in the woods always gather the leaves, and I believe this is a law of nature, and that mulching is the best thing for the vines. I can take better care of them in this way than by cultivating them.

WHAT JACK FROST HAS DONE FOR THE GRAPES IN 1903.

(By Herman Thieme, Springfield, Mo.)

A request to write a paper on grapes and Jack Frost arrived at my place about the same date. How can any body write a paper on grapes when it makes you sick to look at your vineyard? I had the best prospect for a grape crop I ever had, but on the morning of the May 1, I found my hopes all gone, after working all night keeping fire and smoke on three sides of vineyard, but it did no good whatever, and for a week or more it looked as if the vines were killed to the ground, but they look better now. We will have young wood for next year's crop. We will have a few grapes of all kinds; my vineyard will average about two pounds to the vine. The Norton's Virginia and Cynthiana will make about half of a crop and the Ozark vines did not have a green leaf left; the Stark Star will have a few grapes. I have twelve McPike in bearing; one of them is about ten days later in budding out and was not damaged by frost, and I think this one vine is a true McPike. Of the new varieties the St. Louis is very promising; it is a black grape found in St. Louis, supposed to be a seedling of the Concord. Woodruff Red, Goethe, Niagara, Moore's Diamond and Delaware are the varieties

the leaf hopper will damage most. Campbell's Early is damaged badly by the frost, and is not a success with me; it does not pollinize well; the blossoms will drop off and the bunches are too loose. Worden is a fine grape, but does not ripen evenly and cracks badly in wet weather. Moore's Early is hard to beat, and the Concord still holds the fort, but we have some new varieties now that will perhaps take the place of the Concord. It is not much of a trick to raise grapes, but it requires lots of work and close attention to raise the best. Sandy and rocky land with red subsoil is best for grapes, and it must be high and drained well. It is not best to cultivate too early nor too late; from May 1 to August 1 is the best time to give shallow cultivation. Some people think when the young shoots on the grape vines get frozen they will grow out again and have some grapes; new shoots will grow, but the grapes will be very few and far between. I think some of the grape vines planted this spring were killed by the late frost.

GRAPES.

(Ed. Kemper, Hermann, Mo.)

"Grapes" is the subject assigned me. To those that have not studied the origin of the American grape it may be interesting to know how it was originated. Today we have over 1,000 varieties that have been originated from the native grapes that were found growing wild in the woods and their seedlings, from the old country grapes, or a cross between same.

The Northern Fox grape is a native of New England and is the parent species of nearly one-half of our cultivated grapes, including the Concord, Ives, Niagara, Perkins, Eaton, Moore's Early, Woodruff Red, Wyoming Red, Martha, Worden and others. Of the above varieties the Ives, Perkins and Woodruff are not much subject to rot. The River Bank grape is found growing wild along the streams in many parts of the United States and Southern Canada. It is the parent of Missouri Riesling, Montifeore, Clinton, Bacchus, Marion, etc. Of these the Montifeore and Missouri Riesling are not much subject to rot. The Summer grape is found on the uplands of the middle and southern states and is the parent of Hermann, Herbemont, Cynthiana, Neosho, Norton's Virginia Seedling, etc. Of these the Norton does not rot and is known as an excellent late grape. The Texas Post Oak grape is found growing in the Post Oak regions of Texas and northward into Arkansas and Missouri. It is said that it will stand dry and hot weather. The America, Beacon, Carmen and Elvicand contain Post Oak blood.

The Rock or Sand grape, the Mustang grape, and a few other species have, so far, not done very much in the make-up of varieties, so we will not go into detail about these, but the European grapes should be mentioned, although by lack of hardiness they can not be grown here successfully, but have done much in the make-up of varieties. The Delaware, Goethe, Diamond, Duchess, Herbert, Jewel, Lindley, Rochester, Taylor, Wilder and many others are a cross between American and European grapes. The Delaware and Goethe are known to be fine table grapes, but lack of hardiness and subject to rot is a drawback to them, and so are almost all varieties that have blood of the European grape.

Now, I have said nothing about the new varieties that are just coming up, but I don't like to say anything against nor for them. Let the Experiment Stations and those that originated them test them for years. Don't pay one to two dollars per vine and then at last be surprised to find them not quite as good as Concord, for the Concord can be had at five cents per vine. Years ago when Moore's Early came up, my father paid an Eastern grape specialist for one "Moore's Early" vine \$2.50. From the top he grafted a few vines, and then gave all particular care for a few years and then decided that the Moore's Early was not worth planting, and told his customers so. A few years later he found that he had never had a Moore's Early; therefore, take care from whom you buy, and if you are not sure that you get what you pay for, then better buy old well known varieties and know what you have bought.

GRAPES—DISCUSSION.

D. A. Robnett.—I do not believe any grape will pay as well as the Concord. I get more out of it than anything else.

Mr. Todd, New Franklin, Mo.—The Concord is the only fruit that has been a success with me. My red grapes were frozen to the ground. There was not a live bud on them. The Concords were frozen also. They seemed to be killed, and I did not think they would bud, but they have budded nicely and it looks as if we would have half a crop of Concords.

Prof. Dutcher.—The vineyards on the uplands have received very little injury; but on the lowlands, even in shallow ravines, I find a number of young vines with buds forming were frozen back to the old wood. Some were frozen only part way back. I was in one vineyard where I found this to be the case in a ravine leading from the south to the north, but all the vines on the hill were in fair condition. I have only a few vines on the north side of my house with the protection of buildings, and there is not a sign of frost. They are as full of bloom as vines

that have grown since 1891 could be expected to bloom. The varieties, Concord, Moore's Diamond and Moore's Early, are very well supplied with grapes. My Moore's Diamond have only two or three small bunches; they were hurt by the drought and have never recovered. The Elvira and Niagara were also hurt by the drought. I would not put out any more of these two kinds in this locality.

A. T. Nelson.—I think we could well afford to put in Moore's Diamond, and I have never had nicer grapes of any kind than the Niagara. They are not so regular as the Concord, but I have had very fine Niagaras. I think we ought to raise them, because when we have an exhibition it makes a very poor show to have only a few varieties, and we ought to raise some others.

Pres. Robnett.—Does anyone know anything about the McPike or St. Louis?

A. T. Nelson.—I do not know anything of the bearing qualities, but I do not think it any better than the Moore's Early. I mean the McPike. It is a larger grape and shows up nicely, but I do not think it better than the Moore's Early. I think the Moore's Early is as good for commercial purposes as any.

Pres. Robnett.—I have seen the McPike raised by the originator which were very fine. I have not seen any others as fine as his, but possibly he has a particular condition of soil that makes his so fine. He had a very fine display.

Mr. Morrill, Macon, Ga.—What do you think about the Hicks grape?

Pres. Robnett.—I do not know anything about them. They were killed to the ground by the drought. I have tried them, but they did not do any good.

Mr. Morrill.—The McPike grape has been tested in Georgia and was not considered any better than other varieties. It runs about the same as Moore's Early. Most of our grapes ripen in July when we are having our rains, and they do not ship well. The best grapes we can grow, I have decided, are the Brighton, Progress, Delaware, Cynthiana and Norton's Virginia. I had at one time ten acres in grapes. Half of them were killed in 1894 by a heavy freeze, and I have finally cut down everything with the exception of four or five varieties. I would not undertake to grow any more than these varieties in Georgia at the present time. Campbell's Early has been tested there. The Concord and the Worden do not ripen evenly.

Pres. Robnett.—Has anyone tried the St. Louis grape?

Prof. Dutcher.—This paper speaks well of it. It is supposed to be a seedling from the Concord.

Mr. Morrill.—I would like to ask if the Munson's variety has been tried successfully here.

Pres. Robnett.—I think they have by some of our planters and some have thought well of it.

Mr. Morrill.—A few do fairly well in Georgia.

N. Engle, Warrensburg, Mo.—I want to get a few vines and would like to know how to take care of them. I would like to know when to cultivate them; when is too early and when is too late, so that they will produce the best.

Pres. Robnett.—The gentleman in the paper said from May 1st to August 1st.

Mr. Morrill.—We cultivate right up to the time they begin to color, then we quit. But when I first started in the grape business, I was surrounded with considerable timber with all kinds of birds in it, and I discovered, in order to grow my grapes and put them on the market in the best possible shape, I had to bag them. I used to bag all my fruit in one and two-pound paper bags and kept that up until the whole country went to growing grapes, then I had to quit. That keeps off the dust, birds and black rot to a great extent.

Mr. Engle.—How soon did you bag the grapes?

Mr. Morrill.—Just as soon as they got out of bloom. One year I put on seventeen thousand bags, pinning them with the common iron pins, which are not very expensive.

Pres. Robnett.—I never fail to bag my grapes. I have some grapes in my back yard, some on the wood shed and some on the back porch and grow enough for my own use. I mulched some with coal cinders. I grow a great many around my house in that way and got some fine specimens without any cultivation. Grow them where there is plenty of loose earth. As soon as the bloom falls, put them in bags and they will be larger, sweeter and will last longer. I have never failed to have grapes when I put them in bags.

Mr. Nelson.—I bag all my grapes, and think they grow much more perfect. This keeps off all fungi and birds. I cultivate them about once every two weeks to keep the weeds down and to get the ground in good growing condition. I grow five or six varieties for home use and sell some to home markets. I sometimes use a small A harrow with handles so as not to tear the vines. We try to get over them every two weeks.

Prof. Dutcher.—In growing grapes for home use in town, people think it is a great thing to have grapes on arbors. Arbor vines do not make good grapes. Put them on posts, not very high, running north

and south; stretch smooth wire from post to post and do not arbor it over; the vines get too far from the ground, as the sap has too far to travel. As to the varieties, I think you can be sure of the Concord and Moore's Early and in the white grapes the Elvira, although not very perfect, were a great source of pleasure to our family. I have had no success with Moore's Diamond nor the Niagara.

Mr. Kemper.—I cultivate with the hoe and sometimes with a hand plow to keep the ground loose. The rootlets of the grape vines come very near the surface so do not cut the ground deep near the vines. I sometimes cultivate with a five-tooth cultivator and then follow with an A harrow, but nothing more severe. Take away with the hoe the weeds near the vines. Pruning the vines is one of the most important things. It is hard for us to cut the vines back severely enough. If a shoot comes out near the ground, we really want to let it grow and think it will make a good vine, when, ten to one, it will die the next winter. Right here in our home vineyards we do not get grapes near the ground unless put on posts and trimmed back to two eyes nearly every season. On arbors it is impossible to have grapes near the ground.

Pres. Robnett.—We have not said anything about fertilizing the grape. I suggest that Mr. Morrill talk to us about this.

Mr. Morrill.—I suppose the commercial fertilizer business is new to you. In Georgia we do not trust to Providence for anything. We fertilize everything we plant and mostly with the commercial fertilizer. I have been growing grapes for about fifteen years and when I fertilized my vineyards, I had less fungi, less dust, less black rot, less mildew and possibly less insects. I used to fertilize once every two or three years by putting cowpeas between the rows and after the fruit was gathered, plowed them into the ground. I used to use fifty to two hundred pounds of ground bone, and fifty pounds of potash every year. I found that by doing that, my vines were in a more vigorous condition and better able to resist drought. I had finer colored fruit and I picked nothing but first class bunches. I also noticed by fertilizing that I had less imperfect bunches. I grew a number of varieties that would not pollinize without other varieties mixed with them. Brighton has to have another variety; also, the Lindley, a magnificent grape in Georgia. I have had bunches weighing nearly two pounds. I suppose you don't need to fertilize so much in this country. You people claim such rich land. I do not see how you can grow fruit even in Missouri without fertilizing; especially feeding the soil where the grapes draw from the soil, for grapes demand potash and nitrogen, and that is why we fertilize our grapes in Georgia. At one time we had a very large acreage, but we have quit to a large ex-

tent for this reason: They ripen in July when we are having heavy rains and our fruit does not ship well. We grow enough to furnish the home markets. I used to sell my grapes in Macon for seventy-five cents a basket. That was when there was very little other fruit on the market. At that time there were very few vineyards in Bibb county, of which Macon is the county seat. They soon got to growing and putting out grape vines and finally the whole world got to growing grapes and the home markets could not take them. We found that by shipping our grapes were not in good shape. People had no information in regard to grape growing and let their vineyards go down. At the present time very few grapes are grown in a commercial way. We fertilize everything, even peaches, strawberries and all kinds of berries.

Prof. Dutcher.—Our commercial fertilizer used in our corn fields having 3 per cent. potash (our friend thinks almost too small a per cent. for anything, for the very good reason that he is in the potash business), 3 per cent. of phosphoric acid and 6 per cent. nitrogen is used largely to produce wheat and grass in this county. Order from Armour, indicating the per cent. of these ingredients. I know it is all right with our grape vines. Before you bud the vines for the winter, have the ground well cultivated and free from weeds, then scatter under the vines this 3-8-6, as you would salt an asparagus bed and then hoe it under to mix with the soil. To mulch your vines, use corn stalks or refuse from the cane mill, or even clean straw, around the vines and put the fertilizer over the straw, or if you have fairly well rotted and clean manure, put it under the vines and in the spring take away the rough. During the winter the strength will have washed into the ground and the grapes will be larger and finer. But the fine, nice grape with the beautiful color and the fluffy down, we obtain in the country only by bagging. It will be gone before the grape is ripe if you do not bag it.

Mr. Morrill.—I put phosphoric acid first—8 per cent. phosphoric acid, 3 per cent. nitrogen and 6 per cent. potash.

Pres. Robnett.—I hope that we can have some results by next year and know more about this, as the Secretary will send us each a bag of it. I have to have something to make a crop. I believe in short vines.

Prof. Dutcher.—After the grapes set, cut back the vines in order to throw the strength into the bunch.

THURSDAY, JUNE 4, 2 P. M.—ORCHARD QUESTIONS.

PRUNING THE ORCHARD FROM PLANTING TO OLD AGE.

(N. F. Murray, Oregon, Mo.)

The subject assigned me for a paper is a long, broad, deep and important one, and within the proper limit of my paper it will be impossible to go into details, or fully explain the philosophy of pruning the orchard from planting to old age. No attempt should ever be made to lay down an ironclad rule for the pruning of trees. The rule must be flexible in order to suit the habit of growth of each variety, and the individual requirements of every tree. Varieties differ and no two trees of the same variety are alike, no two limbs or leaves on the same tree are just alike. The same variety will vary much in habit of growth on different soils, and in different climates and localities, hence the utter impossibility of laying down a mathematical rule for the pruning of trees. Every successful pruner must of necessity be a student of nature and understand her laws. The most satisfactory way for the beginner to secure a thorough and practical knowledge of my subject will be to go and take a course in our school of horticulture at Columbia, which is now filling a long felt want.

I shall first speak of pruning the apple, the king of all fruits.

Starting with nice trees from the nursery, prune off broken limbs but do not cut back the top; it is a violation of the law of nature, and will have the effect of making the top too thick at the start. For the first five years prune to secure a well rounded symmetrical top, well balanced on the trunk. Do not try to have all varieties grow the same shape and look alike, but let each grow true to nature. As to form, some will be quite upright, some round, others spreading, let them grow! Nature so intended. To cut and mutilate, in order to overcome this law is wrong. In the West we have so much wind and sunshine, that very little pruning should be done. The trees should be grown with low and reasonably thick tops in order to be able to resist the hot sun, and sweeping wind storms. Overpruning in the West has destroyed many orchards and led to the premature decay and death of many more. The lowest limbs should not be more than two or three feet from the ground. In summer cut off all water sprouts from the trunk and in the top, but do your main pruning in the latter part of winter and early spring when the wood is not frozen.

Remember, you are now pruning for growth and shape of tree, there being no leaves to obstruct the view, the operator can see at a glance what to cut out. Prune out all cross limbs, and such limbs as interfere one with another. Prune to prevent forks, shorten back limbs of irregular and rampant growth, and thin by cutting out the weaker limbs, but never cut to exceed one-tenth of the top. Barrenness in young orchards is sometimes the result of overpruning.

Some years ago when picking a crop of Ben Davis from six-year old trees, that yielded from one-half to three bushels per tree, a friend came along and bade us good day, and then in an angry tone wanted to know how it came we had such a fine crop of apples on our young trees while he had none. He said, I bought my trees of you, planted them the same spring you planted yours, and on better land, have cultivated them well, and pruned them nicely, and now you have plenty of fruit and I have none. "And now," said he, "I want to know the reason!" I invited him into our orchard and showed him that this first crop was all in the heart or center of the top. "Now," said I, "You say that you pruned your trees nicely every year. Now tell me, did you not cut out all of these little short spurs in the heart of your trees just to make them look open and pretty, kind of umbrella style?" "Yes," said he, as the truth flashed through his mind, "and, like a fool, cut away all my fruit bearing spurs." Another friend, a fruit grower, and a firm believer in the high open top tree, years ago, when visiting our orchard, censured us severely for neglecting to prune our orchard, although we had pruned according to rule given in this paper, yet he insisted that we should cut out a much larger per cent. of the top. Later, when on a second visit, we showed him through the same orchard ladened with a massive crop of fruit, and asked him what he thought of it, he replied, "Well, you are getting the fruit, there is no denying that fact, however, I think it is at the expense of the constitution of the trees." But this same orchard bore more fruit from year to year, made more money, and lasted longer than any high topped, heavily pruned orchard in the country, thus proving that our good friend was mistaken. One other friend, for whom we planted five hundred two-year-old low-topped trees, mostly Ben Davis, twenty-five years ago, let them grow low, heavy and thick, pruning but very little, has sold more good crops, and for more money than any of his neighbors who have pruned high and thin. I asked this gentleman two years ago how many of the five hundred trees were dead, and he replied, "Two." Yet his neighbors' orchards all around him, pruned high and thin, of same age and variety, are one to two-thirds dead. To briefly sum up the advantages of this system of low

heavy tops, that have been moderately pruned each year: They are more easily grown, will resist the storms, will protect their trunks from sun scald, will act as a shade and protection to their own roots, will not break with weight of fruit, the fruit will be more easily gathered, trees will live much longer, and, last, but not least, there is a great saving of labor, and expense over heavy pruning. The trees having been properly pruned and trained in the orchard for the first five years, at which age they usually begin fruiting, will for a number of years require but little pruning, which, however, should be done regularly each year. Cut out all broken, weak and sickly limbs, also water sprouts. After the trees have borne several full crops, and many of the lower limbs have become weak and sickly from heavy fruiting, they may then be cut out. Cut them from the main leaders of the tree and paint the cut to keep from checking. Do not cut a main leader from the tree unless dead or broken. One of the most important things connected with pruning is to cultivate and care for the trees so they will have a healthy normal growth every year. The wise surgeon after amputating a limb from the human body, will always insist upon the proper care of his patient, and such food as will produce healthy blood so the wound will heal. The fruit grower must learn to use the same good common sense with his trees. Prune to old age. And what are we to understand by the term when applied to the apple orchard? In our opinion it may be anywhere from twenty to fifty years. Owing to variety, soil, climate, care, cultivation, how grown and how treated. Trees often become prematurely old from various causes. Some overbear and die young, while others from barrenness or from great care live long, very long, and like some people outlive their usefulness. We advise to prune and care for the orchard just as long as it continues to produce paying crops, no matter how old, but whenever it ceases to do so, then cut it down and convert into fuel. Why should it longer cumber the ground? For sanitary reasons haul out and burn all prunings from the orchard.

Pruning the Peach.—Starting with the one-year-old peach tree from the nursery, it should be pruned to a single stem or whip and cut off at the top so it will form a head at two or three feet from the ground. Some object to these low heads on the ground that they are difficult to cultivate and that the fruit will not color and ripen so well as on higher heads. To the first of these objections we answer that with our improved modern implements there is no difficulty experienced in cultivating such orchards. To the second objection we answer it depends upon the locality, soil, climate and variety whether or not you find your highest and best colored fruit on the high headed trees. In our experience in collecting specimens in Missouri for the last thirty years, of both peach

and apple, we have found the very best on the low headed trees, and often within three to six feet from the ground. However, in our former experience in the Ohio river valley we found the best specimens much higher up.

Local Conditions.—Much depends upon them, and it is a matter of great importance that each individual grower should study them thoroughly and follow carefully that line of practice that will insure success in his locality. In the west and far out from large bodies of water we find a dryer climate, more wind and sunshine than in the east. Hence the trees may be grown with lower and thicker heads without any detriment whatever to the fruit. While near large bodies of water and along rivers where fog prevails, it will be found absolutely necessary to have a much thinner if not higher top in order that the fruit may have sufficient sunshine to prevent the fruit from being woolly, colorless and insipid.

Cutting in.—Some growers advocate cutting in annually, by this we mean cutting off one-third to one-half of the last year's growth early in the spring. This causes the young branches to multiply and more bearing wood is produced near the main trunk. This may be an advantage and do very well to practice while trees are young and small, or by the man who has a few trees in his garden or small orchard. But in the commercial orchard where the trees are numbered by the thousand, very few, if any, will ever continue to practice it when the trees become large. However as it is the nature of the young peach tree to bear the fruit on the inner limbs, which usually die after ripening the fruit, then the next year the fruit will be found on a new set of limbs further out from the trunk, and so on from year to year so that it becomes an actual necessity to adopt some method of cutting in, in order to have a good supply of strong vigorous growth near the main limbs.

Time—The pruning may be done during mild winter days toward spring. All dead, half dead, and broken limbs should be cut out, as such wood is poison, and detrimental to the health of the tree, and the flavor of the fruit. If trees have borne a crop or two and are becoming open in the top, then they must be cut back. They may be cut back into two, three or even four year old wood. We do the work with a Hawkeye pruner. If we find our fruit buds all killed and the trees need it we cut the entire top back. The winter of 1898 and 1899 was so severe that many peach orchards were badly killed, and heavy cutting back became a necessity. We cut back a number mostly Champion and Elberta.

We cut short, leaving only five to eight main stubs from two to five feet long from trunk. They all made a fine growth the next summer and

the following year bore an average of one bushel of extra fine fruit, and the next year made an average of two bushels per tree. The next year (1902) the fruit buds all being killed, we cut back one-half of the entire top, they made a fine growth and at present have some fine peaches, although most of the buds were killed by severe winter. We notice two large Champion trees in our garden, one of which was cut back, the other was not; the one cut back has quite a number of fine looking peaches, the other but two peaches on entire tree. I have learned from experience, and to my satisfaction that you can not harden the peach buds by any process of starvation, or stunted growth. The fruit buds on weak and feeble growth will almost always be found single on the twigs and always go first in severe winter weather. On the other hand we do not want an overgrowth such as may be produced by high cultivation, manure, and cutting back. The safer rule is to prune and then cultivate early, and thoroughly, so as to keep up a continuous growth all summer. I prefer to have the trees hold their foliage fresh and green well into autumn, rather than check too early, in which case they are liable to cast their leaves, and the buds swell prematurely with the warm weather of autumn and are far more liable to kill. Always clean up all prunings and burn them. If you find a diseased tree in your orchard grub it out and burn it at once, you can't afford to take chances on leaving such a tree remain in your orchard.

Old age of the peach, may be any where from fifteen to thirty years, in general twenty years will cover the profitable age of our commercial peach orchards. Plum, Cherry and Pear, prune much as you would the apple, cut out all weak and sickly branches, all water sprouts, and dead twigs, keep the top uniform and symmetrical.

PLANTING AND GROWING AN ORCHARD—DISCUSSION.

W. H. Benedict.—I believe I would plant yearling trees. I would plant them farther apart and keep them sprayed from youth up and not allow these fungi to gain a foothold. I would be more careful in selecting land. I would avoid planting Missouri Pippin so largely. Of course our orchard has been unprofitable until the last three years. This year will not be so good, but the last two years has been a wonderful improvement. It looks much better and I have hopes of it bringing good financial returns some day.

D. A. Robnett.—I put all the trees in the mixture before planting, and if there is anything in the way of fungi on them it is cleaned off. I then wash the roots in concentrated lye, cutting off the diseased parts, if any, then heel them in the ground.

Some one asked me how long a tree would live after taking out of the nursery. You might as well ask how long a man would live with his head under water. They should be put in damp straw as soon as taken up and planted as soon as possible.

Pruning the roots is as important as pruning the tops. Trim back to the good, healthy root. I believe all mutilated parts and the great long roots should be cut back. The ground should be prepared thoroughly to put them in. If you do not treat them right, they will die. I do not know whether it is best to prune the tops before setting out or not. Bring out the point how the tree should be pruned and taken care of.

G. T. Tippin.—It is pretty hard to give this information. I believe it is best to prune before putting in the ground. The object by which to be guided and the point to reach is the new root system. The inexperienced planter wants to get his trees from the nursery with all the roots possible; in fact, he sometimes thinks he is injured if he does not get all the root system. Those who believe that they ought to have all the root system and that they ought to get the roots in the same position when planting as they grew in the nursery, do that, feeling that they are doing everything they can to start the tree off well. The truth is, however, from my experience, that instead of those roots continuing to spread out and form like they did before, they grow out more fibrous roots, instead of continuing through the soil as they would have done had they never been moved. Trees in the nursery three years old, have few fibrous roots, while if they are taken up and planted in that condition, they will always have fibrous roots and not deep roots. Take a two year old tree from the nursery and trim the roots back to within three, four or five inches of the trunk and plant it out. When the tree is established, you will find the root system the same as if it had never been moved. When the roots are all mashed down they become diseased and the trees will not be as good as if pruned. I never pay any attention to the hairy roots. If the tree is natural, it has none that are injurious. If I planted a one year old tree, I would prune the same way. It is not practical to prune to such a great extreme. As to the top, I have always advocated pruning the top when planting. My success has been better by cutting them back. I have planted trees for twenty years and have found better success by pruning the tops as well as the roots.

L. A. Goodman.—More trees are lost from planting and handling than after. When trees are in good condition and well handled, there is no reason the tree should die. I have planted as many as seventy or eighty thousand trees and we never think of losing any trees. If I find

a doubtful tree I never plant it. I would rather throw away than plant a poor tree. If you find a tree not up to the standard, do not plant it. We do our sorting at the first, before planting, and if I think the chances are against a tree, that tree goes out in the first place. The best apple tree to plant, in my opinion, is a number one, two year old tree. This tree ought to have the form of a pyramid. We want a straight center stem. We want plenty of roots at the ground. About eighteen inches from the ground you will find the branches coming out at right angles. This is the model tree, in my opinion. If you get trees like this, you will have better shaped trees than any other way. Too many of us think that we want an apple tree and that we want to plant it; that is all. We ought to have an ideal. Our shade trees should be planted in the same way. It is a great mistake to plant a straight switch with no branches. The model tree is as pretty when young as when old. When I prune a tree, I first look at the roots. I see how even these roots are, then take the shortest root and cut the rest even, unless it is too short, so that the roots are uniform. The top I take the same way. I cut the branches so that they will make a pyramid. Leave the center stem longer than the others. Keep the ideal in mind; that you want the center stem to keep the lead. You can then grow the apple tree as near the ideal as it is possible to do it. If you find branches near the top, cut them shortest. We cut the roots in the same way. I do not believe in cutting them too short, but medium. If you find a branch is forked, cut one prong about six inches long and leave one two or three feet long. The longer one will become a branch. Sometimes the branches are too close together and some must be taken out. If you have too many, take out every other one. Keep the center stem in the lead all the time. I do not believe in pruning much afterwards. Except in unusual cases, I do not prune. After the first year's growth, only, we take off nothing. After the second year's growth, we begin to form the tree symmetrically. If you do this, you will get better trees than in the haphazard way some do.

The first cost of the tree is not anything. The idea has been to get them cheap without regard to quality. Some have been trying to get ten cent trees for two and a half, three, four or five cents. A nurseryman ought to grow trees in this way and get better prices. It is better for us to get trees grown in this way. If you have an ideal in mind, you will have better trees. We usually head our trees about eighteen inches. As this tree grows, if headed according to this, the lower branches will smother themselves out and will grow very little as the tree gets older. You can take these off, if necessary, and will not make a great scar. I always put the heaviest roots to the southwest, also the heaviest branches.

Dr. Ozias.—A good many have taken up the idea of planting one year old trees. Should the pruning be the same as on two year old trees?

Secy. Goodman.—Yes, a little more severe, leaving about six roots. For instance, I want the tree to head eighteen inches. I cut it so as to leave about one foot. Give one foot and three branches.

Dr. Ozias.—Is the heading done when planted

Secy. Goodman.—Yes. I never trim anything except before planting, when I can see both the roots and branches. Prune the same whether one year old or six years old.

G. T. Tippin.—That thought in regard to one year old trees is important. The custom of planting one year trees is popular. It is no advantage to get a one year old tree taller than three feet. If you plant out a one year old tree four or five feet high and don't top it back, you will have a top heavy tree. It is no advantage to select the tall trees if you want a low headed tree.

W. H. Benedict.—Do you think it preferable to take off the hairy roots. I take them off to the root and think they come right out and make better fibrous roots when cut off. I think the tree would be healthier if taken off.

A. V. Schermerhorn.—I set the trees with the heavy branches and the heavy root system to the southwest. When the roots are trimmed there is nothing much to look after except putting them in good deep soil and pressing down firmly. They should be thoroughly cultivated and the borer business should be looked after right away. The foliage should be protected from fungi. I differ with Mr. Goodman in regard to pruning. I would prune every year and take out the little branches every year.

M. Butterfield.—It is very important to set the trees at a proper depth. I believe every tree I have lost was due to planting. I cannot plant all my trees myself. This spring in taking up trees that had died, every one was traced to the planting. I like to have the upper ground level when the trees are planted. Some people like to use a two horse plow sometimes, but I cannot tell about the depth when planting. I like to have the ground level. Dig the hole fresh and plant no deeper than in the nursery. In regard to borers, I have not seen any in my orchard. I have the trees white washed and throw a handful of wood ashes under each tree. I try to do this as near the fifteenth of May as possible. This composition is hard on the hands, but if the hands are washed in castor oil first, they can stand it better. This year I hired three boys to go over my orchards. The first boy hoed under each tree, then another boy came with the wood ashes and the next boy came with the wash.

W. P. Keith.—If the weather is dry, I have a barrel. I dig the holes, then dip the trees in the water; the mud would adhere to the roots and the tree start off better. I have never had difficulty by treating them this way.

D. A. Robnett.—I am sure Mr. Butterfield is right about deep planting. The trees must not be planted too deep. I had some trees with the roots out of the ground and they are living and doing well. Where they were planted deep I had borers. I would put the same kind of dirt around the root as was natural to that part of the soil.

A. V. Schermerhorn.—In regard to the depth of the soil, I agree with Mr. Butterfield.

Pres. Robnett.—I pack the trees in wet straw to take them to the field, and when I take the tree out of the straw the root is fresh and wet. When I get a large quantity of trees which cannot be set out immediately, I dig a trench three or four feet wide on the north side of one of my barns and heel the trees into this and in case of wet weather, the trees will be all right. Do not set out trees when the ground is wet. I do not take out more than enough trees to last a few hours.

G. T. Tippin.—At this time, we learn most from object lessons. In the matter of deep planting, the best thing you can study is a native seedling apple tree. You will find the roots showing above the ground. Sometimes you will find them growing out several feet. Deep planting has ruined more trees than anything else.

B. C. Auten.—My first year I lost more from deep planting than from anything else.

A. T. Nelson.—When we plant our trees in Southwest Missouri, we first get our ground, then order our trees from a good nurseryman, and when the trees arrive, we plow the ground one way, then cross plow as in corn rows. Then we start three men down each row. The first man throws up a few shovels of dirt, the next man holds the tree in place while the other throws in the dirt, then the tree is jolted well and the dirt packs around the roots. One man follows the wagon and trims the trees as they are thrown out. We once had thirty-five acres of rather low land and planted it with Ben Davis apples. We planted them on the ground and packed dirt around the roots. It is one of the prettiest orchards in Missouri. We planted two year old trees. We put just enough dirt on to cover the roots. I think if this plan were followed, not nearly so many trees would be lost as if they were planted so deep. We set the trees on the ground, then pack the dirt around the roots. We set trees right on the hard ground and shovel dirt around them.

C. H. Dutcher.—Do you plow between the trees?

A. T. Nelson.—Yes, we do not plow where we plant the trees. I did not lose ten per cent. of four thousand trees during the drought year. We set them out in May and the ground was not cultivated at all.

Mr. Engle.—Which is better; the whole root or the piece root?

C. H. Dutcher.—About the only difference is that the whole root will cost you twenty to twenty-five cents and the piece root will cost you six, ten or twelve cents.

T. H. Todd.—In regard to setting out the trees without plowing between. Last year when I was setting out an orchard, we had some clover land in the valley and after planting the trees in this land, we plowed it and planted it in corn. We had some of the same kind of land in wheat and ran our lines in the wheat and planted trees, then mulched them well. The trees in the corn were worked when the corn was, while the trees in the wheat were not cultivated at all. In the fall the mulched trees in the wheat had made a growth of some eighteen inches more than the trees in the cultivated land. The wheat land was put in clover and the clover made a fine growth. We mowed it and let the clover lay on the ground, mulching the trees with it, and they made a wonderful growth. You can hardly imagine the difference.

D. A. Robnett.—What did you mulch with?

T. H. Todd.—I mulched them about three feet each way with rotted straw manure. I did not put any work on the trees during the season.

L. A. Goodman.—Mulching is one of the best ways to grow a young orchard.

T. G. Henly.—In our last planting, after having our ground well prepared, we took a two-horse Deering plow and plowed two furrows to mark the rows. We then took our low wheeled wagon and had a small boy in the wagon with a barrel of slush water and kept in this barrel twenty-five or thirty trees, and as we were ready for them the boy handed them out. We pruned them before planting them, while they were still wet; the dirt adhered to the roots and we got them in in fine shape. In planting we had one man go ahead with a spade and open the furrow where the tree was to be and another man following to put the dirt on the trees as they were planted.

Mr. Morrill.—What we do in Georgia to raise fruit might possibly be done here. I will mention a few ways. In growing peaches in Georgia, after the third year we grow cowpeas to furnish nitrogen for the wood growth. After two or three years we have to quit growing the cowpeas and let the ground rest for two or three years. Then we use, for the protection of the fruit and giving the fruit the proper coloring in proper time for shipping, potash and phosphoric acid, either derived from the phosphoric rock or use the ground bone. We use from two

to five pounds of that composition to the tree. We have in the neighborhood of thirteen million peach trees in commercial orchards. We do not grow even cowpeas without fertilizer. The apple is largely potash, according to the bulletin issued by the Cornell University. It takes about 60 pounds of potash and 20 pounds of phosphoric acid to produce an ordinary crop of apples on one acre. If we haven't that in the soil, we must apply it in order to give all the conditions before the perfection of the fruit. I do not know what the feeling here is in regard to fertilizing. I find in some instances that they are doubling their crops of wheat by fertilizing. It seems to me that I would use it if I were growing orchards in Missouri. I would use some plant foods, especially those that produce a first class crop of apples. In Georgia we do not grow much but summer apples and La Conte pear. We have quit growing the Keiffer, and in fact every other pear. We are turning our attention to peach growing. We made last year in July, a shipment to Europe from the Hale Orchard Company, which was successful, and another shipment was made in September. I think the day is near when we will ship peaches to Europe by the cargo, and that ships will be built for the purpose, in order to carry the fruit to European countries.

I suppose you have considerable faith in your soil here; possibly more than we have. We fertilize everything we grow, even peanuts. I will show what fertilizer has done for Georgia. Until three years ago Texas was first in the production of cotton, Mississippi next and Georgia third. For the last three years we have been next to Texas. We are growing more home supplies in Georgia than we ever grew before. We are growing lots of wheat there. We use from four hundred to five hundred thousand tons of fertilizer every year, and it pays us to do it. Fertilizer is coming to the front and is coming very fast. There are now over five hundred fertilizer factories in Georgia. We get the potash from Germany, and they take our phosphorous rock. They take three times more than we take of their potash. I hope that your experiments here will show that fertilizer pays. I have met a number of strawberry growers. One told me that he used a ton each year of the fertilizer, 10 per cent. potash, 3 per cent. nitrogen and 8 per cent. phosphoric acid. He told me that from present indication he would cut his acreage one-half (I think he has an acreage of sixty acres) and try to raise on thirty acres what he had raised on sixty.

Farmers must study plant feeding. The fertilizer used for the production of the plant is not the same you would use for the fruit. Use nitrogen for the plant and phosphorous and potash for the fruit.

L. A. Goodman.—What per cent. of nitrogen do you use?

Mr. Morrill.—I would rather consider about 10 per cent. potash, 3 per cent. nitrogen and from 4 to 6 per cent. of phosphorous right. If a person understands plant feeding and the principles, if he has a piece of land that grows poor wood, it is easy for him to see that the land needs nitrogen; if he has land that grows wood as high as his shoulder, he needs no nitrogen.

D. A. Robnett.—Do you think that we could produce our nitrogen cheaper by growing cowpeas?

Mr. Morrill.—Certainly. I would not advise anyone to buy nitrogen. Cowpeas furnish enough nitrogen for the soil. Our reason in Georgia for fertilizing the cowpea, is to get a more luxuriant growth, and in this way we get more nitrogen.

THURSDAY, JUNE 4, 8 P. M.

THE HOME YARD.

At a late meeting of the Missouri Valley Horticultural Society, Mrs. Asa Chandler of Randolph, Mo., read a paper on the above subject, which is particularly interesting, because it tells what Mr. Chandler and herself have been doing in trying to clean up and beautify a neglected yard. It should be said, perhaps, that their farm is part of an addition to Kansas City, which was laid out in the days of the boom, when it was thought the town would extend far north of the Missouri River. This fact accounts for the great number of cisterns which Mrs. Chandler says they were compelled to fill up. Her paper follows:

It has been said there is nothing new under the sun. I believe I am justified in contradicting this statement by saying all things are new as they appear. Every season a new season. Whilst it may be a repetition of the old, yet it is new. Our little grandson called the morning glories the "Good morning flowers." So every morning is a good morning—a new morning. And hence my subject, although so many papers have been written, read and printed concerning it, yet the subject has not grown old. It is a subject particularly fitting to us now, having given considerable time and thought to it in trying to bring a wild, unsightly ground under subjection and have an attractive home yard.

Please pardon me if I tell of some of the things that we have done.

First, husband with pitchfork and I with hoe made an attack on dried sunflower stalks. Where our yard now is was literally covered with these, from twelve to fourteen feet high. Some may say, "You with a

hoe!" Yes, but please, not as Edward Markham defines it in his poem, "The Man with the Hoe," but rather as he puts it in his poem, "The Angelus:"

And two have heard the summons on the air,
 And turned from labor, the embodied prayer;
 Bowed with the fine humility of trees,
 Of bended grasses in the quiet breeze;
 As duteous as the never-falling earth
 That gives us bread of rest and bread of mirth;
 As patient as the rocks that have been still
 Since put into their places on the hill;
 In league with earth and all her quiet things;
 Whose lives are wrapped in shade and whisperings;
 In league with earth and all the things that live
 To give their toil for others, and forgive.
 Pausing to let the hush of evening pass
 Across the soul, as shadow over grass,
 They cease their day-long sacrament of toil,
 That living prayer, the tilling of the soil!
 And richer are their two-fold worshipings
 Than flare of pontiff or the pomp of kings.
 For each true deed is worship; it is prayer,
 And carries its own answer unaware.
 Yes, they whose feet upon good errands run
 Are fixed in God, like Michael of the sun.
 Yes, each accomplished service of the day
 Paves for the feet of God a lordlier way.
 The souls that love and labor through all wrong.
 They clasp His hand and make the circle strong;
 They lay the deep foundation, stone by stone,
 And build into Eternity God's throne.
 He is more pleased by some sweet human
 Than by the learned book of the recluse:
 Sweeter are comrade kindnesses to Him
 Than the high harpings of the Seraphim:
 More than white incense circling to the dome
 Is a field well furrowed or a nail sent home—
 More than the hallelujahs of the choirs,
 Or hushed adorings of the altar fires.

But back to my subject. After a bonfire was made of our gathered stalks, what was our discovery? Old shoes, broken dishes, old stove-pipes, tin cans, beer bottles, old iron—things innumerable, just such as would accumulate around a miner's home. Yet after all there were the thirty cisterns that served as receptacles for all this, and this rubbish was soon hustled out of sight. Then, with six cisterns filled, we had a foundation for the home yard.

We have made a new beginning, and from past experiences, are expecting good results. I have often marveled at the great returns for the effort put forth. More than a hundred fold. Oh, the beauties of Nature! Do we adore them half enough! I am ready to exclaim, as

the psalmist, "How manifold are Thy Works, O Lord! The earth is full of Thy riches."

We have left in the center of our yard 100 by 200 feet for a grass plot, grouping shubbery and trees on either side. As Wagner suggests, create a picture, using the rich green grass for your canvass and framing the whole by a well-massed border using only those that are hardy. The trees we have planted are the white elm, camperdown elm, white ash, mountain ash, horse chestnut, Carolina poplar, hard maple, weeping birch, weeping mulberry, Kilmarnock willow, auralia, tulip tree, sweet gum, dogwood, chestnut, pecans, Colorado blue spruce, white pine and the maidenhair tree.

We have been led to appreciate the beauty of small trees, thanks to L. A. Goodman for the suggestion in his article on "City Forestry," to the effect that "another great mistake is in thinking that trees are not beautiful until they have become large. There is just as much beauty, and sometimes, I think more, in small, thrifty, shapely, vigorous-growing trees than there is in the full-grown specimens." This is quite encouraging for people who are on the shady side of life. The shrubbery that we have planted includes tree lilacs, Japan and the common lilac, snowball, barberry, Japan quince, Forsythia, spireas, deutzias, weigelias, hydrangeas, silver bell, snowberry, calycanthus, chrysanthemums, hardy Chinese peonies, dahlias, cannas—I suppose these latter would be classed as flowers. Of bulbs we planted hyacinths, tulips, narcissus. Of climbers we used wisterias, honeysuckles, clematis. By massing the shrubbery, placing the tall varieties in the rear, the medium varieties in the center, and low varieties in front, we have a good effect, having an assortment that will bloom at different periods, in order that each group will have a bloom the season through.

Plant perennial flowers. They require so much less care and increase in beauty from year to year. Yet there are some annuals that are indispensable. Banking foliage against the porches and foundations has a pleasing effect. And don't forget the climbing roses and vines, nor the bed of ever-blooming roses. We have grown very fond of the Wichuriana rose; its beautiful trailing effect and deep green foliage are very pleasing. A bed of tea roses is very beautiful.

Yes, there is no end. Yet we must draw the line somewhere. But please don't let us draw it before we reach the back yard. Let us practice what we preach and beautify our surroundings.

THE APPLE CROP OF 1902.

(G. T. Tippin, Nichols.)

Mr. President, Ladies and Gentlemen:

The apple crop of 1902 has come and gone. To many people it was like Paul's Version of faith, "The substance of things hoped for, and the evidence of things not seen." The struggle upon the part of some men to possess it, and upon the part of others to retain it who already had it, was not equal to the effort required later on to change ownership on a profitable basis either to the grower or dealer. A review of the apple crop of 1902 at this late date even, will renew sad memories upon the part of many of our growers and dealers, and it cannot be justified here unless we may learn some lessons from it. This is the object of this paper; and has been our aim to call your attention to some points of interest, which we think of vital importance, as far as the handling and distribution of our future apple crops upon a profitable basis is concerned. In referring to the mistakes that have been made in connection with the past year, I have not done so in the spirit of criticism, but have only pointed them out that we might profit by them in the future, fully appreciating the fact that results may be as disastrous from mistakes made ignorantly as from those made intentionally. Without proper information we may, and do, individually and collectively through the papers and reports sometimes advise the growers, when it would have been much better to have said nothing, and let things take their natural course. Such was the case to a marked degree as touching the apple crop of 1902. Our fruit journals and many of our prominent growers held out the idea that the crop was several million barrels less than the crop of 1901, and advised holding for certain prices, when in fact the crop was almost, if not quite, double that of the preceding year. As a result of these influences, many growers would not sell in the fall at prices the supply would justify the buyers to pay, and stored their own apples. The dealers, feeling that they must store some apples, bought any way, at too high prices, resulting in too many apples being stored for consumption during the period of time storage stock is generally moved at a price necessary to cover actual cost. At the same time creating an abnormal condition in the consumption of apples during the fall and early winter, a period when a large per cent. of the crop could, and would have been consumed at prices in proportion to the supply as compared with former years.

For your further information we herewith submit the data of the apple crops in the United States since and including the year 1896:

1896	69,070,000	barrels
1897	41,536,000	barrels
1898	28,570,000	barrels
1899	37,560,000	barrels
1900	47,960,000	barrels
1901	23,075,000	barrels
1902	43,000,000	barrels

You will notice that the crop of 1902 was about 20,000,00 barrels larger than the crop of 1901, although the claim was often made during the fall that it was several million barrels less. In fact, I believe there were as many apples purchased last year as there were in 1896, somewhat differently distributed. If the data of all the new territory producing apples last year not formerly taken into account could have been correctly compiled, I believe this would have been verified. The '96 crop was the largest ever produced up to that time. That year during the packing season, and even as late as February, prices in New York and New England ranged from 50 cents to 75 cents per barrel packed F. O. B. cars, this stimulated and increased consumption, and created a large export demand of 2,900,000 barrels; the largest in history of the country. The apple export of the crop 1902 ranks next, of over 2,500,000 barrels with prices over double. If prices had been reasonable, say 75 cents to \$1.00 for the fruit, during the barreling season no doubt but that the export for 1902 would have exceeded 3,000,000 barrels, and as times were so much better in this country last year than they were in 1896 double the amount would have been consumed in the early part of the season and the serious disasters that followed would have been avoided.

We are satisfied that estimates given out by many were honest, and intended for the benefit of the growers, yet we feel assured that in some sections of the country information was given out not based upon facts in possession of those who issued it at the time. With them this may have had a twofold object at the time; first, to cause other sections to hold their apples; second, by others holding they would have a better chance to force prices up to their own ideas; failing in this they stored their apples and suffered by it, realizing less for their fruit than they would, had they been willing to sell at what it was worth, prices based upon the supply (which must always regulate prices) during barreling season. The growers of the United States, especially of the middle west and the Pacific Coast States, must not be unmindful of the fact that there

has been a great expansion of the apple industry in the last decade, as shown by the United States census for 1900. From 1890 to 1900 there was added 75,000,000 apple trees of bearing age, therefore, 35 per cent. of a crop in 1902 would afford as many barrels as 100 per cent. of a crop would, or did produce ten years ago, or in 1892. The apple industry of the United States having reached such large proportions has become one of the staple products, and requires the same business methods as the handling of the cereal or cotton crop, consequently, for the protection of both the growers and dealers, statistical reports should be carefully collected and based upon fact as near as possible. In this connection we would recommend the suggestion made by some writer, that estimates should be made in barrels and not on a per cent. basis. Statistical correspondents should be required to give the number and age of trees, reported upon when furnishing crop estimates. It is a question whether or not by voluntary reports, data can be secured upon which the grower can fully rely. The Apple Packers' Association of America through their organized efforts are making some advancement along this line of work, yet the heaviest buyers do not take these reports entirely, but spends lots of money traveling over the different apple states making their own observations. We know one man who spent one thousand dollars last year looking over the apple crop, and then decided not to buy any apples. Many others did likewise, still the impression was abroad that the buyers were trying to bear the prices, which impression really grew out of wrong ideas as to the size of the crop.

The growers will be better protected and in a position to act safer and more intelligently when in possession of the facts. We believe the organization of the Commercial Apple growers should be encouraged for mutual benefits along these and other lines. One or two other points before we close. These we have referred to in a former paper on this subject, but think them of sufficient importance to justify your attention again. Our apples should be gathered and barreled at the proper stage of ripening, the same as peaches, strawberries and others fruits. A very large per cent. of the shrinkage in the apple crop 1902 was due to the packing of over ripe stock. Apples should never be on the trees when the trees begin to shed their foliage. Again, always remember that it never pays to pack poor stock, especially when we have as large a crop as that of 1902.

FRIDAY, JUNE 5, 9 A. M.

Call to order.

The report of the Committee on Finance was read. That on Fruit follows:

The Committee on Fruits respectfully submit the following report on fruits exhibited by:

J. E. Hall, Warrensburg, Strawberries, 7 varieties, awarded \$2.00.

L. R. Katherman, Warrensburg, strawberries, 3 varieties, awarded \$1.00.

Mr. Katherman also exhibits branches of Early Harvest Blackberry, Kansas Raspberry, Early Richmond Cherry and Wild Goose Plum, showing good crop of fruit set, in good condition.

Jesse Mohler, Warrensburg, 3 varieties Strawberries, awarded \$1.00; 2 plates apples, awarded 50 cents.

Also find on the table some evaporated apples, dried whole by Mr. M. H. Benedict of Richards, which are very nice.

A Rustic Hanging Basket of wild flowers by L. N. Wagner, Loyal Cross Roads, awarded 50 cents.

S. P. Cutler, Warrensburg, one plate Ben Davis awarded 25 cents.

Ed. Sams, Warrensburg, Cherry, Early Richmond, awarded 50 cents.

Ed. Kemper, Hermann, Grapes, 5 varieties, 2 branches of Elvira, one summer pruned and one not pruned, which shows the fruit on the summer pruned vine was much farther advanced, awarded \$1.00.

Signed

G. T. TIPPIN,

A. T. NELSON,

J. S. BUTTERFIELD.

The Secretary read the following letters:

From B. F. Bond, Varner, Ripley county, Mo., May 20, 1903.

Hon. L. A. Goodman:

Dear Sir—I have your address from J. C. Whitten, Columbia Experiment Station. I want to give you my plan to keep peach buds from winter killing, how to dwarf the buds and keep them dormant. Take suitable wire and a pair of pincers and twist the wire round each limb just tight enough to choke off the flow of sap. You must use judgment in doing this. The best time to do this is to be found out by experiment. I should say to dwarf the buds in July and to keep them dormant in August. I mean to test the matter and I want you to give it to your

society. Now here is what I found this spring, a broken limb on a peach tree in full bloom, while all others were winter killed, the limb was broken in early fall and it has peaches on it now doing well. To break the limbs would do, but would look bad, hence my wire plan, and my plan is to treat half of each tree top each year, this plan will cause the tree to be cut back each year, which is necessary for good peach culture. I think about two year old limbs will be best to operate on. If the buds are dwarfed I should take the wire off late in the fall. Just to keep them dormant take the wire off in spring, the sap will rise with force and overcome the injury.

From Tony Moser, Secretary St. Charles County Horticultural Society,
O'Fallon, Mo., April 15, 1903.

Mr. L. A. Goodman:

*Dear Sir—The copies of the 45th annual report of the Missouri State Society received, with many thanks in behalf of the Society. We are getting along nicely with our local Society. Now, Mr. Goodman, would there be any hopes of us being able to induce the Missouri State Society to hold its summer meeting of 1904 in St. Charles? St. Charles is a thriving city with a population of about 10,000 inhabitants, has free mail delivery, municipal water and light plant, a number of colleges, first class hotel accommodations, two railroads, is connected with St. Louis by trolley cars with a 15 cent fare. A highway bridge being constructed, will be completed in the fall. I think this would be an ideal place for the Society to hold its summer meeting of (1904) the World's Fair year. I am sure the kind people of St. Charles would extend a hearty welcome, and be proud to entertain you. I think this would be a great benefit to St. Charles county, as it is in need of a waking up along the line of fruit growing. We have some choice lands for fruit growing in our county, and are near a good market, namely, St. Louis. Hoping to have a favorable reply.

St. Louis, May 25, 1903.

To the President of the Missouri State Horticultural Society:

Sir—The Business Men's League of St. Louis has the honor to extend an invitation to the Missouri State Horticultural Society to hold its convention in 1904 in St. Louis.

The Great Louisiana Purchase Exposition will then be open, and the city will be most attractive. The hotel and hall accommodations will be adequate, and railway rates will be low.

Very truly yours,

C. P. WALDRIDGE,

President.

WM. F. LEWELLYN SAUNDERS,

Secretary and General Manager.

St. Louis, May 25, 1903.

To the Honorable President and Members, Missouri State Horticultural Society, Pertle Springs, Mo.,

Gentlemen—In behalf of the City of St. Louis, I take pleasure in extending to your Society a cordial invitation to hold your meeting for the year 1904, in this city.

Very truly,

ROLLA WELLS, Mayor.

Holt, Clay county, Mo, May 30, 1903.

L. A. Goodman, Kansas City, Mo.,

Dear Sir—Of all the 14 years I have handled berries this is the worst I have had. All along I had hopes of getting a pretty good half crop, but I give up. This morning the field is red with berries with rain pouring and every other one is rotten, so there is nothing to show. The creeks are all out of their banks. Of 20 varieties I have tried, Haverland is worth them all and Bubach next. I have a patch of Haverland now that has been badly frosted 3 times that I believe will fill 2 rows of boxes set end to end on each side of the row if we can get sun to mature them. They are in hedge row, they are about 3 plants wide and 4 inches apart in rows, they are fertilized with Clyde and they are just as full, but it must hurt any man's conscience to ship them to any one, they are so poor in quality.

Well, I have a good show yet, but there are but few apples in the country, some of the Ben Davis are getting moldy and it is impossible to spray for rain and mud. Most of the orchards are brown from the work of canker worms. If men have the right to raise such stock as that to destroy our fruit, why do we make them restrain their other stock? I think this will be a good question for the June meeting.

Well, we will have a few cherries, a few peaches, plenty of black and raspberries, no dewberries, no pears, not much corn, about half planted. I am too poorly to leave home, but will be with you in spirit as long as you meet.

From Yours Fraternaly,

G. T. ODOR.

From Z. T. Russell, Carthage, Mo., June 1, 1903.

L. A. Goodman:

Dear Sir—Many people used to claim and believe that the black raspberry did not do as well in the south as in the north because of the greater heat and less moisture of the former.

Now, in 1901, we had the longest and severest drouth ever known since berry growing was first tried in this section of the State, and not-

withstanding this fact there was gathered and sold in 1902 the largest and best crop of raspberries ever grown in this county. This, it appears to me, completely upsets the old theory and calls for a new one.

If agreeable to you, I would like for you to present this point to the meeting for discussion. There will certainly be members there who can explain this point and give us a new and better philosophy of it, that will be in harmony with the fact above stated. With best wishes for the success of the meeting.

THE PRODUCTION OF HARDY VARIETIES OF PLANTS.

(Dr. J. C. Whitten, Experiment Station, Columbia, Mo.)

Hardy varieties of plants are usually secured by selecting from a hardy specimen as a basis, or by crossing some desirable form with a hardy variety and then by carefully selecting the hardy seedlings which possess the other characteristics desired. The first step, then, is to secure the proper hardy variety with which to make a beginning. If these varieties contain in a fair degree the other characteristics desired, selection of such as most nearly suit our ideals is all that is necessary. If, however, the hardy varieties possess other characteristics which are not desirable they may be crossed with such forms as will supplement them in other desirable characteristics. From this progeny seedlings may be secured which possess the hardiness of the one parent to at least a considerable degree, and which also possess the desirable characteristics of the other parent.

It is not always easy, however, to determine just what constitutes a hardy variety. There is sometimes a correlation of parts in plants which enables us to determine one characteristic by observing the other characteristics of the same plant. For example, in peaches large size fruit is usually correlated with large leaves and stout twigs. The breeder of peaches, then, is usually able to determine whether a seedling will have large, fine fruit without waiting for it to come into bearing. If it possesses large leaves and stout twigs he knows that it will probably produce large fruit when it reaches bearing age; while the peach seedling which produces small leaves and slender, closely knit twigs, will almost invariably produce small fruit. In the pear, a seedling which produces small leaves and small twigs with short nodes, and a scrubby, thorny appearance, usually produces small, inferior fruit, while the tree which produces large leaves and stout twigs with long nodes, will usually produce large fruit.

In this State it would be highly desirable if we could produce hardy strains of peaches. Very frequently the fruit buds of the peach are injured by cold weather of winter. At the experiment station we are attempting to produce varieties of the peach which will less frequently winter kill. Could we secure commercial varieties whose buds would fail only half as often as do those of varieties now in cultivation, it would be worth millions of dollars to the State.

The first step has been to attempt to determine what constitutes hardiness in the peach, and what, if any, outward characteristics are correlated with hardiness in the different varieties.

Observations in various orchards for a series of years have shown us that the winter killing of peach buds, while due directly to low temperatures in winter, is usually due indirectly to the premature starting into growth of the buds on sunny days in winter. Sometimes late cultivation in an orchard, especially if it is not carrying a heavy crop of fruit, induces a late autumn growth, so that the trees go into winter with unripened wood and buds which are very easily stimulated into activity or growth on warm winter days. This premature growth renders the buds and twigs tender, so that they will not withstand the subsequent cold. Sometimes a midsummer drouth causes peach trees to cease growth abnormally early, particularly if thorough cultivation is not kept up to conserve the moisture in the soil during the dry time. If warm autumn rains subsequently occur, the trees frequently take on a second period of growth in autumn, which is somewhat akin to the spring awakening. Occasionally, even fruit buds which should normally remain dormant during the winter, come into blossom in the autumn. Buds which do not actually blossom, often swell sufficiently to cause them to be rendered tender.

The ability of a peach tree to withstand cold, then, often depends upon its being thoroughly dormant. The same thing may be observed in seeds. Seeds may be subjected to extremely cold temperatures without injury, provided they are dry and dormant. After they have sprouted and made a little growth, however, they may be killed by even a much higher temperature.

At the experiment station we have observed that there is an apparent correlation between the color of peach twigs and their ability to pass the winter safely. We might say, in other words, that there is a correlation between color and hardiness in the peach. It was first observed that our hardiest varieties usually produce lighter colored twigs than do those varieties which frequently winter kill. The Snow type of peaches, for

instance, all produce pale, yellowish-green twigs, and they are remarkably hardy. Their fruit buds frequently pass the winter safely and the trees produce fruit when other varieties are winter killed. The Ortiz, another variety with pale, yellowish-green twigs, is remarkably hardy, while varieties containing darkest purple twigs winter kill. An examination of the fruit buds of various varieties during a number of winters indicates that the hardiness of these varieties producing pale twigs is due to the fact that they are less easily stimulated into growth on warm winter days and consequently remain more thoroughly dormant during winter than do those sorts which possess dark purple twigs.

Experiments have shown why this may be. Thermometers inserted in the twigs of very purple colored varieties show that on sunny days in winter these twigs often attain a temperature of fifteen or sixteen degrees higher than the temperature of the atmosphere. Laboratory experiments show that this purple coloring matter of the twig or syanin, has the power of absorbing great quantities of heat from the sun. Similar thermometers inserted in peach twigs whitened with lime wash to reflect the rays of the sun, show that the whitened twigs will remain at atmospheric temperature, or slightly below. It may easily be seen, that during sunny winter days a raise of fifteen degrees, or sometimes even more than twenty degrees, in the temperature of the purple twigs above the atmospheric temperature, might cause them to make considerable growth and become active enough to be easily injured by the subsequent cold, while twigs which are whitened to reflect this heat, remaining at the atmospheric temperature, might pass this sunny period in a dormant condition. The varieties like the Snow and Ortiz, which have pale twigs, register a temperature between that of the whitened twigs and the dark purple twigs, showing that they would probably be less easily stimulated into growth on sunny days than would the latter. Aside from the difference in actual temperature of light twigs and the dark purple twigs, the rapid change, or fluctuation, in temperature of the latter may be unfavorable. Observations show that in cases where the difference between day and night temperature of the atmosphere and of whitened twigs is only ten degrees, that the difference between the night and day temperatures of purple twigs was twenty-five or twenty-six degrees. In days of intermittent sunlight, the sudden appearance of the sun from behind a cloud in one case where the ground was covered with a light snow which reflected the heat upwards to the trees, thermometers in purple twigs raised in temperature sixteen degrees in six or seven minutes; when the sun again passed under a cloud, the temperature of the twig fell fifteen or sixteen degrees in a very few moments. This fluctuation of temperature on the part of the purple twigs is no doubt injurious.

There seems to be, then, a correlation between the hardness of our peaches and the absence of purple coloring matter in their twigs. In order to determine whether or not this supposition is of any economic importance, we are now attempting to breed varieties possessing light colored twigs. In order to do this we have begun a collection of as large a number of the light twigged sorts as possible. These light twigged sorts and their seedlings usually do not produce the finest fruits; from them, the peaches are not only usually small, but usually pale in color. Furthermore, they do not produce quite the high flavor of some of the purple twigged varieties. For that reason we are crossing the light twigged varieties with such purple twigged varieties as produce the finest fruit. We wish to determine whether or not we can obtain varieties from which the purple color will be eliminated and which may yet produce as good fruit as do our purple twigged sorts. It remains to be seen whether or not this can be accomplished.

Weston, Mo., June 2, 1903.

Friend Goodman—You are aware of the situation that surrounds us. Water bound—no trains to Kansas City. Two a day only with mail and way passengers to St. Joseph reach us. I send the paper by mail; it may reach you in a round-about way. My full intention was to meet with you. Just now the outlook for travel is uncertain. Hoping that those who can meet will have a good and profitable time, is the wish of

Yours truly,

J. A. DURKES.

THE PEAR.

(J. A. Durkes, Weston, Mo.)

The most desirable situation for the pear orchard is on elevated sites, sloping to the south or east, on a loamy, sandy clay, that is open sufficiently to admit of free drainage, and yet where the roots extending deeply and freely in it, reach moisture in very dry seasons. Cold, wet stiff clay is a very undesirable subsoil, perfect drainage being very important.

We have records of localities in many states where the pear seems to succeed perfectly, continuing to increase in vigor and productiveness from year to year; and doubtless many other sections in due time will be added to the list of those now become famous.

The fruit growers of the Union certainly deserve much praise in their efforts to make pear growing practical. Our country is a large one with such diversity of soil and climatic influences much experimenting will be required.

An orchard of dwarf pears, trained in pyramidal form, is a beautiful sight, planted with adapted varieties, it can be made quite profitable in hands of a specialist. The ground for the trees should be thoroughly prepared by plowing and harrowing, checked off ten or twelve feet apart. Varieties known to do best on the Quince are planted, such as Duchess, Bartlett, Anjou, Louise Bonne, and others in smaller lots that may be grown for trial. The ground can be planted for several years in low growing crops of any kind; then left to rest—grass and weeds cut down for hay or left as a mulch. In planting, the trees should be formed, roots trimmed, the soil well firmed upon them, and very little pruning done after, except to bring the straggling branches into shape. The aim is to retard excessive growth, but to induce a larger number of small limbs and twiggy growth. This, we think, will be largely a safe-guard against blight by diverting the sap into many channels. Trees of the pear orchard should be twenty or twenty-five feet apart. I plant twenty; this seems to be a good distance, for in few instances will the trees grow large enough to need more space.

The pear tree is an upright grower, the roots not spreading near the surface.

We start the heads of trees low, one to two feet from the ground. After the first season no trimming is done except to cut away dead or blighted limbs when these appear.

Shoots starting from near the ground, unless too many, are left to grow as a new part of the tree.

In the mode of training the pear we have adopted, which could be termed the renewal system, these new shoots become very serviceable for this reason, quite often a tree blights and only part is lost, the root and a part remaining healthy and living on, growing vigorously and bearing fruit the same as when all the tree was there. The percentage of trees lost by blight has been much reduced when trained in this way. While those trained to a single stem, when blight appears, the whole tree is lost, the trunks all being shaded may in part be a safe-guard, but our theory is, as before stated, inducing a slow, healthy growth of wood, and plenty of it has as much influence, if not more, for we find that trees having passed the first years of fruiting, and the older they become, are less subject to the blight. Of course we have not been free from it, but it does not worry us much. When we see a twig

and limb, large or small, turning black, they are cut away and destroyed. When a whole tree is lost, we put in another soon as possible.

For home use and experimenting we plant many kinds; but for commercial purposes we have selected the following:

First, the Bartlett bears every year, though it also has its full and off seasons; the tree adapts itself well to the mode of renewal.

Keiffer, for shipping long distances, storing to ripen late, is the best pear we have.

Clarigeau is very large, fine form and color.

The Duchess on the Quince seems to succeed everywhere; one of the best in size and quality.

Anjou, out East, an early winter pear, ripens with us from the middle to the last of September.

The Howell is large, smooth, finely colored and very fruitful.

Bergamotte Cadette is one of our best pears, not known as well as the others named; it is large to very large, firm; excellent flavor; carries well; trees healthy, of spreading habit.

The Seckle we include in the list, though small, its high fame for quality gives it ready sale.

Flemish Beauty is one of the best pears we have. The trees bear well but are so subject to blight. But we cannot afford to do without them, so, in order to keep up a supply, we are forced to adhere to the old adage, for every tree that is lost, plant two in its place, and by the way this must be the motto for all fruit growers.

THE PEAR.

(Polster Brothers, Warrenton, Mo.)

This is an old subject and nothing new to report. In other lines and branches there is advancement and new remedies for diseases are discovered, but it seems for pear blight there is no remedy, and it is a vexed and *difficult subject in horticulture*. The knife and saw seem to be the only remedy. Watching the trees from early spring till late in the summer, cutting and sawing off all affected limbs and branches and at once burning same seems to be the only refuge. Warm, moist weather is favorable for blight. Cool, dry weather is unfavorable. Most of damage is in a month or two following bloom, but young trees may be attacked at any time during the summer. Eighteen years ago we planted four hundred pear trees and continued planting every year until we had eighteen hundred trees. Eighty per cent. were Keiffer; the balance, other varieties. If we had planted Keiffer only, we would have been much better off, as seventy-five per cent. of Keiffer are still alive and bearing heavy crops, and nearly all other varieties are dead from blight, except

Garber did well. The Keiffer on our clay timber soil grows to perfection here and is equal to a Bartlett for canning and eating if properly ripened. The Keiffer, like the would-be doomed Ben Davis, has been much abused, but those who know them and want money in their pocketbooks will do well to plant both.

PEARS—DISCUSSION.

B. C. Auten.—I have nearly all the varieties mentioned and some others. I have more success with the Dwarf than any other.

Pres. Robnett.—I had some trees that grew for six years and then died. They will do fine for several years.

Mr. Kemper.—Is new land good for pears?

L. A. Goodman.—It depends on the sub-soil. It is no use to plant without the proper sub-soil.

Pres. Robnett.—I believe it is a good plan to let the sprouts grow. I met a man who was a great pear grower and he said that he had a tree planted in a fence corner that did not receive much attention, and the sprouts grew. This tree did better than any in the orchard. I am trying a tree that way and it is doing finely.

THE PLUM.

(J. E. Thompson, Windsor, Mo.)

This grand fruit is being sadly neglected, and we find ourselves up against the proposition of whether we will raise our own plums or pay the people of California to do this for us, and "we pay the freight."

The plum, to succeed best should be budded on plum roots. While some of our nurserymen for economy's sake will bud on peach roots, yet I regard this as false economy. I greatly prefer "plum on plum" even at the greater cost.

Location.—The soil should be reasonably fertile, porous and well drained. Should be so cultivated that the water will not stand around the roots of the growing tree. Then, too, let me suggest a thing to our farmer friends: A good plum tree makes too expensive a hen roost to be used for that purpose. Better use a goods box. Pardon this digression, but I have seen so many fine plum trees ruined by this method that I feel a word of warning is in good place.

Culture.—Plant the tree not quite as deep as it grew in the nursery, and then mound up well with dirt for six or eight inches around the body of the tree. Hoe or plow well for the first three years. By this time it should be well rooted so that you need only to keep the weeds closely mown. Never mulch a tree after the fourth season.

Varieties.—Among the Americans: Wild Goose still leads. It is sour and the curculio loves it as a dainty morsel, yet its immense prolific

nature will assert itself to such extent that it will come nearer making a crop every season than any variety that I have tried. Wolf is another good one of American type.

Japans.—I put Abundance as first, Burbank as second. Wickson is new with us, but its immense size will recommend it for thorough trial. Red June is another that is all O. K. I will say right here that you will not go very far amiss if you plant almost any of the Japans. Frost in early spring seems to be their worst enemy as they bloom pretty early.

Europeans.—Damson is a good one, a shy bearer, but none more delicious. It is local in its habits. In many localities it bears better than any other of its class. I prefer the Shropshire Damson, on account of its larger size. Lombard, Shippers' Pride are both good ones. Shippers' Pride especially standing up pretty well against the hot suns of June and July. Sun scald is their worst enemy. German Prune is well spoken of in some localities, but I have not fruited it.

Enemies and the Remedy.—Borers or worms getting into the roots are the worst enemies that we have to contend with so far as the tree is concerned. The leaf rollers that prey upon the leaves and the different species of Caterpillars that eat the leaves all are very destructive if allowed to go unchecked. We spray the trees with a mixture of Paris Green mixed with lime and water. One pound of Paris Green and one pound of lime mixed with water at the rate of the above to 200 gallons of water. Usually one application has been sufficient to destroy them. If not, then in four or five days later try it over. It is remarkable how quickly the pests will succumb to these poisons.

Marketing.—We have usually sold to nearby markets and have found that the market basket that holds one-tenth of a bushel the best. Although it is easily tried to find what your market calls for. I have shipped very successfully in ordinary berry boxes and crated the same as the strawberry, raspberry or any of this class.

Procuring the Trees for Planting.—Always buy from some reliable nurseryman. It is far better to pay two prices and get what is reliable, than to place your order with some peddler who has no interest at stake but the present deal. Plant the varieties with a good reputation; shun the high prices, new wonders. They will in almost every instance prove a disappointment.

DISCUSSION ON PLUMS.

Mr. Morrill.—I would like to ask what success you are having with the Japanese varieties?

Secy. Goodman.—A great trouble with them is that they bloom so early that they get caught by the spring frosts. Wherever they escaped

they have borne wonderful crops. The Gold is a good plum. We had fine crops in Bates county last year, also in South Missouri. Wickson, Burkank, Gold and Red June are good varieties. If there were some way that they could get over the two or three weeks at blooming time, they would certainly be very good.

Mr. Kemper.—Is there much difference about the peach on plum and plum on plum?

Secy. Goodman.—I think where the soil is not dry enough for the peach root, it is well to have it on the plum root.

Mr. Kemper.—Will it live as well with plum on plum?

Secy. Goodman.—The plum root will stand more moisture.

Pres. Bobnett.—Do chickens roosting on the plum trees hurt them?

G. T. Tippin.—When they bend the limbs and get them out of shape. When we have a few chickens and lots of plum trees, it is all right.

Secy. Goodman.—In the spring when the sap is running up, the chickens are apt to rub the bark and loosen it and kill the trees.

Mr. Tippin.—I have one tree of the Newman. It is a more prolific bearer than the others and lasts longer in the season. It is about the size of the Wild Goose plum. I am safe in saying the plum lasts six weeks and gives better results than anything I have planted.

DISCUSSION ON GIRDLING.

Mr. Morrill.—Three years ago I was at Sparta, Ga., and several traveling men were talking about the peach business. In the month of March we had our peach crop damaged. One of these gentlemen, who traveled for a chemical company in Ohio, asked me what it would be worth to Georgia if they would be assured of a peach crop every year. I said it would be worth millions. He said he would like to make a proposition to me. He said that several years ago in Ohio, he was looking at some peach trees and some one had hitched their horse to a tree, the strap had been broken and part left tied around the tree. He said he noticed that the sap was not running into the limb on which the strap was tied. A freeze came and killed every peach except on that limb which was loaded with fruit. He thought there was something in that and took a tree in his own garden and bound it with a strong piece of scrap iron. That year every peach in his garden, he said, was killed except on that tree and it had a full crop. He had not time to tend to this business, but thought the principle could be patented. It might save millions. We could patent the principle and the steel bands and might save the peach crop in the whole Union, by preventing the early budding of the peach. I would like to see some one try this prin-

ciple. I have not had time to do this myself, but believe there is something in it.

Secy. Goodman.—I have done a great deal of this all my life. I remember in my old home in Michigan, we often had trouble in the trees not bearing and girdled them, with the idea of holding back and making them more hardy. I believe this is worth testing. The trees usually set plenty of peach buds. Even then the fruit may hold better and become larger and have better color if they are girdled. We used to girdle apple trees as much as pruning them. The trees were marked at bearing time and we girdled the trees that did not bear. I have no fear in taking off six or ten inches on the tree. Girdling is a much better way, because this space will heal over in the course of two years and almost every instance will heal. It may take three or four years sometimes. By girdling the size of the crop and the size of the fruit is often double, also girdle the peach, plum and cherry. One man told me he had an orchard that did not bear and I told him to girdle them. He said he was afraid he would kill them. I told him to go through the orchard and girdle every other tree and note the difference, and then the next year girdle the others. This year we are girdling some we girdled last year. Of these, I am taking out a strip about two inches above the old girdling. They have got to bear. You need not be afraid of killing the tree. This of course injures the tree, as does every bearing, but this injury is to our profit and if I can make a tree bear by injuring it, I will do so. You are not injuring the tree; only making it do what it ought to do for you. In girdling this time of the year, from now until the twentieth of June, you may be sure you will not injure the tree, only make them make perfect fruit buds and the chances are that you will have fruit for the next year.

Every grower of the grape knows very well how to produce a long cluster by tying a wire around the vine and so have the vine loaded with magnificent fruit.

You can make a tree bear and hold the fruit by girdling, the apple, pear, cherry, plum and in some instances the peach. The apple begins budding June 1st; also the pear. You can transform the young bud into a fruit bud if you girdle now. You may girdle in July and August and change it. Even as late as August, you can make the growth of the bud much better. I take off from two to six inches, depending on the size of the tree. On a tree thirteen or fourteen years old, I would take off six inches, clear around the tree; usually at the center of the body of the tree. This year we girdled about six inches above that, sometimes only four inches.

D. A. Robnett.—How tight would you bind the grape vine? Would you imbed the wire in the vine a little?

L. A. Goodman.—Just so it was tight. You will cut it off any way the next year. Girdle it just so it is tight. The grape vine does not increase much, so wind it tight.

Mr. Morrill.—You would not girdle unless the tree was putting on plenty of fruit buds?

L. A. Goodman.—No.

Mr. Morrill.—Do you wrap the girdled place after taking off the bark?

Secy. Goodman.—No. There is a thick sap which comes out and it takes care of itself.

J. E. Gladdish.—Will girdling make the tree hardier and protect it from the frost?

Secy. Goodman.—No.

J. E. Mohler.—We have an orchard of trees twelve and thirteen years old. Every year they bloom heavily and when the peaches become the size of marbles they drop off, leaving only a half or third of a crop. Will girdling help it?

L. A. Goodman.—Girdling may cause the tree to give more pollen to fertilize better.

J. E. Mohler.—We thought it might be that the ground was too rich and sowed the ground in timothy last fall. It made the growth better. Would girdling help the Keiffer pear any?

Secy. Goodman.—Yes.

A. H. Gilkeson.—I once had apple trees that would not bear and was told about the girdling business. One year I girdled one limb. It was full of fruit and the rest of the tree was not. I had some Huntsman that did not bear and girdled them, as I thought, severely, about the last of May. The orchard is thirty years old and they are still bearing. The first year after they were girdled, they bore a big crop and they had never borne before and they were fifteen years old. I think the best thing to do with the Keiffer pear is to kill it.

Mr. Morrill.—Was not the falling of the fruit caused by too much nitrogen in the soil?

C. H. Dutcher.—Nitrogen is productive of wood substances and if it has too large amount, the tree is expending its energy in making wood. I do not know that nitrogen was the cause of Mr. Mohler's fruit falling. I had some apple trees and all the apples dropped off. Would you girdle them?

Secy. Goodman.—That would depend on the condition of the trees. The apples have dropped from want of the perfection of the fruit buds,

possibly. If so, and the trees are overgrown and are making a good deal of wood, I would girdle them.

C. H. Dutcher.—It struck me that an apple tree that bloomed well and set plenty of fruit buds and the fruit got as large as marbles, and are now all gone, that it was no fault of the tree.

J. E. Mohler.—Would you girdle the Mammoth Blacktwig?

Secy. Goodman.—Yes.

J. E. Mohler.—Can you make them profitable?

Mr. Goodman.—Yes. They are profitable in South Missouri and Mr. Dix at Jefferson City has some fine trees that have done well.

FINAL RESOLUTIONS.

Resolved, That the State Horticultural Society fully appreciate the hospitable treatment accorded them by Mr. J. H. Christopher of Pertle Springs, Mr. and Mrs. McCrinn of the hotel, and hereby express our thanks to them for the same.

Resolve further, That we express our appreciation of the interest taken by Vice-President C. H. Dutcher, Mr. A. H. Gilkeson and the local Horticulturists, who under so adverse circumstances caused by the excessive rains, have done all they could to make our meeting among them a success.

Resolved, That we express our thanks to Dr. E. B. Craighead, Prof. B. L. Seawell and Senator Bradley of Warrensburg, for their able contributions to the success of our session by their papers and speeches; also to Miss Dogget for literary entertainment.

Resolved, That we express our thanks to the railroads who kindly favored the delegates to the meeting with reasonable rates over their respective lines.

G. T. TIPPIN, Chairman.

MISCELLANEOUS.

MISSOURI STATE HORTICULTURAL SOCIETY.

(By Prof. J. C. Whitten.)

(Written expressly for The American Truck Farmer.)

The Missouri State Horticultural Society will hold its next meeting at Columbia, Mo., on Dec. 8, 9 and 10. An account of this Society, and what it is doing for Missouri horticulture will no doubt be of interest

to the truck growers. This Society was organized in 1859, by some of the pioneer fruit growers and gardeners of the State who conceived the idea that meetings for the mutual expression of opinion would be helpful to them in their profession. At that time the horticulture of the State was in its infancy. The large commercial orchard was practically unknown in this section. The best commercial varieties of fruit were scarcely yet determined, and planting largely, or exclusively of a single variety was not dreamed of. The best orchard was at that time the one that contained the greatest assortment of varieties, regardless of whether these varieties would thrive well in this climate or not. The nomenclature of varieties was not well systematized, a variety frequently passing by different local names in various sections. Modern methods of cultivation and management were not well understood. With this confusion of ideas and methods the pioneers of this Society entered into the work of furthering the interests of Missouri Horticulture, and the improvement they have brought about has been little short of wonderful.

One of the first lines of work that attracted attention was the determination of the best varieties to plant for market. Reports by different growers of the behavior of the various sorts were secured, in order to determine what ones proved to be most generally profitable. This revealed the fact that the correct names of varieties were not generally known, for the reason that local names were variously applied to fruits in different sections. A correct nomenclature was of importance in order that the grower might be sure he possessed a given sort. At the meetings of the Society collections of fruit were exhibited, so that competent committees might pass on their comparative merits and also straighten out conflicting names. This has given rise to a comparatively wide knowledge of varieties by the leading fruit men of the State.

The origination of new varieties, adapted to our soil and climate, was also taken up by a number of enthusiastic members. As a result a goodly number of commercial sorts have originated in Missouri. New varieties of apples, peaches, pears, grapes and berries have gradually swelled the list. Formerly nearly all the varieties of fruit grown in the State were old sorts which were brought from the east. At the present time the majority of commercial sorts are of western origin, many of them having had their birth in Missouri soil.

Ideas and traditions with respect to methods of cultivation and management, as well as varieties, were formerly brought from the eastern states, where conditions are very different from our own. The Horticultural Society began agitating the question of adapting methods of shaping fruit trees and of pruning to our own local conditions. Mem-

bers of the Society began experimenting along this line and reporting their results at the meetings. Early copies of the reports of this body show that for a series of years attention was fastened largely upon the question of adopting low heads and a dense branching system for their fruit trees. As a result a new system of shaping the tree, better adapted to our conditions has been developed. In the eastern states, with a maritime climate, trees were given high heads, so the ground under the trees would warm up and so grasses, or other crops could be harvested under their branches; the trees were given open tops, and were freely pruned, so as to admit sunlight and air to ripen and to color up the fruit. As opposed to this we have gradually adopted in the west, where our sunlight is intense, low heads, to shade the trunk of the tree and the ground under it; we have adopted a straight, central trunk, with dense lateral limbs as a protection to the tree and its fruit. Earlier fruiting and closer planting have been adopted as better suited to our conditions.

A quarter of a century ago the officers of the Society began planting what might be called the pioneer, large commercial apple orchard of the State. It contained 1,600 acres and was for years the largest orchard in Missouri. The experience of putting this enterprise on a paying, commercial basis did much toward developing the present methods of commercial fruit growing in Missouri.

Reference to the reports of the Society shows that only a comparatively short time ago the members began to agitate the question of better cultivation of fruit trees. Up to that time it was quite common for fruit trees to receive no cultivation at all, but to leave the orchard in sod and perhaps pasture it with domestic animals. Today nearly all the leading orchards of the State receive good cultivation. In many cases the orchard receives as good tillage as does the garden.

The old custom of planting promiscuous varieties has given place to the planting of a few commercial sorts. This has enabled the grower to harvest and market to better advantage and restricts his varieties to those that are the most profitable. In picking, packing, handling and marketing great advancement has been made in recent years.

A short time ago Missouri ranked far down the list among the fruit growing states. The last census, however, showed that there were over twenty millions of apple trees growing in Missouri orchards, or one-third as many again as in any other state. Since the apple comprises over 80 per cent. of the fruit grown in the United States it will be seen that this State is now in the front rank as a fruit growing State. The same census report shows that Missouri has more than doubled the area of its apple and peach orchards in the past ten years.

a growth in this respect that is phenomenal. It is safe to say that more than half of the fruit trees now growing in Missouri orchards are not yet old enough to have borne fruit, and a still larger proportion of them have not yet reached full bearing age. For that reason this State has not yet reached first place among the various states in actual fruit production. The present indication is that when all our young orchards come into bearing we will produce more apples than any other state and rank well up in the production of peaches and other fruit. The work of the Horticultural Society has been one of the most important factors in promoting this rapid growth in the fruit growing industry.

Under the auspices of this Society exhibits of Missouri fruit have been made at all the expositions and leading fruit shows held in recent years. These exhibits have never failed to attract wide attention to the fruit industry of the State and to carry off their share of the prizes.

The Society holds two meetings each year, one in June and the other in December. These meetings are generally held in communities where fruit growing is creating interest in the industry. Papers are read by successful fruit growers and by scientific investigators and these are published in the annual report of the Society. In this way the organization is able to present to the horticulturists of the State the best up-to-date methods. These meetings are open to the discussion of such problems as confront the horticulturist.

At the coming meeting in Columbia papers will be read by some of the leading fruit growers and scientific investigators of the country. The University will at that time dedicate the new Horticultural building, which is one of the finest of the kind in the United States. Opportunity will be given to see the University and the Experiment Station grounds. It is expected to make this one of the most largely attended and successful meetings that the Society has yet held.

MEETINGS OF THE MISSOURI STATE HORTICULTURE SOCIETY.

Every fruit grower in Missouri who can possibly do so should attend the three day's meeting of the State Horticulture Society to be held at Pertle Springs, next week.

The impression that some people have got in their minds that the summer meetings are not as important as the winter meetings, is a wrong one. True, it comes in a busy season, but the three or four days taken from work to attend these meetings will rest and refresh mind and body and permit us to take up the regular routine of work upon our return with so much added zeal that no time will have been lost.

One of the aims of the Society, as shown by reading the programs of the past years, is to pretty well cover the scope of general horticultural work each year; so it will be seen that part of our fruits are given prominence at the annual June meetings while others are taken at the December meeting; hence it is necessary to attend both to gather up the strings of the whole year's work. As at the last winter meeting, where much prominence was given the apple, one gentleman said he came just to hear about the strawberry, and they had hardly been mentioned, while so much time had been given to the apple.

The Secretary replied that it was true, but if the gentleman had attended the June meeting previous, he would have seen that small fruit was most thoroughly discussed and scarcely anything relative to the apple.

So it goes, and to get all the good possible from the Society's meetings, let us attend all that we can.

We are assured that the location possesses sufficient attraction in itself to well repay us for the time and money spent, and with the program as already printed, and the discussions that are even better than written papers, all render this meeting one of importance.

More especially is it necessary to meet at this time, together with fruit growers from all over this State, and from other states as well, and discuss plans for the great work before us. We refer to the Big Fair, for which plans must be made and work promptly pushed in order to be ready for this "biggest show on earth."

It is said "there is nothing new under the sun," so it requires a more perfect system and the exercise of our best talent to so prepare and put old things before the world in a new form, and so take and hold the first place in horticultural display in the known world.

This is a great undertaking and may seem egotistical for "Poor Old Missouri" to aspire to such a position, but judging from past progress, and feeling our courage rise higher with each new difficulty, we feel that we are really modest in our humble aspirations to lead the world.

With our faith strong in the possibilities of our State, with the improved methods in orchard work becoming generally practiced among our fruit growers, we need only to properly put before the people our magnificent products to win success.

Any and all mishaps that have or may yet occur to our fruit crops should only spur us on to greater zeal, and more earnest activity, and will make success only so much more deserving.

These things all need discussion, not only by members of the executive board, however able, but by each and every fruit grower in

the State, who may have just the exact idea that means perfect success.

In looking back over the work of the Society in past years, we find it was always at the front.

Fruits, varieties and methods of cultivation and marketing; insect depredation, or diseases, were all promptly met, taken up, and discussed at once, that the best means necessary could be placed quickly before the people. Along with it all, there has ever been careful consideration for the amateur, the beginner in horticultural work. Every session of the Society shows many papers and thoughtful discussion by the most practical fruit growers in the State, with the special aim of giving needed information to the beginner.

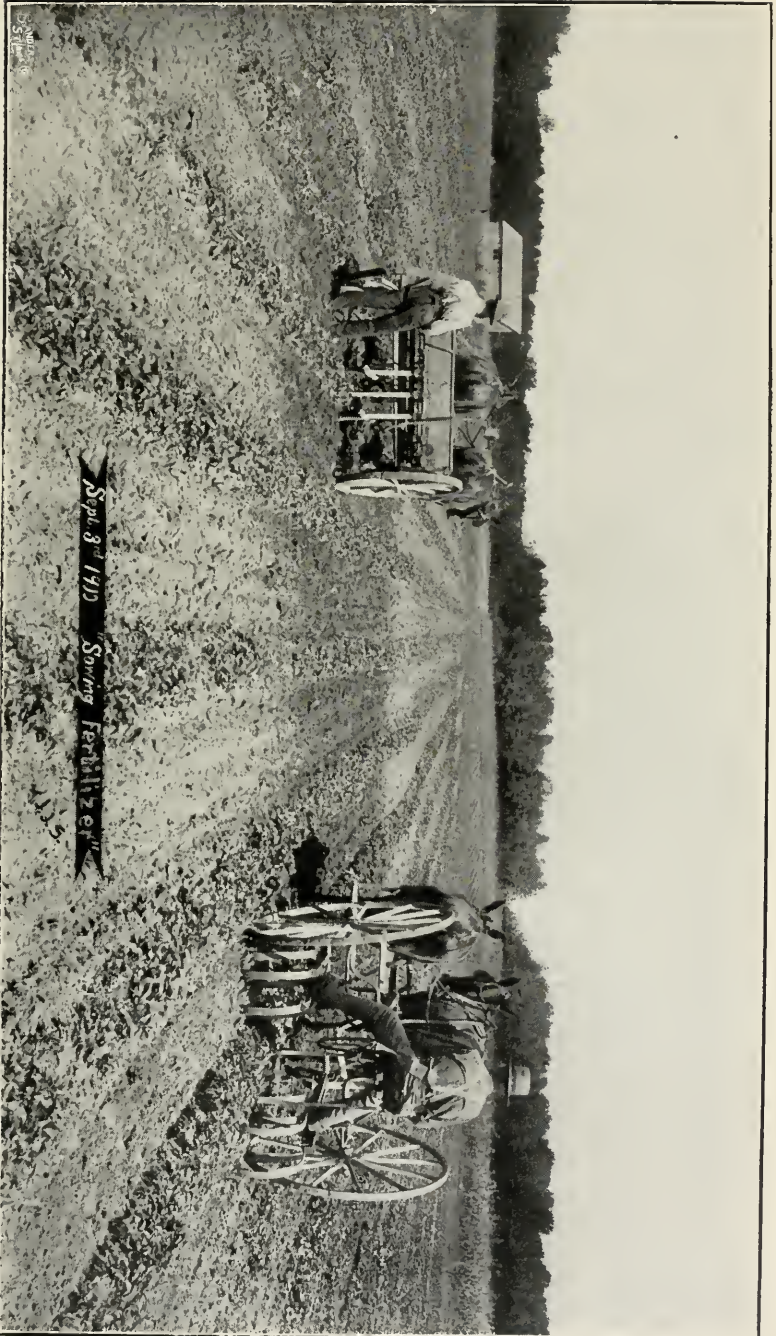
In fact, from the beginning, it has been the great aim of the Society to get the people to study and think intelligently, to awaken a more active desire for more knowledge, and to unite the people in an effort to push the wonderful development of our products.

To be able to take advantage of all that is possible for us to develop, means increased intelligence and a higher education, together with more thorough appreciation of what it means to live in a fruit state. Benefit will come to us in our homes, our business, local community and our State. In all of this the State Horticultural Society has proven itself a leading factor.

Practical knowledge is made so by experience, and here again the Society has done an immense work, and has made it possible for a man of inquiring mind to become more wise and thoughtful, more cultured and conservative, and more of a companionable creature, capable of enjoying more deeply, with a more generous appreciation of our fellow-man, and a more abiding faith in the power that has bestowed gifts with such a beneficent hand, and given us the intelligence to seek out and make these gracious gifts our own.—The Ruralist.

PLANTING STRAWBERRY PLANTS.

With some the season for planting is already at hand. To begin, have your ground well plowed and smoothed down with a drag or roller. Mark out your rows 4 feet apart. This is best done with a rope (wash line). Drive a stake down at the end of the first row and unwind your rope to the other end of the field to be planted; now drive another stake in line and tie to the stake. Walk back upon the line in such a way that you tread the line with each foot placed directly in front upon the line so that it will not be moved out of place. Continue the lining out until the field is "lined out" in this manner. You will observe that this



Saxe, Mo.
D. Saxe

Strawberry Field, D. McNeill, Saxe, Mo.

leaves a plain mark and is easily followed in setting the plants; besides, the rope or line is not in the way and the mark much easier to set to.

Early planting is best. Much depends upon this work of setting the plants, which should be thoroughly done and with the least exposure to the plants. For this reason procure a small, light box or basin to carry the plants in. Take a bunch of 25 or 30, as the case may be, and trinit off about one-third of the long roots (some take off half). Provide yourself with a dibble (made of steel), or a wooden one will do if the planting is not to be a large one. A dibble is made like a medium sized butcher knife with a handle across the end, the blade being about twice to three times as thick and provided with a double cutting edge, not so sharp as the knife. The wooden one can be made easily out of a piece of hard wood, osage orange being very suitable for this purpose. Take the dibble and push it into the soil (on the line), draw it toward you before withdrawing it, which will leave an opening for the roots of the plant to be set. Now, with your left hand take out one of the plants and place the roots about half way across the opening, and with the dibble in the right hand draw the blade of the dibble across the roots, and with the curved portion press the roots down into the opening in such a way that when the dibble reaches to the bottom the roots will not be doubled up but be straight down in the hole. A little practice will soon show how easily it is done. Next take the dibble and push it down about two inches ahead of the plant and draw the soil toward the plant, firming it well, so as to cover the opening. Make another draw a little farther ahead and the plant is set, which should leave the crown just peeping out of the ground. Continue the planting at from 18 to 20 inches apart. Some set 2 feet, others 3 feet apart, depending on the variety or the manner of after culture. Where it is intended that the cultivation is to be both ways the plants are set 3 feet apart.

Generally it is best to begin the planting with a staminate variety. Where pistillate varieties are used they are planted in the same field. Most growers plant two rows of pistillate, then one of staminate, and so on.

Varieties in succession of season of ripening suitable for family use or for market: Michel, Lady Thompson, Warfield, Clyde, Haverland, Aroma, Ridgeway, Gandy.

All blossoms should be removed from time to time, in order that no fruit ripens on the new-set plants. Cultivation should be thorough from the beginning in order to secure an even stand of your plants.

HENRY N. WILD,

Sarcoxie, Mo.

Practical Fruit Grower.

SECOND CROP STRAWBERRIES.

St. Joseph, a French variety, comes nearer being perpetual bearing than any variety we have tried, but does not succeed well here under ordinary culture.

Of our American varieties, Cumberland Triumph comes nearest being a double cropper. Two-year old beds are almost sure to produce a good strawberry in the fall. This fall fruiting can be encouraged by barring the rows off with a one-horse plow as soon as the June crop is over, and cultivating several times between rows. A neighbor of mine is, and has for some weeks, been gathering from two to six quarts of that variety daily from an acre. The bed is two years old and was barred off and cultivated in the manner stated.—Colman's Rural World.

 INTERESTING TALK ON SOILS.

Prof. E. M. Shepard, of Drury College, addressed the Greene County Horticultural Society at the March meeting on "The Soils of Greene county, Mo." The following are some of the thoughts advanced as reported for The P. F. G. by the Secretary, Miss Emma J. Park:

Soil is the unconsolidated surface material of the earth. It is divided into two kinds: First, soil proper, which is a few inches deep, and, second, sub-soil, which is from a few inches to many feet in thickness. Soil proper is composed mostly of sand, clay, iron and humus. There is less of lime and magnesia and an extremely small amount of phosphoric acid and potash.

Erosion has been a powerful agent in the breaking down of rocks. When we realize that 30 miles of the Alleghany mountains have eroded away as they rose and that 3,000 feet of this country has washed away, some idea of the length of time taken to build this earth is formed.

Of soils proper there are two kinds—those of disintegration and those of transportation. The soils in the northern portion of our country are largely made up of soils of transportation, that being the glacial district. Here, except in the river bottoms, we have the soils of disintegration. One of the things we need on this limestone soil is lime, as lime is easily dissolved out of the soil. With a sandstone soil, however, the sand is insoluble. In soil derived from the wash of limestone we will find lime more abundant. It is the upland where lime is needed. If you have a sandy soil it is important to know your sub-soil. If clay

is the sub-soil deep tillage gives the best results; if you lack the clay the moisture is retained better, by shallow tillage. A shale soil, which is rich in clay, needs the deep tillage, and sand or ashes help to loosen it.

There are different means of stirring the soil: First mechanically, by tillage and sub-soiling; second, by nature's methods. By capillary attraction the soluble portions of the soil are transferred, either up or down, dependent on the moisture. Evaporation brings the soluble portion near the surface. The earth worms do a vast amount of stirring. It is estimated that they bring up 10 tons of earth to an acre and work from 3 to 6 feet in depth. They loosen the soil and correct the sour land. Transportation of streams is another important method employed by nature. For 6,000 years the Nile has made Egypt a garden spot, and in this country the Mississippi acts much the same.

There are chemical and physical agents needed to make a soil, and three conditions are necessary for this:

First, easy penetrability of roots.

Second, sufficient retentiveness of moisture and fertility, but not too retentive. Washington township has the post oak flats and a too retentive soil.

Third, a soil that will absorb solar heat. The soil needs for this, color and texture. A light color is objectionable, while a black soil goes to the other extreme and dries out too steadily.

The texture of a soil depends on three substances—silica or sand, clay and humus. The percentage of each for a perfect soil are 60 to 80 per cent. sand, 10 to 30 per cent. clay and 5 to 10 per cent. humus.

Some soils need correcting or reclaiming to yield good crops. For the sandy pine barrens with clay sub-soil add quick lime. The peaty soil can be reclaimed by careful drainage and the addition of ashes. For the clay soil, under-drainage is a good corrective and the addition of quick lime ashes; or use deep plowing and piling in of brush to assist drainage.

If you are in doubt as to what you need as a fertilizer a good way to tell what is needed is to burn the fruits and analyze the ash and see what it contains. The ash represents the material taken from the soil.

In digging a well here in Springfield we would pass through a great number of rock. The greater part of the surface rock of Greene county is made up of a coarse crystalline limestone (pure limestone contains 98 per cent. carbonate of lime). This rock alone would not give a very good soil, but just below is a flint rock, which gives the soil its rich and lasting properties. Below the flint is a slate-colored rock called the Lower Burlington, which gives the soil of Washington township. Below this is the Choteau, a yellow rock of sandy limestone. This alone

gives a very thin soil, but right beneath is the vermicular shales (another poor soil producer,) which with the Choteau makes a wonderfully fertile soil. Farther down comes the Phelps sandstone, which is the same as the Kentucky phosphoric acid beds, but the layer is not thick enough to yield a paying quantity. Going farther we come to the cotton rock, and then the sacroidal sandstone, neither of which gives good soil. The rocks below these are not found as out-croppings near Springfield.

FERTILITY FOR FRUIT GROWERS.

Dr. Jordan, the director of the State Experiment Station at Geneva, N. Y., gave us a talk on fertility, in which the so-called essential plant foods were hardly mentioned, showing that the subject, as he says, is really a very complex one. The soil may contain nitrogen, phosphoric acid and potash in greatest abundance, and yet their purpose be defeated by other conditions, especially by lack of the proper texture of the soil, and by lack of water. Trials made at the Station showed plants growing in clear sand to be unhappy and miserable, while doing very nicely in sand to which three per cent. of sphagnum moss had been added. The favorable result in the latter case was brought about simply by change of texture in the medium. Water must be considered one of the elements of fertility. A lack of it is a more serious handicap in the production of a crop than any other untoward condition. In a good many cases the water conditions of the soil are not up to the point where the plants can do their best. An acre of peach orchard containing, say 160 trees, pumps into the atmosphere from 2,000,000 to 3,000,000 pounds of water in the course of a single season; a corn plant evaporates 30 pounds, and a sunflower or hemp plant 60 pounds in their season. The annual precipitation, if from 19 to 36 inches, equals the amount of from 4,000,000 to 8,000,000 pounds of water per acre. Some of this is carried away in the drains; another portion evaporates from the surface, and only a part is saved for the plants or evaporation by the foliage. The available water supply is that which the soil retains for the use of plants, and the only way to save it is by thorough tillage, which breaks the capillarity. It takes from 8 to 20 inches of water to support a tree for a year. If we start in the spring with saturated soil, 12 inches of rainfall will be sufficient for the remainder of the season, provided that we take good care to supply by tillage. Tools of tillage for orchard use should go down from three to four inches into the soil. In some cases two inches might be sufficient.

Late fall plowing has a tendency to increase the water supply for another year. Rolling, after seeding, while increasing the percentage of germination of the seed, also increases the loss of water by evaporation. Soon after every rainfall, the soil mulch should be restored by cultivation. A cover crop during a dry season may steal water needed for the fruit crop. Prof. Beach, in reply to a query, states that experiments have shown a check to growth, whether direct by lack of water in early fall, or indirectly by the presence of a cover crop, to favor the development of fruit buds.—Report of West N.Y. Hort. Society—Rural New Yorker.

EAT AN APPLE.

(Written for Green's Fruit Grower by Oliver Rice.)

Are you feeling sort of blue,
 Don't know hardly what to do?
 Everything gone all awry,
 Or, at least, so to your eye?
 Eat an apple.

Are you feeling kinder sick,
 Like a rag the chickens pick?
 Are you feeling cross and worried?
 Wish, almost, you're dead and buried?
 Eat an apple.

If you are a minister,
 And your sermon seems a blur:
 And your prayers but little better—
 Think not Satan is the matter.
 Eat an apple.

Apples, apples are the charm,
 That can keep the world from harm;
 Call back faith though far recessed,
 Give an uplift when most needed—
 Eat an apple.

THE BIG RED APPLE OF THE OZARKS.

Reasons why attempts to run it down should not be encouraged—Handsome Fruit keeps well—A great favorite among Orchardists of Missouri and the Southwest—Comes in mighty handy at Midwinter.

In some of the Horticultural journals have appeared recently articles decrying the Ben Davis apple, so long a popular favorite and the principal stock in trade of the Western nurseryman and commercial orchardist. In the markets, too, the prices paid the present year have been less, proportionally, than for other varieties.

Popular preference is apt to be fickle and unreasonable and it would be most unfortunate for the majority of apple growers and equally unjust to the qualities of the apple in question should a prejudice against the latter prevail among consumers.

It is undeniable that there are many varieties of apples superior in flavor and texture to the Ben Davis, but these deficiencies are more than balanced by other characteristics and qualities in which it takes the lead. In the first place the tree is a rapid grower, is hardy, less subject to fungous and other diseases and more resistant to insect attacks than most others. It is an annual bearer, which the Dominie and other choice sorts are not, the fruit is, taking one thing with another, incomparably beautiful, it is a fairly good dessert fruit and excellent for all cooking purposes; makes cider of the best quality and is scarcely equaled by any other variety as a keeper, not only in cold storage, but in the ordinary storeroom and cellar.

Said a lady to the writer the other day: "Do come and help us eat some delicious apples—Jonathans. We bought a barrel recently, but they are not keeping well at all and a large part will spoil before we can possibly use them and my family does not care for canned apple-sauce." The same might be said of Grime's golden pippin, Huntsman's favorite, Northern Spy, Winesaps and other so-called winter varieties.

Some of the eastern varieties, such as the Baldwin, Seek No Further, York Imperial and Rhode Island Greenings when free from codling moth and when carefully handled can be made to last out the winter. But of Mississippi Valley grown fruit very little is seen in the market or remains in the cellar by spring except Ben Davis and the Black Ben Davis or Gano of the same strain. The leathery and rather flavorless Jeniton might be adduced as an equally good keeper, but when grown in Missouri and states to the southward, it isn't worth keeping.

Another thing must be taken into consideration by the too fastidious consumer and that is, that as the Ben Davis has been planted so largely for the last fifteen or twenty years there is now no other variety or collection of varieties grown in sufficient quantity to supplant it. It is Ben Davis or nothing.

That this overwhelming preference for a single sort, on the part of commercial orchardists was wise is open to question and may result in loss in the future. No doubt planters will give greater areas to other apples henceforth, but the "big, red apple of the Ozarks" will still have its devotees, not only among horticulturists, but among dealers and apple lovers generally. It may not be able to tickle the palate quite so acceptably during autumn and early winter, as some others, but, as has been mentioned, these have comparatively a brief season and when the great,

glowing globes of the Ben Davis are brought out of cold storage at mid-winter, crisp and juicy, as when taken from the tree, they are not likely to wither in the fruiturer's stalls nor to be rejected by the cook or regarded slightly by guests at the dinner table.—M. E. Murtfeldt in Farm Visitor.—St. Louis.

SHAPING YOUNG APPLE TREES.

(By Dr. J. C. Whitten.)

Recently large areas have been planted to apples in Missouri. The last census shows that Missouri now has more growing apple trees than any other state. The larger part of these are in young orchards, many of which have not yet come into bearing. The problem of how best to shape these trees is, or should be, in the mind of every possessor of an orchard. The time to shape an apple tree is while the tree is young. A recent trip through some of the newly developing fruit sections of the State shows the greatest possible difference of opinion among growers as to the pruning and shaping that should be given a young tree. Some believe in high heads, others in low; some contend that the tree should have an open, spreading head, while others are just as positive that the head should be dense to shade the tree. The former prune by a thinning process, restricting the top to a few main branches with scattering laterals, while the latter adopt a cutting back method to secure as many limbs as possible and never thin out any of the laterals. Many are opposed to any pruning at all; they contend that this is the natural method and that it is not wise to oppose nature in the treatment of a tree.

This medley of opinions should not cause the orchardist to think that there is no such thing as correct pruning, or that to learn to shape trees aright is a hopeless task. Diversity of opinion indicates the truth that methods should be modified to suit different conditions. The habit of growth of the variety, the soil, aspect and climatic conditions tend to determine what method should be employed in a given orchard. Different growers succeed with different methods or systems of pruning if they conserve such principles as are adapted to their conditions.

The man who would prune intelligently should learn to know his tree and to consider what environmental forces, in his particular orchard, favor or oppose its best development. He should consider it a sensitive, living, plastic organism which responds to treatment. Too much stress cannot be put upon the fact that everything we do to a tree is sure to either favor or oppose its best development. Before a single step is taken in shaping a tree the grower should consider carefully what effect it

is to have upon the tree. For example, if a tree is too dense, thinning out a judicious number of its twigs to admit sunlight may be beneficial; on the other hand if this thinning out is so severe as to admit too much sunlight the pruning becomes injurious. In low ground and in a foggy climate very low heads which shade the ground, thus keeping it moist, favor the development of injurious fungi, while in a sunny, windy bleak region low heads may be just the thing. An upright grower like Clayton should be headed lower than a spreading or drooping variety like Huntsman. A tree which naturally makes a thick, dense head, like Rome Beauty, may need to have a few of its branches thinned out when an open, straggling grower like Minkler may not have limbs enough for its best protection from the sunlight. The parts of the trees with reference to the sun's rays should also be considered. It may be advisable to shorten or to remove limbs from the north side of a tree when to remove a similar amount of wood from the sunny side might let in so much sunlight as to cause serious injury from sunscald.

But let us proceed to some of the practical details. Once a tree is well headed in the nursery it is not advisable to attempt to change the height of the head. It is better to leave it too high or too low than to attempt to re-establish the system of branches. Severely cutting an apple tree back to induce main limbs to form lower down is generally useless, while cutting off main limbs to secure a higher growth is in this climate always dangerous.

A straight trunk, or central leader should be secured and maintained. This may be accomplished by shortening any branches that tend to outgrow the main trunk. If a fork forms in this main trunk it may be corrected by cutting off one side of the fork to a short spur, the next winter after it forces. At this young age the spur will contain active buds which will throw out side branches next spring in place of the fork. Forked trees may grow all right until they come into bearing, but the forks are liable to split and ruin the tree as soon as it is loaded with fruit. It is better to remove one side of such a fork while it is young than to delay. Removing large limbs should always be avoided.

In this climate young trees are liable to lean away from the sun, toward the north or east. The best way to keep them straight is not to set them so they lean toward the sun but to keep them in balance by winter pruning. It will be observed that the limbs on the north side tend to grow faster than those on the sunny side. In some varieties the southern limbs turn toward the trunk of the tree, away from the intense sunlight, while the northern limbs spread well out away from the body of the tree. Shortening the limbs on the north side equalizes the weight of the head of the tree so it will not tip to the north. In correcting

forks the side nearest the south should be left in order to throw more of the weight of the tree top toward the sun. The young orchard should be gone over every winter for this sort of shaping until the trees reach bearing age. If the trees are thus properly shaped they will need but little pruning after they come into bearing.

Having secured a straight central leader it is desirable that all other limbs be equally distributed as side limbs. Then the tree will be symmetrical and will not split. If limbs cross and injure each other by rubbing, one should be removed or shortened below the point of crossing. The cutting back and thinning of young branches may be done more freely on the north or east sides of the tree than on the sunny side. All possible limbs should usually be left on the sunny side of the tree to protect the trunk and main limbs from sunscald. In fact it is sometimes better to allow two southern limbs to rub and injure each other than to remove one of them, if its removal is liable to leave the south side of the trunk exposed to too much sunlight. In the west, dense heads are preferable for the same reason that low heads are—to protect the trunk and main limbs from our intense sunlight. Even though the heads may seem too dense for the first five or six years, as soon as the trees come into bearing the limbs fruit, thus opening up the tree so that too much sunlight may fall on the trunk and on the bending limbs.

While the grower should carefully go over his orchard to shape the young trees every winter until the trees reach bearing age, it must not be decided that every tree will need pruning. In fact it often happens that a tree makes a correct, symmetrical growth and needs no pruning in a given winter. In such cases it is folly to prune it just because the orchard is being pruned. Most growers who prune, prune too much. Our need of dense heads renders comparatively little pruning sufficient for the apple, but this little should be all the more conscientiously done. Much of the injury to our orchards is due to the fact that a tree is neglected just at a time when the removal of a single small twig would have corrected an error that eventually leads to the breaking down of the tree or to the removal of a large limb. Prune as is necessary while the trees are young and the removal of large limbs will be avoided later.

WEST. FRUIT GROWER.

LOW HEADED APPLE TREES.

(By Prof. Arthur T. Erwin—Experiment Station, Ames, Iowa.)

One important lesson gained from the past is that, at least for the northwest, low-headed trees are very much better than the old-time "sky-scrapers."

In a prairie region like Iowa, protection from the wind is important. This refers not only to the matter of wind falls, but also to the protection of the plant from the drying influences of winds in winter. A low headed tree offers less leverage, hence less wind fall; and the head being closer to the ground receives proportionally more protection from desiccation.

A serious loss to young trees is by sunscald. This usually occurs on bright, warm spells in early spring, and the injury is generally on the south or west side of the trunk. Heat stimulates activity. During the winter season the protoplasm is in a dormant state, and while in this condition is uninjured by cold. On a bright, warm day, on account of the rise in temperature, the protoplasm becomes active. At night the temperature suddenly falls, catching the protoplasm in this active condition and it is destroyed. The live bark dies and partially peels away in patches. A low head has less trunk exposure, hence less opportunity for such injury. The top also shades the stem better, and hence affords a protection not received with high headed trees.

No fruit grower who is in the business for the money can afford to omit spraying as one of his orchard operations. Low headed trees can be sprayed much more effectively and also cheaper than high ones.

At gathering time there is also an important advantage. One man on the ground can do the work of two on ladders.

Perhaps the reader is beginning to ask if low headed trees are such an advantage, why haven't we had them long ago, or do they have disadvantages also, that have not been mentioned? Yes and No. Orchard cultivation is an essential to good fruit growing, and a high headed tree is very much more convenient in this respect. It is likely in this one fact that we find the practice of high heading so prevalent in older sections. With the old-time implements and harness it meant slow work and lots of lifting, to work around low headed trees. The fellow who has had such an experience is very strongly tempted to lop off a few of the lower branches the first opportunity.

Better types of orchard harness and implements have remedied this to a large degree, and there is no longer ground for complaint from this source. The traceless harness does away with single-trees, which skin the bark and are very useful in the orchard.

Some of the recent types of orchard tools are also a great convenience. A form of the Acme Harrow with wheels in front and handles behind, is easily run about by the driver, and is an excellent tool.

The Extension Disk Harrow, which is provided with an extension whereby the sides can be spread, thus enabling the driver to cut under

the tree without driving so close as was formerly necessary, is also a great convenience.

With the emphasis that has been placed on orchard culture, there have also arisen certain misconceptions as to what the idea embraces. This is due, in a measure, to the lack of a clearer knowledge regarding the vast system of a plant, and its work. Many think that the clean culture idea requires the stirring of the soil up close about the stem. This is feasible, only while the tree is young. As the top becomes larger it becomes difficult and expensive, hence the tendency is to either lop off the lower limbs, thus heading the tree higher, or else cease cultivating as the tree becomes large. As the top increases in size, there is less necessity for cultivating close, and the greater part of the benefits of clean culture may be obtained without doing so.

The root system of a plant serves two important purposes. The one is to hold the plant in place—to stay it. The second is to take in plant food.

The staying power of the root system of a plant is well exemplified in a large tree, on a windy day. The leverage afforded by its broad spreading top is tremendous, and were not the roots good stayers, the tree would certainly move off. We also have the practical example of this same power in the "back muscle," required in pulling weeds in the garden. The large roots serve the important office of holding the plant in place, and also act as a conductor of food material. The small rootlets and root-hairs are the organs of absorption or the feeding roots, as we call them. The feeding-roots are situated at the outer extremity of the root system, and the plant is entirely dependent upon these for the absorption of nutrient material.

Examining the root system of a thrifty bearing apple tree, you will find that even where the rows are thirty-three feet or more apart that these feeding-roots reach beyond the middle and interlap freely.

This being the case, it is evident that the place where the soil is really being fed upon most freely and the place where there is the greatest demand for moisture, is not up close to the stem, but out in the middles, where these feeding roots are found in such great abundance. Hence the presence of a dust mulch in the centers conserves moisture at the place where it is needed most.

I recently visited a thrifty young orchard, which had reached bearing age. It has received good cultivation up to this time, and the trees have made an excellent growth. The owner now proposes to seed the orchard down, with the exception of a small circle around each tree, which he proposes to cultivate with the hoe.

From the standpoint of both efficiency and saving in expense, I should exactly reverse this plan. The shade under the tree is an aid in conserving moisture, and on the other hand a soft blanket of vegetable matter is of advantage in protecting wind falls from severe bruising.

To briefly recapitulate, a low headed tree is less subject to sunscald, and sustains less injury from winds, the crop can be gathered cheaper and spraying can be done cheaper and more thoroughly.

By the use of improved orchard tools and the cultivation of the middles only, after the trees become large we can maintain good cultural conditions, and yet have the trees headed low.

COMMERCIAL ORCHARDING.

(By G. T. Tippin, Nichols, Mo.)

Abstract of an address delivered before the Wisconsin State Horticultural Society.

In presenting this paper we are keenly sensible of the fact that while a great deal of valuable information and good has obtained from addresses of similar character, a large amount of harm has also been done. What might be termed a broadcast or blanket information based upon individual experience in a certain locality is often more harmful than beneficial in its effect, for in the majority of instances where adopted and followed out by the inexperienced fruit grower, because of entirely different conditions as to climate, soil, variety, etc., from those upon which the information were based, failure and disappointment follow in a marked degree.

While commercial orcharding is reaching large proportions in this country, the center of the apple production moving west of the Alleghanies to the great Mississippi Valley, Missouri, the state we have the honor to represent, being in the lead with five million more trees planted than any other state, we have felt that this phase of the subject would not be of as much importance at this time as a discussion of how and what to plant, to cultivate and care for, and, last, but not least, how best to handle the products of our commercial orchards. The object of planting the home or family orchard is to provide fruit, health and comfort for the family, while commercial orchards are planted with the view of profitable investment and making money; hence, to know how to plant, grow and bring our crops to maturity does not avail us much if all our labor is sacrificed by improper handling and marketing our crops. In this connection we deem it not out of place to state that

we believe that the National Apple Growers' Congress recently organized at St. Louis, was made necessary in the progress and development of this great industry and will prove to be a very valuable institution to all commercial orchard growers, especially so as to packing and handling our fruit.

This being true, some one may ask, "Is there danger of commercial apple orcharding being overdone?" We do not think so, but as our production increases our grading and packing must be better to insure success. Pack only No. 1 stock, turning everything else to the evaporator or other sources. Some one may say that too much fruit was evaporated this year, as the price is very low, and if more had been evaporated price would have been still lower. We do not believe this, for it is our opinion that the low price for green apples this winter is not due to quantity but to quality. We believe that if all the apples in the country were No. 1 the market would be 50 cents to \$1.00 per barrel more than it is. We also believe that the low price of green fruit makes the low price of dried fruit, consequently, if all poor stock had been evaporated, since evaporated stock can be carried without much risk, and goes into consumption much more readily when green fruit is high, we would have realized much better returns than we will under present conditions.

In growing a commercial orchard the soil is the most important factor. We believe this applies anywhere within the apple belt of the United States. Fertility and moisture are indispensable in successful apple growing. Deep clay soils, free from stone or gravel, without hardpan below, are best in our country. Select soil that will remain as near an even temperature as possible, as to wet and dry, heat and cold.

The selection of varieties to plant should always be governed by the way the different varieties behave in different localities. The varieties that we would plant in Missouri, as a rule, would not be adapted to your state. Not being acquainted with those sorts that do best here we would not assume to recommend. However, if the Duchess and Wealthy do correspondingly as well here as they do in North Missouri and Iowa we believe they could be as profitably grown in a commercial way as Ben Davis in Missouri. Select your varieties adapted to your locality, testing new and untried sorts only in a limited way. What would be better still, let all your experiments, as near as you can, be made at your horticultural experiment station. This is what they are for, and if all our state horticultural societies would discourage the planting of new and untried sorts, unless they had been named by some pomological society of the states or nation or state horticultural society and recommended as worthy of trial, thousands of dollars would be saved to the planter, and

many amateurs would not plant the same variety under two or three different names or pay an exorbitant price for trees propagated in a special way and on special stocks, which never approached a reality nearer than the incubation of the idea in the brain of some schemer who wanted something for nothing. We simply refer to this as a caution in making a bad start. Many good men have been shipwrecked in commercial orchard ventures because of bad beginning, so we trust our diversion will be pardonable.

Good, well-grown trees should be selected, grown as near home as possible. Be careful not to plant too deep, keeping in mind that tree roots can be starved for want of sunlight and air. Do your thinning in the early life of your orchard, shaping your trees and trimming them. Keeping in mind the fact that extreme changes in sap temperature are very injurious to trees, causing them to die in spots, forming canker, etc., while our trees should not be allowed to grow too thick inside, yet they should be formed so that the force of the sun's rays would be broken both in the summer and the winter.

How best to cultivate depends largely on local conditions. As a general rule it is best to cultivate regularly until the orchard comes to bearing. After this, in some sections and upon some soils, it is best to sow clover, cowpeas, or grow some grass crop and mow it twice a year, leaving the crop on the ground for mulch. Some have splendid success by continuous surface cultivation during the season. In applying the different modes of cultivation to our orchards we should study the nature of our soil, the location and the effect of the cultivation and treatment about to be applied, and not go ahead on the theory that because Smith, in Missouri or Illinois, by treating his orchard a certain way made a success the same treatment will succeed with us.

Commercial orchards are being planted on a large scale in many sections of the apple region. Large contiguous blocks, reaching one to three thousand acres, are being handled successfully; yet we believe that the same number of trees planted in 10 to 20-acre plats would give better results. It has occurred to us in our observations, covering a number of years, that it would be better in planting 40 or 80 acres, as the case may be, to plant in blocks, leaving avenues at least 100 yards wide which could be cultivated in small fruits or other crops. Our reason for this is that in our experience in packing apples we have found that, after the trees have become large the limbs reach, or almost reach, each other. We have often found that the fruit is not so perfect in the large orchards as it is in the smaller ones, and have come to the conclusion that it is easier to combat the ravages of insects and fungi in the smaller plats than it is in the very large plantations. As the extended

and unfrequented forest is the habitation of wild animals and birds, so may the extensive orchards after becoming thickly grown become, to a greater extent, the habitation and harbor for insects and fungi than the smaller and more frequented blocks.

The time for gathering our commercial crops is also very important. Fruit should always be gathered when at the proper stage of ripening, regardless of the time of season. This season our apples matured three weeks to one month earlier than last year, and many growers sustained heavy loss by waiting until fruit was too ripe to pack.

As a large per cent. of the growth in the development of tree fruits and plants is supplied by light and air we perhaps give too little consideration to this feature of fruit culture and have suffered by doing so. We know of no vocation that requires the application of good judgment and common sense more, or one that pays any better on the capital invested, when applied, than commercial orcharding. The individual must take the best information he can get as to soil, varieties, care and culture, and intelligently apply it to his needs, governed by local environments with which he is surrounded. Do this and he will succeed in growing an orchard.

HEREDITY IN PLANTS.

(F. S. Earl in *Am. Gardening.*)

The great importance of heredity as a factor in controlling plant diseases is only now beginning to be fully recognized. Individual plants, like individual men, vary in their ability to resist disease. Even in plants of the same cultural variety, this difference in resisting power is often quite marked. It has long been observed that some varieties are more resistant than others. It is now found that, like other qualities, this power of resistance is inheritable, and that by carefully breeding from the most resistant individuals, it is often possible to establish resistant strains or varieties. This point was clearly brought out at the recent Conference on Plant Breeding in New York. The case of resistant strains of cotton, described by Mr. Orton, of the Department of Agriculture, was particularly interesting. In a very few years he has been able to select strains of cotton, practically immune to the wilt, a disease that has devastated large areas in the Southern States. Spraying to prevent disease is at best an expensive and exacting operation, and cultivators will welcome the day, if it shall ever come, when the breeding and selection of resistant varieties shall make it no longer necessary.

PEAR BLIGHT.

(Conrad Aul, Smithville, Mo.)

The blight is nearly always caused by too rapid growth. The remedy: set on thin land. If you have no thin land, do not cultivate but little, one year for peach, plum or cherry and for pears not at all. Apple trees will bear two years cultivation if land is very rich, if not overly rich, three or four years will do.

EVERGREENS, HOW TO CARE FOR AND PLANT.

(Read by Joseph Hurley, gardener, to James W. Paul, Jr., Radnor, Pa., before the Pennsylvania Horticultural Society.)

Evergreens should be heeled-in as soon as received. A great mistake, in my judgment, is frequently made in having the holes already dug in advance of the arrival of the trees, but the anxiety of the gardener to get the job off his hands naturally inspires him to be prepared to plant them as soon as they arrive and, as frequently happens, the planting takes more time than he calculated, and the results are that the trees are lying on the ground from perhaps four to six hours before they are all planted, exposed to the prevailing dry winds of either autumn or spring.

Now, there is one point to which I would like to call especial attention and which I think is not sufficiently well understood by most persons. The reason why an evergreen cannot stand getting even partially dry, as the deciduous trees can, is that the sap of the evergreen is of a resinous nature and, after once becoming dry, it can never be brought back to its normal condition, no matter how you water it or care for it afterwards; whereas, if most deciduous trees become somewhat dried out they can be brought back to a normal condition by soaking the roots, or if necessity requires it, burying the whole tree, roots and branches, in the ground for a week or ten days, and unless the roots have been entirely dried out before burying the tree you will find your tree comes out of its grave ready to start to grow.

Half an hour of exposure to a hot sun or a drying wind is often enough to dry out the roots of an evergreen; notwithstanding it may have the best of the gardener's care in planting and ample watering after it is planted, it will eventually die. And while the water question is in

my mind, if there is any one thing that causes more failures, other than allowing roots to dry out, it is that of puddling roots before planting. As a rule, those who puddle do not water afterwards, hence in the course of a few days the dry earth, coming in contact with the damp puddled roots, absorbs all the moisture and leaves nothing for the young roots to start in, only a few hard dry balls of earth that had adhered to the roots.

HOW TO PLANT.

Assuming that you have had your trees heeled-in, of course you would be naturally familiar with the size of the balls, and, therefore, could judge accurately the size of the hole required for each tree, but it is always wise in digging holes for trees, if you err at all, to err on the side of having the hole both deep and wide, and, in low or filled-in ground, it is always advisable to fill in the bottom of the hole with eight or ten inches of broken stone, for if there is anything that an evergreen detests it is water lying around the roots. Where such conditions prevail and where artificial drainage is not provided, the tree may survive for a few months, then take on that yellow, sickly appearance called tree consumption, and die. Dig around the roots of one of those trees which I have just described and what will you find? You will find all the lower roots black, sour, rotten; the tree is existing on the few little white roots which the trunk is sending out just at the grade level, where the air has kept the soil sweet and pure. These few young roots sustain life for a while, but in the end the result is what I have already described—death.

In planting, be sure you do not plant them any deeper in the ground than they were growing in the nursery row; this can be readily seen by a ring around the tree showing the dirt mark. Throw your rammer across the hole, sight it with your eye, and if the underneath part of your rammer is level with the former dirt mark on your tree, then you are ready for planting.

Now for a willing rammer and a lazy shoveler, and my experience has taught me that it is wise to use two men ramming to one shoveling. It is very prudent and wise after the tree has been set in position, its best side facing London, to tie up all the lower branches with a rope. This will prevent them from being injured with either the rammer or shovel.

If your trees have not come to you bagged and with a good ball of earth, and I would not buy an evergreen tree of any nurseryman who would not send his trees bagged, then I would consider it a very

wise plan to spread out the roots as the hole is being filled in, so as to try and get them in as near the same position as they were before the removal of the tree from the nursery. Keep your eye on the rammer; never mind the fellow with the shovel; make the rammer ram and ram and ram, but look out that he doesn't get his rammer to close to the trunk of the tree and ram off the young, fibrous roots that the tree has to depend on to make it a thing of joy forever.

Never fill in the soil level at first; leave room for water. Have a man follow the planters with the hose, and if not convenient to a hydrant, then use the garden watering barrel, giving to each tree planted from eight to ten quarts of water; give them the same amount of water as soon as the first watering has soaked through, and when the second watering has soaked in then you are ready to put in the balance of your soil, and the tree is planted.

CARE AFTER PLANTING.

Having planted our tree, the next thing to do is to mulch it with manure, leaves, or any other kind of litter that will help keep the moisture around the roots. Under no circumstances, no matter how dry the weather may be, should you give any more water to the roots, but that does not mean that the tree can survive through a protracted hot, dry spell. We have another method in hot or drying winds of supplying moisture and that is syringing. Syringe morning noon and night, syringe Sunday as well as week day, syringe the foliage as often as you can, syringe it whenever you can. If you cannot reach your evergreens with the hose, go around among them with the bucket, and the little greenhouse syringe. No matter when you plant, spring or fall, keep the syringe going until Thanksgiving.

These are the methods which I adopt and I have planted more than 5,000 evergreens within the last two years and our percentage of loss has not been over two and one-half per cent.

American Florist.

SUGGESTIONS FOR TREE PLANTING FOR ARBOR DAY.

(L. A. Goodman, Kansas City, Mo.)

1. *Selection of Trees.*—Care should be taken in this selection that they be not too large, too old, too crooked or grown in too much shade. Beautiful, young, symmetrical and well-grown trees should always be selected. It is a great mistake to think a tree is not beautiful because it is small or young. It is another mistake to think that you must have

large trees in order to get quick shade. Medium or even small trees will often give good shade as soon as large trees, and they are always healthy and sound when they do get large.

2. *Digging and Handling of Trees.*—The greatest of care should be taken in digging the trees to secure plenty of good roots, and that without bruising them. Again, the trees should never be exposed to the air any longer than is absolutely necessary. Handle carefully. Put them in ground as quickly as can be done. Heel them in at once, so that the air will not injure them. Never leave them out if the air is frosty. In fact, do not dig them if it is frosty weather.

More trees are lost from careless handling than from any other cause. Remember that the trees are alive and that they cannot be kept alive in any better way than to keep their roots covered with earth. Roots out of ground are like fish out of water; it is only a question of time how soon they will die.

3. *Planting the Trees.*—Dig large holes, especially if the trees have to be planted in a sod. Have plenty of loose soil in the bottom of the holes and plant carefully, being sure that you get the soil in contact with every root of the tree. As soon as the roots are thus covered, tramp the ground well and then fill up the holes and tramp again, leaving the trees just about as deep as they stood in the nursery and no deeper. Trim the tops slightly so as to equalize with the roots and still leave some of the young wood growth so as to assist in the development of leaf surface. Without leaf surface you can have no root growth and hence no tree growth. It is a great mistake to cut off all the top to a square stump. In fact we should use no tree, if possible, where this has to be done.

4. *List of Trees.*—

Deciduous: Sugar maple, elm, box elder, white ash, tulip, linn, chestnut, oak, sycamore, cut-leaf birch.

Evergreens: Norway spruce, red cedar, white pine, Scotch pine, white spruce, arbor vitae, savin, dwarf pine, pyramidal arbor vitae and dwarf arbor vitae.

Shrubs: Forsythia, lilac, snowball deutzia, weigelia, syringia, althea, japonica, spireas, hydrangea red bud, dogwood.

Roses: Madame Plantier, General Jacqueminot, John Hopper, La Reine, General Washington, La France, Madame Charles Wood, Paul Neron, Seven Sisters, Prairie Queen.

Climbing Plants: American ivy, bitter sweet, Japan ivy, honeysuckles, trumpet creeper.

5. Take care of the trees and they will repay you.

Canst thou tell, little tree,
What the glory of thy boughs will be?

RAISE QUAIL TO KILL INSECTS.

The pupils of the Peru High School listened recently to a most unusual lecture. Isaac W. Brown, of Rochester, Ind., widely known as the "Bird and Bee Man," talked on "The Quail and Its Habits," and a pair of quails, alive and domesticated, were used as an illustration of the truths imparted by the lecturer. The quail were taken from their cage and placed upon it, where they sat during the lecture. They did not even make an attempt to fly away, and when Mr. Brown whistled "Bob White" they quickly answered his call. The quail were raised by Prof. Andrew J. Redmon, one of the high school instructors, who has one of the largest and best collections of birds in Indiana.

"I am the happiest man in Indiana today," said the lecturer, because I am standing in the presence of a pair of birds that have been domesticated. This is absolute proof that the quail can be semi-domesticated and put to good use. We don't want them domesticated, because then they will remain about our homes and will not go into the fields and rid us of the insects, like the Hessian fly, which ruin our wheat crops almost every year.

"If the farmer would domesticate the quail we would not have to spray our orchards when they are in bloom in order to raise a crop of fine fruit. Quail would eat and drive away the insects. From observation I have learned that a quail will eat an insect every minute of the day. Take ten hours of the day and you'll find that one quail will get away with 660 insects. Usually there are twenty-five quails in a covey, and they would eat 15,000 insects a day. At this rate, with two or three coveys on each farm, it would not take long to rid the fields of the insects and insure us a good crop of grain.

"Then in the fall what a happy and profitable pastime it would be to go quail netting, just as the English do fox hunting. The nets we once used were fifteen feet long, with one end and both sides open. On a wet day quails do not move about unless they are compelled to seek a place of safety. Whenever they roam about the mother goes first, while the young follow after her. The father remains in the rear looking for danger. One signal from him and the covey hides.

"The quails, after they are caught in the fall, could be held in captivity until spring to keep them from starving and freezing to death. Then, when spring comes they should be turned loose again to roam about the fields, to eat the insects and to whistle 'Bob White,' which

means, 'Don't get lost, Mandy,' who is on the other side of the fence with her young, just out of their nest and with part of the shell still clinging to them."—*Chicago Tribune*.

The *Ruralist* heartily endorses the above proposition except the netting and especially is it so now of Missouri when the drouth last year prevented seeds from maturing and the cold hard winter and wet spring of this year killed the birds and ruined the eggs, thus reducing the number until there is hardly "seed" left for this year's crop of Bob Whites.

There should be a law passed to prevent killing quail for five years, and he who is found hunting quail this year should be pitied for lack of good judgment, or common sense, to use a more forcible term. Let them alone until they multiply. There is no finer sport than a quail hunt, provided you find birds; but in Missouri, alas, there will soon be no birds to hunt.—*The Ruralist, Sedalia, Mo.*

WINTER MEETING

AT COLUMBIA, DECEMBER 8, 9, 10, 1903.

WINTER MEETING.

FORTY-SIXTH ANNUAL MEETING.

The forty-sixth annual meeting convened on December 8, 9 and 10, 1903, at Columbia. The day sessions and fruit display were in the new Horticultural Building of the Agricultural College; the evening sessions were held in the auditorium of the Missouri State University.

This meeting was one of the most enjoyable the organization has ever held. The meeting was especially notable because of the number of other states represented at the meeting. Among the visitors were Messrs. Munger of Iowa, Loop of Wisconsin, Christy of Nebraska, Snedeker, Riehl, McClay, Baxter of Illinois, Kellogg of Michigan, three members of the Holsinger family and M. E. Chandler of Kansas. Then there were the visitors who were on the program—Dr. Burrill of Illinois, Hale of Connecticut, Craig of Cornell University, and Powell of the Department of Agriculture. Then, too, the different sections of Missouri were well represented, the delegates being distributed over the entire State.—Western Fruit Grower.

The first session was called to order by President Robnett. The Rev. Dr. Layman read a passage from Psalms and delivered the invocation. The president introduced Mr. W. H. Rothwell, city attorney, who in the absence of the mayor, made the address of welcome on behalf of the city.

WELCOME ADDRESS.

Mr. Rothwell said in part: Fellow citizens and members of the State Horticultural Society: I am a very young man to have placed upon me by the absence of our mayor the duty of welcoming such men as you. When I look over this intelligent audience, especially at the ladies in it, I wish that I were a fellow horticulturist, that I might mingle with you. At the request of the mayor and on behalf

of the city council I welcome you to our broad thoroughfares, to our homes and our family circles, to everything you see except our wives and daughters. The keys of the city are in your possession; use them in whatever way you see fit.

During the few days of your sojourn here I think the people of the city and of Boone county will do everything in their power to make you welcome. Thanking you for your kind attention, I welcome you to the city. Whatever you see is yours while you are here.

PRESIDENT R. H. JESSE ON BEHALF OF THE UNIVERSITY.

I most heartily bid you welcome. When you were here five years ago you asked the State Legislature for a new building of horticulture. No response was given by that Legislature or the next, but victory has at last crowned our efforts; and it seems fitting for this society which has done so much to secure the building, to meet here for the purpose of dedicating it to the service of horticulture. You suggested the building; you sustained us in every effort to get it, and therefore it is peculiarly your building. I heartily welcome you to it for the first time.

In my opinion no organization in this State has done more for the advancement of the State than this society. For the last twelve years, as long as I have been in the State, you have displayed intelligence and devotion to the science of horticulture. For your good works I love you and welcome you most heartily on behalf of the University.

RESPONSE.

(By Second Vice-President C. H. Dutcher.)

Mr. President, Ladies and Gentlemen:

A position on our program means work as well as honor. None of us object to the honor, but few, if indeed any, covet the work. But, fellow members, to respond to such cordial and able welcome addresses as have just been tendered us, ought to be a pleasure to anyone; and such I consider it, however much I may have desired not to serve you in this capacity upon this occasion.

We cannot thank the mayor and President Jesse too highly for their words of hearty welcome and exceeding good cheer. They give us a home feeling at once, and indeed such ought to be the case. The bond of sympathy between this society and the University and the city in which

it is located, grows naturally out of the similarity of our work, at least as it pertains to the Agricultural College. We honor all her departments of instruction, and are glad of the success of each, but our especial interest was manifested in a resolution I myself had the honor to offer at our Springfield meeting asking the Legislature for "an appropriation of \$25,000 for additional experimental work in horticulture, entomology and botany at the Agricultural College and Experimental Station at Columbia." Yes, gentlemen of the University, just so long as you will allow us to wear a few of your feathers, and you continue to wear some of ours as gracefully as you have done in the past, these birds of similar feathers will gladly flock together very harmoniously.

We know you have done us much good by meeting with us in various parts of the State and in many other ways. And somehow we flatter ourselves that you had more furniture upstairs when you came home than when you left, though your pocketbooks may have been somewhat depleted. Of one thing I am sure, the work the University professors have done over the State among the farmers and the fruit-growers has brought to the University large returns in the way of new friends, friends converted from among the indifferent, the ignorant and the opposing, a deeper interest and larger enthusiasm in old friends, a better understanding in many ways, the results of which are readily perceived when you compare the University of the early 70's with the University of the late 90's and the three years since. That graphic picture "Before and After Taking" don't any more than tell the story. It was just five years ago tonight we closed the last session we held at Columbia. On pages 232 and 3 of our '98 report you can see what we thought then. I lost my modest proposition of \$30,000. Mr. Tippin made a dash for \$50,000 and got it—on paper—but the college got only \$40,000. Only four years after this I offered the Springfield resolution already mentioned, and while we do not think we did it all with our little hatchet, we helped; and what we now see delights us, and we are glad to be here again after a five years' absence.

Our only regret is that we have not a better display of apples to put before you at this meeting. But you will remember that we have seen a hard time in the last five years. We met here in December, '98. The damage October had done to our orchards by the continued rain to the 16th, and the unexpected freeze that night, which put all our trees to bed with wet and frozen feet, had not attracted our attention. The February freeze following so soon afterward, almost ruined some of us. Fruit buds were killed; young trees and nursery stock almost wholly ruined; the bark on many of our old and bearing trees burst

open, and those not in prime condition killed outright. Of course we had no fruit in '99, but the season being a reasonably good growing one, many trees partially recovered, fruit buds were formed and our 1900 crop was fairly good.

But what shall I say of 1901, '2 and '3? Borrowing an idea from the arithmetical genius who, finding no difficulty in saying '98, '99 and even 1900, did not like to say nineteen hundred and one every time, but cut it short by saying "naughty one," I can truly say 1901, '2 and '3 have been naughty one, naughty two and naughty three to the fruit growers of nearly the whole country. The favorable spring of 1901 was followed by our almost unprecedented drouth. Many trees that had not fully recovered from the freezes of October and February preceding succumbed. They set some fruit, but could not mature it and live. The summer was very unfavorable for setting fruit buds for 1902. The recovery of many trees from former disasters was checked. But 1902 in itself, will be remembered as a favorable year for fruit raising for all whose trees had reasonably recovered. Those trees, then, that had borne little or no fruit in 1901 did fairly well in 1902. It was a growing season and our orchards did reasonably well. Fruit buds were set, the winter of 1902 and '3 was quite favorable, and our orchards started well for 1903. More people made adequate arrangements for spraying than ever before. The spraying for scab was well done, and that for the canker worm was successful. True, it was a little muddy. A good horse would sometimes stick with only a light spring wagon, a Cyclone Dust Sprayer and an extra bushel of dust. But the leaves were growing, the blossom buds were changing color, and soon a fine bloom delighted our vision. The blossoms had not been sweeter in years. We were happy and began to talk about barrels and boxes, and cold storage, and to see visions of bank accounts with a good credit balance. Over the country telephone came the oft repeated query, "How's your orchard?" and cheering replies went back, congratulations followed. The country groceryman congratulated us on our happy prospect, and the local consumer who thinks 25 cents high for a bushel of apples and will postpone buying till they drop to 15, said, "I do hope we will have a full apple crop this year. I am really hungry for apples," and was glad when told of the prospect.

Thus passed most of April, 1903. We had new moon at 8:30 a. m. on the 27th, but she set at 10:05 the night of the 30th, hence we really had "the dark of the moon" that night, and according to our moon-eyed friends, a frost on such a night will surely hurt. Any way it did hurt. A large portion of the apples fell to the ground. The cold rain that

preceded and followed prevented proper fertilization. The hail in many sections of the country bruised those that were left, and hard spots resulted. Rain continued through the warmer months, and prevented spraying for codling moth, hence many wormy apples. Scab formed abundantly, old insects flourished, many new ones appeared, and we were unable to prevent their depredations. Under such conditions a perfect apple was almost an impossibility, and many orchards furnished not a barrel for Eastern or foreign markets, or even cold storage. Our credit balances disappeared, and if we got enough out of our poor stock for our own families, we were glad it was no worse.

This is a dark picture say you, and too pessimistic for one of my temperament. What of 1904? Is there no promise for the future? I think so. The copious rains of the past season kept our trees growing, and could they have had a proper amount of sunshine the growth would have been phenomenal. The crab grass grew close around our trees, for we could not use the hoe, and this kept the borer moth away. Those, therefore, who thoroughly rid the trees of the borer last year had an easy job this fall.

While the past season gave us, in many portions of the State, though not in all, no good fruit and not much of any kind, it was good for the recovery of injured trees. Trees set out in '97 and '98 are old enough for a crop next year. If all trees old enough did not set fruit buds in last July and August, what in the world did they do? They did little or nothing else in my section. True, some of them shed their leaves rather prematurely, but I hope no permanent injury to the tree is presaged thereby. Possibly it is our fault. And here I am tempted to venture the opinion that if we will all apply more lime dust either with or without poisons, to our trees from the time the leaves first appear till they fully mature, the leaves will be more healthy, more persistent, and our trees will do better. It is becoming known that dry poisons burn and debilitate the leaves much less than wet poisons; and "the good we all may do" by a more liberal use of lime dust upon the tree and lime in any form on the ground under the tree, is by no means determined. When our dust spray men devise an easy, cheap and ready method of reducing the ingredients of their dust to an impalpable powder, and at the same time thoroughly mixing them, they will not only revolutionize the whole spray business, but they will come very near furnishing a specific for all the ills our orchards are heir to, when it is thoroughly and frequently applied.

Do you ask about the season for 1904? The kind of season we may reasonably expect would interest us all, I am sure. I wish I could tell you

all about it, but I dare not venture too much. I have compared the latest storm charts and astronomical diagrams for January to May included for this year and next, and I must confess my inability to say much to encourage. I fear the last week in April and the first half of May. We shall certainly have an opportunity to test the influence of Venus, under whose influence we had so much rain last May and June, and that of Mercury, the well known sleet god, to whom our cold first half of last April was charged. This year Venus is in almost full force by the last week of April, and Mercury enters our sphere April 26th. On May 3d both Vulcan and Mercury pass their equinoxes, and Venus reaches hers on the 4th. She continues till the 23d, but from the 12th to the 30th Vulcan passes his equinox twice giving us his modifying and I hope mollifying influence.

All I can say, then, is about this: I don't look for a repetition of February, 1899. Our winter is not to be very lamb like, nor are we very likely to have our apple buds killed. If we should have "some extenuating circumstance"—an opposing planet whose influence we have not sufficiently considered, or much cloudy weather from April 26th to May 10th--we may escape a probable repetition of last April and May. If so, be of good cheer afterward. We shall, in that case, have an apple crop, and a good October and November in which to gather and store our fruit. It may cheer some of you to know that in 1904 we have "the light of the moon" from April 22nd to May 7th. If the moon theorists are right, then we may escape. -

But I must close. My desire for a good crop this year and the heartiness of our welcome tonight filled me too full for utterance; hence, I could not say much. But the inspiration of the hour is upon us and we want to hear from Europe and Oregon, and to learn what Hannibal has sent us on the apple business. Columbia and Missouri University so nearly one and the same, we thank you for the welcome you have tendered us tonight.

SOME NOTES ON HORTICULTURE IN EUROPE.

(By Marie L. Goodman, Kansas City, Mo.)

To cover this collection of notes we shall need to take horticulture in its most comprehensive sense, including experiment stations, gardens, flowers, fruits and markets. The first new method noted on our trip was foreign indeed, but not on the other side of the water. At the Experiment Station of Amherst, Mass., you will find a Kansas man in

charge, Prof. Waugh from Manhattan, now dean of this eastern station. With characteristic Western energy, he pointed out the experiments under way there, and one of the most interesting was that of the Cordon apple trees, dwarf stock planted 18 inches apart in a row and bent or grafted at right angles, 8 inches from the ground, all in the same direction. When the one behind reaches its neighbor in front the end is grafted in and soon all are grown together as a rope or, in French, a Cordon. The end is kept for growth and feeding the tree. Back of this to the bend are the fruit spurs. The foreigners using this Cordon method put in other buds for more fruit. There are 150 students at the Amherst College and Prof. Waugh has 100 in his lectures on horticulture. They grow flowers, plants, fruits and vegetables for sale. Last spring over 2 cars of nursery stock were sold and from 2 to 4 tons of grapes at 8 to 12 cents per pound, besides the waste and trimmings to farmers and neighbors for jelly, canning, etc., at 5 cents per lb.

At Florence, Italy, also, we saw the School of Horticulture and the experiment grounds. Here American peaches were planted 9 by 12 feet apart—too close as the gardener agreed. The peaches on the field trees were killed by a late frost, but on those trained against the walls were many peaches and the Amsden were already pink. The pyramidal forms bear fruit best, but they take so much longer to come to bearing; so all manner of other forms are used, like lattice work some, a seven branched candlestick; like U and double or triple U. In the hot houses grapes were growing large as plums, and Japanese persimmons were large as our tomatoes, and tomato plants in pots were ripening the second crop. The Italian soldiers are taught at this school. Since the country people cannot read, printed bulletins are not issued much but institutes are held for them at many places.

Another school is at Geisenheim, a tiny town near Bingen on the Rhine, and is, as Prof. Whitten said, the finest technical school of horticulture in Europe, and I gave my hearty congratulations to the one American student so fortunate in being there.

Every now and then, commenting on different varieties, the Professor of the school said of one and another, "It is 'dankbar,'" which is translated "thankful," and, as it proved, means that the tree gratefully responds to care and cultivation. There is a pleasant sound in that little word "dankbar," and our crops would be better if more of our trees had a chance to be "thankful." Even the little Cordons responded generously to the attention given them; and every tree and plant, every foot of ground, gave evidence of the care taken with every detail of work.

On a rainy day in August at Geisenheim, you may find the students

at the preserving house. All stages of the work were in progress. The plum butter and all other products were cooked in small, shallow retorts by steam heat. The result of this work was an array of beautiful jars of preserves, canned fruits and jellies, such a collection as would win prizes at any State fair, delight the hearts of housekeepers and of hungry boys. Very properly these are used by the boys and faculty who live on the grounds. Instruction in floriculture and landscape gardening is apparent on every hand. Most astonishing were the glorious begonia blossoms 4 to 5 inches across, and double ones as large, like delicate double hollyhocks, of every shade and hue. In a storage house we found, lying on racks, not only pears as we are accustomed to have, that they may ripen off the tree, but peaches also, and apples, plums and tomatoes.

We all know of the time given in care to a tree, or perhaps two in a tiny garden, or to one trained against the stone wall; but we Americans scarcely guess what can be done on a roof in a space 20 feet square. Our hostess at Rome had all her horticultural products on a small part of her roof. You went through a gate from the other part to this shady room. The wall of the house comes up about 4 feet above the roof, and on a shelf inside were the rows of pots and boxes that held her plants. All manner of flowers she had, and in large boxes sitting on the floor grew the larger shrubs and vines. The hose came into play every evening to give them all a good drink. On the wires overhead were trained the vines for shade. The wistaria flourished, the honeysuckle added its share of shade, the five leafed ivy apparently struggled for existence, although it had as much earth and water as its neighbors. One grape vine gave promise of a small crop. The nespoli or medlar tree grew in a tub and bore fruit, and from the few wild strawberry plants in little boxes we had a taste of 3 or 4 tiny dry sweet berries.

The nespoli or medlar tree grows as large as a persimmon tree and the fruit is shaped like a small pear with a very yellow skin, but the flesh white and as smooth as satin, the seeds are large as persimmon seeds.

The practical mind of a horticulturist might not be delighted by the grape vines of Italy, but his artist soul would surely be charmed. The vines are trained in luxuriant festoons from tree to tree along the borders of small grain fields or there would be a row of trees, each side of an irrigating ditch, each joined to the next by the graceful green garlands of the vine. In an orchard five or six festoons will reach from a center tree to its surrounding neighbors. Such grace and beauty could be accomplished in no other way than by these lovely bending garlands of the rich dark foliage. The trees used for the supports are often planted and grown for the purpose, but they are usually forest

varieties and not fruit trees, even the mulberry is not grown for the fruit, but for the leaves which are stripped off to be used in feeding the silk worms.

The best apricot we had served to us on the shores of Lake Lugano, northern Italy. It was not insipid as the yellow, but its white juicy flesh had a most delicate flavor and partially clung to the pit.

The children in Italy spent their pennies for fruit and poor men and women chose a cornucopia of cherries for refreshment between meals.

Because fruit is such a luxury more pains is taken in arranging the packages for sale. Strawberries, for instance, a pint in a little graceful basket were piled up on a bed of leaves leaving a green border of them extended beyond the edge of the basket, a charming contrast to the red berries. Anybody would pay 25 cents for such a fragrant, pretty treat.

In the Paris market quantities of leaves—oak, grape, linden, etc.—are sold in packages of 25 or more for the purpose of using under the fruit. In a small, white paper dish were laid 3 grape leaves to make an attractive background to the two peaches, one bunch of grapes and 6 plums, over the top, another leaf, then wrapped in white paper and tied so that by a loop of the cord you could carry your package right side up. The whole cost sixty cents. It ought to be nice at that price. Well, and it *was* nice.

You have heard of the marvels of intensive culture; nevertheless you are surprised upon looking at the tiny plots of gardens in the valley outside Paris to learn that from three to five crops are grown on each lot every year, and the profit runs from one to five thousand dollars per acre each year. No wonder, then that the vegetables brought into Paris overflow the limits of even the immense market building; so that two blocks from the great covered square you will find the vegetable wagons and carts blocking the traffic, the sidewalks so covered with baskets you can scarcely pass. In the building, business is more orderly. Among other fruits were peaches from Algiers: 6 are packed in a wooden box on a bed of excelsior which also filled the extra spaces. Each peach is wrapped with tissue paper and a layer of cotton; 24 of these boxes are fastened together for shipment, by express; no wonder a peach sells for 20 to 60 cents. The water-cress bunches were packed in a deep cylinder basket, 12 dozen in a basket. One layer deep all 'round, thus leaving an opening in the center, through which air could circulate, every bunch be reached by the sprinkling of water, while a cover at the top shut out the light which might turn the leaves yellow.

The cut flowers were handled under roof, but the plant market was a canvas covered square away from the big market, only the square was not large enough so the rows of green and flowering plants reached over to the bank of the River Seine, extended both sides of the bridge and a block or two in each direction from the end of the bridge on the other bank. A flower show for four or five blocks.

The fruit business of France is divided into 17 parts. Each division has a superintendent who oversees the inspection of all the fruit of his department that comes into Paris. He also is auctioneer at the wholesale market for his section. The office is a government appointment, but also the man has to pay his predecessor from two to five thousand dollars for the position, according to the value of the business.

In the London market this year most of the fruit, including plums peaches and pears came from California. The small proportion of English product had been grown in hot houses, all outside having been destroyed by frosts.

The fruits used in Germany this year came from the south, from the Tyrol, a mountainous western corner of Austria.

Many things merit adoption, and one is a custom, another a fruit. In spite of the scarcity of fruits a custom prevailed which horticulturists doctors should rapidly introduce among our people. 'Tis that of having fruit served after the dessert of every dinner, as fresh currants on the stem, cherries, peaches, grapes, apples, pears, oranges, apricots and nespoli, called by the English medlars. This delicious fruit is worthy the attention of the United States Department of Pomology, and the furtherance of the attempts of some of our scientific men to introduce it for the purpose of producing it for us all. Perhaps it may be grown in some of our new and warmer possessions.

SHALL WE CULTIVATE OUR ORCHARDS?

(By N. F. Murray, Oregon, Mo.)

In presenting my views upon this important question, I shall start out by answering in the affirmative, and say, yes by all means we should cultivate our orchards. Before proceeding further upon a discussion of the question, permit me to give a brief definition of the word cultivate. First we find it to mean, to till, to fertilize; second, to foster, to cherish; third, to improve by care or study, and fourth, to produce by tillage. Now I hardly think it possible to find a fruit grower of average intelligence who would expect or hope to grow first-class fruit and secure satis-

factory crops year after year throughout the life time of the orchard and leave out all that is implied in the word cultivate.

I am aware, and freely admit, that some wonderful crops of fruit have been grown with but little or no cultivation. However, such crops are an exception to the general rule, and do not furnish a sufficient foundation upon which to found a general practice. Permit me to digress for a moment, and pass from the orchard to the garden, to relate the experience of two of my friends in potato growing. The past abnormal season, one planted his potato patch, took sick and could not work it. Weeds grew up and took possession of the ground, he hired a man to mow the weeds and nothing more was done, and he dug twenty five bushels of fine potatoes! The other planted near one-half acre of early Ohio, and on account of excessive rains which continued for weeks, only succeeded in plowing and hoeing them once, and the ground was too wet then to do a good job, yet he harvested seventy-five bushels of fine potatoes! While others who succeeded in cultivating and keeping their potatoes clean did not have one-third as many. But should we now jump to the conclusion that the best way to grow potatoes is to plant and not cultivate? Surely not. No one should ever attempt to lay down an iron clad rule for the cultivation of crops. The rule must of necessity be flexible to suit the season, and meet the variable conditions of land, soil, climate, and the peculiar demands of each species, and variety of fruit. In fact this is a deep, broad and important question, one upon which a volume might be written, and one that can not be answered briefly. We have very much to learn before we reach a satisfactory conclusion as to the best method of cultivation; or when best to begin and where to leave off, or just how to cultivate and feed our orchards to secure a healthy normal growth of wood, and at the same time produce a sufficient but not over abundant crop of well developed fruit buds for a crop the ensuing year. The young orchard should be cultivated from the time it is planted in order to bring the trees up to a bearing size. Trees not having been cultivated may be of the fruiting age and not be large enough to bear a peck, while the cultivated tree of same age will have the capacity to bear a barrel of fruit. The finest, most perfect and best paying crops of apples we have been able to grow were from an orchard that was cultivated from start to finish except two years while in red clover. We generally used a breaking plow in preparing the ground for corn and many roots were broken. The corn was cultivated in the usual manner, and the tree rows kept clean by use of double shovel plow and hoe. About once in three years we gave a top dressing of stable manure and some wood ashes scattered broad cast and

cultivated in. At the end of twenty years this orchard had net eight hundred dollars per acre. The best crop sold at two hundred dollars per acre, and the average was forty dollars per acre per annum for the entire period of twenty years from time of planting. During the same time we were growing a few acres of budded peaches, which we gave continuous and clean cultivation from planting up to old age (eighteen years) when we cut it down. This orchard resisted the cold and produced crops of fine fruit beyond any of the orchards, of same varieties, in the same locality that were not cultivated. The fruit was larger and better, and sold for much higher prices, the best crop netting three hundred dollars per acre. In support of my own practice, I desire to submit the experience of others. Last year (1902) a reliable, and large buyer of apples, from one of our Eastern states, told me that in the pursuit of his business in his native state, some years ago, he went to a farmer whom he knew had a commercial orchard of twenty-five acres, trees thirteen years old. When he inquired what he wanted for his apples, the farmer replied in an angry tone, "Apples the mischief, haint got any; blamed orchard is no account, never bore and never will. The pesky tree agents had better never come about me again, with any of their fine spun lingo about money in apples. I tell you sir it is all stuff and humbug, I am going to cut my orchard down and clean up the ground for crops that will pay." When at last for a much needed supply of wind he closed his billings gate of abuse against the tree vender, the nurseryman, and the apple industry. The apple buyer, coolly inquired what he would be willing to take for a lease of five years on the orchard "spot cash." "Four hundred and fifty dollars." "All right," said the apple buyer, and the deal was closed and the money paid. Now this orchard was on fairly good hill land, had been cultivated while young to give it a start, and then, like many others, was sown to grass and left to make its own way as best it could. The apple merchant broke up the sod, pruned the trees, sprayed once before blooming, and three times after blooming, continued to cultivate and care for the orchard and keep it in first-class condition from year to year, and now for the result: He sold the first crop for two thousand and eight hundred dollars: the second crop for two thousand and two hundred dollars, the third crop for one thousand and one hundred dollars; total amount for the three crops, six thousand and one hundred dollars! and two years to report on. My informant requested me not to give the names of parties to this contract, "For," said he, "if that farmer ever finds out just what I really made out of his orchard it would kill him stone dead!"

Along in the early nineties a friend requested me to go out with

him and look over his forty acre commercial orchard (nearly all Ben Davis) and about thirteen years old. I accepted his invitation, went out and found a most magnificent orchard loaded down with a fine crop of very nice apples. The ground was a stiff sod, but very pretty and green, having been close cut. After looking it over, the owner wanted my advice as to how best to treat it from that time on. I told him that, after harvesting the crop he should break up the sod, and what he could not reach with the plow to dig up, and cultivate the entire surface like a garden, to keep the surface clean of weeds and grass, and in a mellow and finely pulverized condition two or three inches deep. With a look of surprise he wanted to know why he should pursue such a course when he had an ideal crop in the sod that sold for five thousand dollars? I replied by admitting that it was a splendid crop and the price, five thousand dollars, was a very handsome income from forty acres in one year. "But," said I, "your orchard can't possibly continue to grow and produce such crops if left in the sod," and that the time had come to give the orchard extra care and cultivation; that if he would do so, he might yet gather larger and better paying crops in the future. He followed my advice, broke up the sod and cultivated in true garden style (fifteen times the next summer) and the ensuing year sold the crop for twelve thousand dollars. It seems to me that this is sufficient evidence to convince the most doubting Thomas in horticulture that we should cultivate our orchards. But just how, and when to cultivate, the best implement to use, how deep to stir the soil, when to commence, and where to leave off are questions that each individual grower must determine from his practice and experience with his own trees and on his own ground.

Let us remember that fruit trees, like people, have individuality, and we must learn to know the wants and requirements of each tree. For this reason the same care and cultivation that will bring success in one case may fail in another. While the apple, pear, peach, plum and cherry should all be cultivated, yet their cultivation must vary to suit each, not only so, but, to at least some extent, the individual variety of each species will require different treatment, and some should be cultivated more than others. Again the cultivation of all must vary to suit the season, whether it be wet or dry. During a severe drouth the cultivation should be frequent, and done with such implements as will keep the entire surface of the orchard in a fine, pulverized condition two or three inches deep. With the peach, cherry and plum, it is a bad practice to permit them to cease growing in mid summer, if so, they are liable to mature their growth, shed their leaves, and then start a sap late in autumn, thus endangering, not only the fruit buds, but the health, and possibly the life of the tree.

We have cultivated our orchards and fruit gardens from three up to fifteen times in one spring and summer, just as often as the condition of land and season made it necessary. Every day the ground remains in a crusted condition there is a loss in growth of tree, and if it be loaded with fruit, so much greater will be the necessity of thorough cultivation in order to conserve the moisture needed to carry the fruit to maturity, and at the same time keep the trees in a healthy growing condition and induce them (if possible) to make fruit buds for a crop the ensuing year.

CROPS PERMISSIBLE.

Any crop which requires careful cultivation, as corn, potatoes, melons, cabbage, and other vegetables may be grown with advantage to the trees and profit to the owner. There are also other crops which may be profitably grown in the orchard (while young), notably, strawberries, raspberries, red clover and cowpeas, and for a cover crop for winter protection to root system, rye may be sown in fall and used for winter pasture for hogs. No one should attempt to grow all of these crops in his orchard. And as to which will be the most suitable, and best paying crop, each one must decide for himself, since much will depend upon the kind and character of land, and the demands of the local market. One objection so often urged against cultivating the orchard is the loss that occurs by washing. True, there will be a loss of this kind, just the same that the farmer meets with continually in cultivating his corn crops on rolling or hilly land, but what farmer would advise non-cultivation of corn because the land washes?

When the orchard reaches a bearing age, and when carrying a full crop of fruit, no crop of any kind whatever should be grown in it, but the cultivation should be for fruit alone, and the cover crop for winter protection, whatever it may be, should be destroyed, and cultivated into the soil in early spring. Cultivated orchards, are less liable to damage from insects on both tree and fruit, for the reason that the poultry and birds have a much better chance to pick them up than in the orchard left to grow in weeds and grass. The sun, air, and frost, will also have a more beneficial effect upon the orchard when cultivated.

But the great drawback to cultivation, and to the Missouri fruit grower in general, is that old mother nature has done so very much for him, that he thinks it altogether unnecessary to do much for himself or his orchard. He seems to think it quite enough to plant the trees, turn in the stock, and gather the fruit. In conclusion permit me to say, that, if all the fruit growers and farmers of Missouri (which has

been so very richly endowed by nature) would only embrace and improve the opportunities, and give that pains-taking care, and thorough cultivation to their orchards and fruit gardens, that the people in the over crowded countries of Europe, and in the less favored sections of our own country, are compelled to give in order to make a bare living, then the fame of our fruits would soon become world wide, and the universal verdict would be that Missouri orchards pay better than those of any other country in the world, and that Missouri, fruits are the very best of all to be found on this side of Paradise.

DISCUSSION OF CULTIVATION.

Question.—I have a young orchard which has been cultivated in corn for three years, what shall I plant next?

J. C. Evans.—I would advise cowpeas from this time on.

D. A. Robnett.—If the land is rich I would plant two more corn crops.

M. Butterfield.—I would recommend two more crops of corn, if the ground is very rich. I would cultivate five years and then seed to clover, get one crop of hay, and then continue to mow it twice a year, leaving the clover on the ground, and never break that land up again for twenty-five years.

Mr. Auten, Carthage.—I have a sixty-acre orchard, eight or nine years old, which has never had much of a crop. It is in clover. I think it has too much nitrogen. The twigs produce only wood buds. The trees are very full of slender twigs.

N. F. Murray.—I am aware that young orchards are sometimes cultivated too much and make too much wood growth, but there is a vast difference in soils and localities.

Col. Evans, in his Ozark lands, is about right, but in rich land a different course may be better. So I say it is necessary to vary the treatment of an orchard according to the soil, the season and other conditions.

Mr. Chandler.—I would like light upon the new system of bringing orchards into bearing by girdling the trees.

Maj. Frank Holsinger.—I have had experience in making trees bear by girdling to stop too vigorous growth. There is no doubt of its success, if you do it at the right time. In our latitude this is about the middle of June, when the cambium layer is forming. The girdling stops the excessive growth and induces the formation of fruit buds. Such varieties as Northern Spy and Yellow Bellflower are brought into bearing by removing all the bark from two or three feet of the trunk of the tree. There is no danger in this. Some men peel the bark up into the limbs.

I have seen elm trees peeled in this way to get rid of the rough bark. You must not bruise or injure the peeled surface; if you do, new bark will not grow.

This year I saw on the banks of the Kaw river some very fine peaches. I inquired into the treatment of this orchard. I found that it had been cultivated and plowed. Every variety of fruit, from the strawberry to the apple had a good crop. Where the orchard had not been plowed, though other conditions were the same, there was little fruit. There was some condition of warmth generated there. I can not explain it, but I take it that this cultivation had much to do with it. Adjoining orchards without cultivation had no such crops. From one hundred trees of one variety the owner gathered 2,500 baskets of peaches, an average of twenty-five baskets to the tree.

D. A. Robnett.—I know of an instance just the opposite of that told by Major Holsinger. From a cultivated orchard there was no fruit, but a good half crop of peaches from an orchard that was not cultivated.

N. F. Murray.—I girdled 1,500 apple trees. It did not kill them. The girdled trees and those not girdled had a full bloom last spring, but the girdled trees set and held five times as much fruit as the others. Where there was any tendency to blight the girdling was injurious.

Secy. Goodman.—Let us keep to the subject of cultivation.

J. C. Evans.—I have always advocated thorough cultivation, but the longer I live the more I have to learn. I have in mind a peach orchard partly plowed across the rows of varieties. Every tree that stood in the plowed ground was free of peaches; in the ground not plowed there was a good crop—just the opposite of Major Holsinger's experience. I think it is not good to plow peach orchards early or apple orchards late.

A Cass county man spoke of the careless handling of young fruit trees by those who buy to plant. One man bought twelve pear trees, planted them in his yard and let the cows eat them up. He believed in cultivation in various ways. He planted potatoes or beans and cultivated with a hoe around the trees, enough to keep the weeds down, and then sowed in clover for four or five years.

Question: Do you intend to plow that orchard again?

Answer: Excuse me, I done sold that place.

C. B. Green.—There is a proper time to cultivate, and that time is in the spring of the year. I think right pruning would have the same effect as girdling. I do not believe in too much cultivation, say five, six or seven years for young orchards. I think a mulch to keep the land free from weeds, and to hold the moisture would be better than much

cultivation. Too much cultivation destroys or lessens the humus in the soil. One plowing in five or six years to root prune the trees in rich land, I think, is a good practice. This is my experience in Pettis county.

Mr. Elliot.—I don't believe it is a good idea to cultivate peaches too early in the spring or apples late in the fall. In my orchard 150 apple trees hoed in the fall failed of a crop when those not hoed had a fair crop. I built fires in my orchard two cold nights and had more than a thousand dollars worth of peaches. I cultivate up to the first of July and then I quit. The trees were five years old. The first two or three years we had berries in the orchard, for the last two years nothing at all in the orchard except the trees.

J. H. Ruddick, Bourbon.—The growth of cultivated trees is so much greater than those not cultivated, that I believe in keeping an orchard clean in summer or winter. There are less insects in thoroughly cultivated orchards. Clean cultivation has much the same effect as spraying.

Mr. Cook.—I have made the most success with hoe cultivation; planting strawberries or blackberries in the orchard appears to give the trees all the cultivation they need. I think there is a golden mean in this matter. I can not approve of girdling. I think right pruning preferable. Continuous cultivation upon sloping land would be ruinous; all the soil would wash away.

WEDNESDAY, DECEMBER 9, 9:30 A. M.

The call to order was made by President Robnett. The morning prayer was offered by Rev. Wender.

The following credentials were presented and the delegates introduced to the society:

Princeton, Illinois, Dec. 4, 1903.

To the Officers and Members of the Missouri State Horticultural Society, Greeting:

This is to certify that Mr. Isaac D. Snedeker of Jerseyville, Ill., is a duly appointed delegate from the Illinois State Horticultural Society to the annual meeting of your society at Columbia, December 8 to 10, 1903.

Mr. Snedeker is an experienced horticulturist and an extensive fruit-grower, and I am sure that his visit with you will be mutually pleasant and profitable.

Yours fraternally,

L. R. BRYANT,

Secretary.

St. Joseph, Mo., December 5, 1903.

To the Missouri State Horticultural Society:

This is to certify that at a meeting of the St. Joseph Horticultural Society today, Mr. L. J. Hartman and Mr. L. C. Wilson were elected delegates to represent this society at the meeting of your organization at Columbia.

JAMES M. IRVINE,
Secretary.

St. Joseph, Mo., December 5, 1903.

To the Missouri State Horticultural Society:

Gentlemen—At the meeting of the Platte Purchase Horticultural Association today, Messrs. J. R. Milne and J. W. McAdow were chosen as delegates to the meeting of your body at Columbia.

J. H. KARNES, Pres.,
JAMES M. IRVINE, Secy.

Des Moines, Iowa, November 24, 1903.

To Whom it may concern:

I hereby certify that Mr. W. S. Monger of Mt. Pleasant, is a duly accredited delegate to represent the Iowa State Horticultural Society at a meeting of the Missouri State Horticultural Society to be held at Columbia, on December 8, 9 and 10, 1903.

Very respectfully,
M. J. WRAGG, Pres.,
WESLEY GREENE, Secy.

M. E. Chandler, delegate from Missouri Valley Horticultural Society, to attend Missouri State Horticultural meeting, Columbia, December 8, 9, 10, 1903.

GEO. W. HOLSINGER, Pres.,
HARRIET E. J. CHANDLER, Secy.

C. V. Holsinger delegate from the Missouri Valley Horticultural Society to attend Missouri State Horticultural meeting, Columbia, December 8, 9, 10, 1903.

GEO. W. HOLSINGER, Pres.,
HARRIET E. J. CHANDLER, Secy.

J. A. Durkees, delegate from the Missouri Valley Horticultural meeting to attend Missouri State Horticultural meeting, December 8, 9, 10, 1903.

GEO. W. HOLSINGER, Pres.,
HARRIET E. J. CHANDLER, Secy.

LIST OF DELEGATES.

Isaac D. Snedeker, Illinois State Society, Jerseyville, Illinois.
Mr. Luke, Wisconsin Horticultural Society.
S. W. Moore, State Society, Elwell, West Virginia.
E. A. Riehl, Director Society Experiment Station, Alton, Illinois.
Prof. John Craig, Director Experiment Station, Ithaca, N. Y.
G. Harold Powell, Ass't Horticulturist, Washington, D. C.
G. S. Christy, President State Society, Johnson, Neb.
T. H. Todd, Apple Growers' Congress, New Franklin, Mo.

MISSOURI VALLEY HORTICULTURAL SOCIETY.

M. E. Chandler, Randolph, Mo.
C. V. Holsinger, Rosedale, Kas.
J. A. Durkes, Weston, Mo.

ST. JOSEPH HORTICULTURAL SOCIETY.

L. J. Hartman, St. Joseph, Mo.
L. C. Wilson, St. Joseph, Mo.

PLATTE PURCHASE HORTICULTURAL ASSOCIATION.

J. R. Milne, St. Joseph, Mo.
J. W. McAdow, St. Joseph, Mo.
W. S. Monger, Iowa State Horticultural Society, Mt. Pleasant, Iowa.

REMARKS BY DELEGATES.

Mr. E. A. Riehl of Alton, Illinois, spoke of the work of the Illinois society. We have gathered together some four hundred varieties of apples in our search for a better and more profitable variety than the Ben Davis.

The interest in the nut question all over the United States is wonderful. We have found that we can bud and graft them, and if any of your members have good varieties of native nuts I would like to communicate with you.

Mr. Todd of New Franklin, Missouri, spoke of the work of the "American Apple Growers' Congress." He said that Missouri had more apple trees than any other state. He thought that the apple growers of the State should join this society and be ready for the packing and

marketing of the crop, when all the millions of trees we are now planting should come into bearing. He thought the "congress" would be a great instructor to the apple grower.

Prof John Craig, Cornell University, N. Y.—I am glad to be here. I realize that I am in a horticultural community, and that these fruit growers are here to study the various problems which from time to time present themselves. I do not know enough of your conditions to give you any good advice. I extend to you the greeting of your co-workers from New York. We have not as many trees as you, but more apples than you have. Many of these apples are now stored in the orchard, because of the scarcity of barrels and the rather sudden coming of winter weather, a very unusual condition.

I wish you a very successful and profitable meeting. I shall be glad to give what assistance I can, as the discussions go on.

Mr. G. H. Powell gave the society the cordial greetings of the Secretary of Agriculture and the Department at Washington.

FROM SEEDLING TO ORCHARD.

(R. J. Bagby, New Haven, Missouri.)

I have not a paper, but can say something on the subject. I can speak of the aphid and root gall. We have found no way to grow trees to render them immune, or free from, these diseases after they are planted in the orchard. We have considerable complaint from over the country. We have inquiries from every quarter in regard to these diseases. Scientific men are trying to get some stock that is immune. We have found the Northern Spy not any more immune than any other variety. Methods of propagation have nothing to do with the dissemination of root gall or crown gall. I would like to know if there is any nurseryman who can grow trees without these pests. If there is I would like to hear from him and learn his methods.

As to cutting scions from selected bearing trees, if apple trees were selling for fifty cents apiece it might be practicable. We undertook to grow some apple trees from scions cut from bearing trees. We got 100,000 scions from a man in Michigan who claimed to have the scions cut from bearing trees. They proved to be badly mixed, and to have every thing that could be found in any body's catalogue. I mention this to show how it is not practical. Perhaps the man was honest in sending the scions.

I can say without question that there is less aphid on nursery trees today than ever before, because more care is taken. Still it crops out notwithstanding all the care we can use. We can not render trees immune from aphid. In Laclede county there is a planter who thinks a nurseryman has infested his entire orchard with aphid. The aphid comes and goes. When we can avoid grasshopper raids we may avoid aphid raids.

We cut our scions mostly from scion orchards that we planted especially to grow them. They have never borne apples, but they were propagated from known trees and we have bearing orchards grown from these scions to prove their correctness. We do not treat our trees in any way from the nursery to the orchard. Fumigation has destroyed more trees than the scale and the aphid and all other pests of the nursery combined.

DISCUSSION ON NURSERIES.

N. F. Murray.—I rise to speak a word for the nurseryman. I am no longer in the business, but my past long experience has taught me many of the difficulties under which they labor. It is impossible to grow trees free or immune from the diseases of which we are speaking. The main point is this: people are agitated and excited in regard to these things. They are demanding too much. Some of the best orchards we have were grown from aphid infected trees. For my part I would as soon have a little aphid in the roots of the trees as not. The aphid multiplies the fibrous root system and makes the trees grow faster. A little aphid will usually make no further trouble.

Mr. Baxter.—I once bought some apple trees of Mr. Murray that had too many fibrous roots.

Mr. Cook.—I have found aphid in the roots of trees and dipped them in a solution of concentrated lye. I believe the lye solution does good. I do not care much for the aphid. I think ashes around the trees is good for the aphid. Whitewash is also good. Put a little salt or sulphur in your whitewash.

Mr. Butterfield.—I had a friend who wanted to plant 200 acres. He thought he could grow his own trees. He did grow them, but every one of them was covered with aphid. He planted them and put wooden tree wrappers around them. When he removed the wrappers and found his trees covered with aphid, he thought they were ruined, but they were not. That has been one of the most profitable orchards in the country.

G. T. Tippin.—I believe most nurserymen are careful in the propagation of trees. The aphid comes and goes. It is bad this year: perhaps it will be scarce next year. Most nurserymen are careful in gathering

scions. Irresponsible shysters claim to have accomplished what you know they have not done. I say to you, gentlemen, you don't know the extent of this fraud. The scion orchards, as a rule, are grown from trees known to be true to name, and are the only practicable source from which scions can be obtained. When a nurseryman takes his trees from a good young scion orchard he knows he is giving to the public the very best thing that can be given.

N. F. Murray.—In south Missouri I would not plant aphid trees. In north Missouri it does but little harm. Nurserymen throw out all badly diseased trees upon the brush pile. In my father's orchard in Ohio fifty years ago, we threw away badly infested trees. I close by saying that if you refuse to buy trees of all nurserymen who have root gall or aphid you will have to quit the business.

Mr. Ruddick.—In Crawford county we seldom see aphid above ground. If we all cared for our trees and kept the borers out it would not do much harm. Tobacco dust is used with good success against the aphid. I don't think a little aphid on an apple tree is any worse than a few fleas on a dog.

G. B. Lamm.—I go among a good many orchards and I find but little complaint of the nurserymen

C. H. Dutcher.—The aphid is also found on shade trees. I found it upon young elms. I rid them of it by spraying with kerosene emulsion, not too strong. Strong lye will do the same thing. There is no need of throwing away a tree with the aphid any more than for throwing away a young one who came from school with the itch. Nurserymen are not going to send us trees with visible aphid upon them. Some men leave the wrappers upon the trees too long and find the aphid under the wrapper. Wash them off with kerosene emulsion, and put tobacco dust around the root of the tree. Where the kerosene emulsion was too strong there is no tree there now. My elm trees were pretty bad, but one good washing cured them.

Mrs. Chandler.—I cleared chrysanthemums of aphid with sulpho-tobacco soap.

Mr. Dutcher.—I do not throw away trees with aphid upon them.

Prof. Stedman.—Nurserymen are now so particular that you will find they will discard any tree that shows nodules. Occasionally you may find a little aphid without nodules. In some instances nurserymen may discard ten per cent., but this is rare. You need not hesitate to plant any ordinary aphid tree shipped by responsible nurserymen. Even if you plant trees without aphid at all, they will have aphid within a year. Then why not plant the slightly infested tree? You know it costs but

little trouble to keep the aphid in check. I know from inspecting the nurseries of the State for seven years, that the nurseryman is very particular about sending aphid trees. I would not, of course, plant a badly infested tree. It is just as impossible for the nurseryman to raise trees without some aphid or other pest as for you to raise a family of children without having some of the common diseases of childhood. I do not mean it is absolutely necessary for all of you to be continually fighting aphid. When you pass through your orchard and see a tree infested with aphid, or other pest, treat that tree. When you find you have the aphid, don't neglect it. In the northern part of the State it does but little harm. In the southern part of the State you will have to fight it vigorously.

K. B. Wilkerson.—I once dreaded aphid, but now I fear it very little. I once sold 120,000 apple trees for \$2,000, because they were covered with aphid. I sold them as damaged trees at a low price. Some of them were literally white from top to bottom. At a certain time the aphid began to leave and in forty-eight hours it was all gone. I do not fear aphid as I once did.

H. N. Wild.—Mr. Bagby did not begin with the apple seedling. That is where we get the aphid first. You can get all the aphid you want even on the best grown apple seedlings. If they appear to be free from it when dug it will develop upon them later as the season advances. The seedlings carry them into the nursery. I would like for the station to get some seedlings free from aphid and see if they do not develop upon them.

FORMATION OF FRUIT BUDS.

(J. C. Evans, Harlem, Missouri.)

I feel incompetent to do justice to this subject, and so have not prepared a paper upon it. These distinguished scientists here should know far more of it than I do. The more I study the less I seem to know—the darker the subject gets. If I should tell you fruit buds are formed in August perhaps most of you would agree, but they do not form always in August. Their formation is governed by circumstances. They may be formed in any growing month of the year. I have known fruit buds to form in the month of May, when the first crop of fruit buds had perished. None of us can tell when the fruit buds are formed. The time is governed by conditions of the soil and season. I have known peaches to bear the second time after the first crop had formed. I think the subject is too big for any one except some one high up in the sciences. What I have said applies to apples.

DISCUSSION ON FORMATION OF FRUIT BUDS.

J. C. Whitten.—Of course under normal conditions in bearing trees, in late summer, July or August, we can see the large fruit buds which are forming. I believe Col. Evans is right: these buds may be developed at any time. Last spring after many blossoms were killed, many later flowers appeared. The tree managed to put out some flowers for a second crop. There are certain conditions which favor and other conditions which oppose the formation of fruit buds. Abnormal wood growth hinders the formation of fruit. The forces of the tree may be divided into vegetative and reproductive activity, somewhat opposed to each other. Excessive wood growth, caused by too much fertilizer or late cultivation may prevent fruit buds from forming. Any thing which, in a measure, checks the wood-growing activity may cause the tree to form fruit buds for the next year. Some trees here in the grounds are girdled. In the girdled trees there is less wood growth, but there are larger and more fruit buds. The buds were also formed earlier in the season than on the other trees. We usually find fruit buds upon that growth which ceases to lengthen early in the season, on short spurs which make their wood growth early.

Secy. Goodman.—Are there not some indeterminate buds which may be either wood or fruit buds?

J. C. Whitten.—Fruit buds sometimes send out little shoots which produce later blossoms. These shoots may be six or eight inches long. It may be possible for some fruit buds not to push out in the spring at the normal time. I have observed this in the cherry. I have also known of fruit buds upon young wood.

Mr. Powell, Washington, D. C.—I know an orchard of Kieffer pears which was defoliated with leaf blight early in the season. Many of these trees started a second growth and bloomed in July or August this year. For several years I have made a study of the fruit bud. You may often find the flower part of the bud of the apple in June. In bearing apple trees the best fruits are those made on trees which make the best growth, and not upon those making slow growth. This applies to bearing trees. Young orchards making a fast growth are not apt to bear.

J. C. Evans.—I have seen fruit buds upon water sprouts of the current year's growth. When were these buds formed?

Mr. Todd, Howard County.—I know of a twenty-five acre orchard which had a crop of apples as large as walnuts on it. The trees bloomed a second time in June, set a full crop and both crops came to maturity.

Mr. Murray.—I have known the Maiden Blush apple to make two

crops in one season. I think fruit buds formed early in the summer are better than those formed late in the summer. In north Missouri in rich, deep, black soil, late formed buds are not apt to set much fruit. Manage to have the buds set early in the summer. This may not be desirable in south Missouri where the soil is not so rich and the season is dryer. With us 1,500 girdled trees, which formed their fruit buds early, set more than twice as much fruit as those not girdled, though all these trees had a full bloom. As other conditions were the same, I reason that the earlier formed buds were stronger. I favor the early formation of fruit buds.

J. C. Evans.—I am much encouraged by observation in the last two or three months, for the prospect of a crop next year. I said the buds were formed in August while the tree was still growing. This year many orchards have formed the fruit buds while yet in a growing condition. I feel hopeful for a full apple crop next year.

Secy. Goodman.—When is the proper time, with no abnormal conditions, for the formation of the apple buds?

Mr. Ferguson.—The conclusions I have reached are these. The first part of the growing season we have a vigorous growth. When the air gets warmer and the water in the soil and the air is reduced, the fruit buds are formed. When normal conditions check the vigorous growth of the early part of the season, then the buds are formed. Later in the season there is an accumulation of food in these buds. Too much water or too much cultivation will have a tendency to keep up wood growth late in the season, and thus hinder the formation of fruit buds.

Prof. John Craig.—Both fruit buds and leaf buds are developed from the same material. I do not think any investigator can place his pen upon the very moment when the buds are formed. I once had a letter from a Missouri man who had a large orchard which bore a crop on the even years. He wished to plant another orchard for the odd years, and asked for information to enable him to do this.

Prof. Whitten spoke of the vegetative and the reproductive tendency in trees and other plants. If we could properly control and balance these two forces there would be no need of "off years" for the trees to rest up; but we have a full program and I must stop.

AN EIGHTY-ACRE ORCHARD, IS IT ENOUGH?

(Daniel Lowmiller, Parkville, Mo.)

Our worthy secretary has assigned to me the reading of a paper on this subject, but before I am through with it, he will feel sorry for me and wish he had left me off the program.

Is an eighty-acre orchard enough for one man? I would say yes, and more than enough. Eighty acres properly taken care of would yield much finer fruit than 160 acres neglected, not saying anything about the quality of the apple; for any of us would much rather have fine, nice, large, smooth apples hanging on our trees, that we might point to with pride—something to be proud of—than snarly, knotty, scabby, disgusting little things—the kind that is sure to grow in a neglected orchard.

In planting this orchard, be sure you know what you want to do, for a mistake here would be a hard one to correct. If you do not know anything about the fruit business, you want to make a thorough study of it before you begin planting, especially as to location, quality of soil, subsoil and air drainage, as I think many of us make this first mistake in locating our orchards; we do not stop to think where is the best place, but just begin digging holes and setting trees at random in any old place wherever fancy suggests. This is wrong, because a mistake made here, as I said before, can never be rectified and will be a source of regret as well as a losing game financially for time to come.

And I wish to repeat with emphasis, "That when one man has looked after the pruning and trimming and spraying and cultivation of an eighty-acre orchard, and done it faithfully and well, he has done all that any mortal man ought to do or could do; hence if my premise is correct, which I maintain that it is, then if he has more than eighty acres, he must have necessarily left it uncared for, and has not done his work well.

In earlier days when we were not bothered with the orchard pests which we have to contend with now, then perhaps we could have handled with profit a larger orchard; but with what we have to contend with now, the prudent man will cut his acres down.

We have today in the State of Missouri some very large orchards, ranging from 500 to 2,000 acres, from which I venture to say, the owners realize a very small profit for the reason as I said before, the

owners are unable to give the trees sufficient care. Ask the farmer which he had rather have, "one" acre of corn well cultivated, or "ten" acres half cultivated, and we need not surmise at his answer; promptly and emphatically it comes, "One acre well tended." As is the farmer, so should be the prudent fruit man.

In making a success of the fruit business, much depends upon the varieties we plant as well as the market for which we are planting. If it is a home market, it would perhaps be incumbent upon us to plant an entirely different variety and grade than would we if we were planting for and depending upon a foreign market; all of these things must be thought of as well as a look into the future and its possible developments and requirements in the fruit line.

It is not the amount of apples we grow, but it is the quality, and this we can't get in this day and age of fruit growing without thorough cultivation, spraying, pruning and thinning.

I have in mind an orchard of eighty acres, planted two years ago, in a stiff timothy sod, the owner cutting a crop of hay off of it every year since; and he came to me not long since and said to me, "Lowmiller, would you advise me to plant that other 80 of mine in fruit, too," and I said to him, don't do it, you go home and plow up that sod and plant corn in your orchard and cultivate it, and you will have all you can attend to, and more too, and your fruit will be 100 per cent better.

What we want in the fruit business is men with plenty of hard common sense and a heart that never fails, even though the apple crop does. The thing to do is to hope on, push on, work on and never give up, though adversity stares us in the face and we fail to get a good crop of apples every year; don't expect too much from your orchard at first, but coax it and work with it and live with it, and in the near future you will see that your close attention has made for you a fine orchard that repays you ten-fold. Then you can sit down under your own fig-tree and survey with pride the handiwork of your own hands and brain.

Yes, eighty acres is enough.

VARIETIES AND THEIR RESPECTIVE MERITS.

(A. T. Nelson, Lebanon, Mo.)

Mr. President, Ladies and Gentlemen:

The subject our worthy secretary has assigned to me, "Different varieties and their respective merits for South Missouri," is one which I doubt I can do justice to. As I see before me many apple

growers from South Missouri who have been in the harness a great deal longer than I have, and who know more about this subject than myself. In the first place most any variety will do well in South Missouri. In taking up this subject I will speak on apples that we have planted and varieties that have come under my observation during the buying and shipping season.

I will commence with the summer varieties and pass quickly through them. The Early Harvest, Yellow Transparent, Red June, Red Astrachan and Lowell all do well; grown only for home use and local trade. The Lowell, however, I find is very susceptible to bitter rot; the trees are vigorous growers, bear young and are very prolific. I ship one to two cars every summer (except this last summer.) Maiden Blush is one of the varieties we do not plant enough of. I believe a grower would derive as much, if not more, revenue from a 40-acre orchard of Maiden Blush than most any other apple he could plant; the trouble is that it would take a great deal of nerve to plant forty acres of Maiden Blush. In fall varieties, the Rambo does fairly well with us. The Northern Spy does well for a home apple; trees very hardy and very prolific; apples grow to very large size; no shipper unless under ice. Smith Cider is a good apple while the trees are young. After the trees are 13 or 14 years old, they do not do as well, as they overbear themselves. We all know what the Jonathan will do. The one objection I have to it is that it matures while the weather is warm before it gets its color, and in South Missouri they have to be shipped under ice to insure their getting to market in good condition; the trees are vigorous growers, bear young and are quite prolific. The Grimes Golden I consider a better apple for South Missouri than the Jonathan, as it will do well on soil that will not grow Jonathans at all. The tree grows to a large size, very hardy, prolific bearer; apples hang on tree later than Jonathan; barrels closer and a delicious flavor, and on the market commands as high a price as Jonathans. No one will miss it by planting Grimes Golden. The Bell Flower is a good apple, though I would not plant it on account of it being a shy bearer. I can say the same about Pa. Red Streak and Baldwin. The Flora Bell and Ortley are good apples, but cannot compare with the Grimes Golden in productiveness or prices on the market. Taking up a few of the winter varieties, will say that the York Imperial seems to succeed in South Missouri; the fruit is irregular in shape, large in size and of a fine color and quality; the tree is a vigorous grower and grows to a large size. We planted our Yorks on deep soil where they seem to do the best. I like Missouri Pippin for a young bearer and a quick money maker; to use

as a filler up to the age of 11 years old, then pull them up and burn them. Winesaps do very well with us until the trees get a little old; then they run small; also you will have a good crop one year and will miss the next crop entirely, where other varieties are full. The Huntsman is not a good apple with us; very shy as a bearer, sunburns too easily, rots badly, fair flavor. The Willow Twig is a good apple; good color, good flavor, good tree, good bearer, and if the bitter rot is within 100 miles from you the Willow Twig will be the first apple to catch it. The Jeniton is a good apple to have one tree of for home use; it is not a good commercial apple on account of its size and color. The Minkler does well; a good tree, fast grower, bears early, fine color, good size and flavor. The Rome Beauty is a grand good apple, but does not do well with us; shy bearer, drops badly before maturing. The Mammoth Black Twig is grown some here; a vigorous tree, shy bearer, nothing extra in flavor and I would rather plant a Winesap; can say the same about Arkansas Black. The Stark apple seems to do well here; good tree, good bearer, large in size and good color. The Ingram is a profitable apple to grow in South Missouri; tree is an upright grower, very prolific, very hardy; the only fault is that unless you thin they are inclined to run small. White Winter Pearmain, Red Winter Pearmain, Bailey Sweet, Clayton, Little Red Romanite and numerous other varieties are all grown here and seem to do well. Payne's Late Keeper seems to be one of the coming apples. I have a few trees that have fruited one year. I do not know much about the apple, only that it has every appearance of being a good keeper and shipper; tree is hardy and bears well. The Nixonite I believe is going to be a good apple for South Missouri. Those who have planted it speak very highly of it; they claim the tree is long lived, vigorous grower, very productive and the apple has long keeping qualities; a very bright yellow showy apple. I planted 300 Nixonite trees in my orchard two years ago. I will now bring my paper to a close by making a few remarks about our old standbys—Ben Davis and Gano—the money makers of South Missouri. There is no need of my standing here and telling you what Ben Davis and Gano will do; you that have planted them already know. If I were to plant 10,000 trees to-morrow, I would plant 4,000 Ben Davis, 4,000 Gano, and let me see, yes, I would plant 1,000 Ben Davis and 1,000 Gano more.

DISCUSSION OF VARIETIES.

Mr. Todd, Howard County.—In an orchard planted about eight years ago, Ben Davis and Gano have been great money makers; Winesaps have done very well; Huntsman has not done well; fruit is

very imperfect; Jonathan does well and is a money maker; Grimes does well. We are planting more of them. Maiden Blush does well. My choice of five varieties would be Jonathan, Grimes, Winesap, Gano and Ben Davis.

A. T. Nelson, Laclede County.—Grimes will grow well upon black soil, while the Jonathan will not. My choice would be Ben Davis, Gano, Grimes, Ingram and Nixonite for South Missouri.

Mr. Irvine, Buchanan County.—Mr. Turner, near St. Joe., would recommend Wealthy as a profitable early apple; ten to one better than the Maiden Blush; bears better, and is better in every way. He markets his stuff to retail dealers at the market house. When apples are scarce he picks early and keeps on picking.

Mr. Wilson, Buchanan County.—My five varieties, Wealthy, Maiden Blush, Jonathan, Ben Davis and Grimes. Perhaps York Imperial for Ben Davis.

Mr. Murray, Holt County.—I think Mr. Turner would drop the Maiden Bush entirely and hold on to the Wealthy. I think he recommends Winesap upon certain soils.

Mr. Butterfield, St. Francois County.—My five varieties would be, first, the Gano, the finest in the world; second, the old Jonathan; then Grimes, Nixonite and Ben Davis. In some localities Winesap and York Imperial would have a place in the list of five best varieties.

Mr. Steiman, Chariton County.—I would like to know more of Payne's Late Keeper.

G. T. Tippin, Greene County.—Payne's Late Keeper comes from Dade county, just west of Springfield. It was grown from seed brought from North Carolina at an early day. The man who grew it from seed had some trees grafted for his own use. The fruit of these trees, some eighty in number, attracted attention and led to the planting of a 240-acre orchard of the variety. The fruit is medium size, striped, subacid, one of the longest keepers we have. Where it has been grown and marketed it has brought the highest prices. The flavor is good, almost the best, almost sweet, but subacid. It is good to bear and good to store.

C. B. Green, Pettis County.—I would name Gano, Jonathan, Winesap, York Imperial and Ben Davis.

Mr. Hartman, Buchanan County.—For North Missouri I would say Wealthy, Gano, Ben Davis, Jonathan, Grimes.

Mr. Lowmiller, Platte County.—Grimes, Jonathan, York Imperial, Ben Davis and Winesap.

S. R. Young, St. Louis.—Ben Davis, Gano, Jonathan, Grimes and Winesap.

H. S. Wayman, Mercer County.—Jonathan, Grimes, Ben Davis, Gano and Missouri Pippin:

Mr. May, Macon County.—Grimes, Ben Davis, York, Missouri Pippin and Jonathan.

Mr. Cook, Potosi.—Winesap, Nixonite, Rome Beauty, Gano and Red Astrachan.

K. B. Wilkerson.—Gano, Jonathan, York, Grimes and Ben Davis.

T. G. Henley, Miller County.—Wealthy, Jonathan, Gano, York and Ben Davis.

VALUE OF COVER CROPS.

(Paul Evans, Director Experiment Station, Mountain Grove, Mo.)

As far back as historical writings lead us, scientific men have been studying the soil. Lives have been spent studying the chemical composition, physical conditions, etc., and reporting the results of their investigations to all the world; yet the tiller of the soil is just now beginning to think.

In this country particularly, where vast acres of fertile lands were laying all cleared and ready for the plow, where all that was necessary to be done to produce abundant crops was to turn the sod and plant the seed, they have not stopped to think. Why should they?

Crop after crop was grown with apparently very little deterioration of the soil, and if it should give out there was an abundance of fertile virgin soil left. Why should they buy commercial fertilizer and sow cowpeas between the corn rows?

Although comparatively a new country, time is beginning to tell. Good land is all taken up, and some of it is growing thin. We have cleared some of the timbered land, and are now settling up the rocky hill sides. The grand-children of the pioneer settler, instead of turning the sod and planting the corn with an ax, giving it no cultivation whatever, but reaping abundant harvest, are now preparing their soil with improved machinery and planting their crops with drills and planters, which have commercial fertilizer attachments, and eagerly watching each mail for a bulletin from their experiment station reporting the results of experiments on varieties of cow peas, to decide which they will use as a cover crop.

If there has been such a vast change in these few years of the past, what is there ahead of us?

The study of plant food and plant feeding is as important to the fruit grower as cattle feeding is to the stockman. To obtain the best results it is just as necessary that a peach tree should have a balanced ration as it is for a steer to be fed in a certain way and with certain kinds of foods. In feeding pigs and calves we feed for muscle and bone; the dairy cow we feed for milk; the matured hog or steer we feed for fat.

The orchardist should feed his trees in like manner. If they are young trees, just planted, he should feed for a proper growth and development of the tree. If they are of bearing age, they must be fed for the development of fruit buds and the maturing of the fruit as well as tree growth. It is in balancing this ration that cover crops play an important part.

We find that if we keep our trees in a high state of cultivation through the entire season, that the wood and fruit buds will be too succulent, too tender to stand the cold of winter. If we cultivate in the early part of the season, then leave the bare soil exposed to the heat of summer and the cold of winter, to the washing and leaching effect of rain and melting snow, the results will be unsatisfactory. We should then induce the necessary growth in the forepart of the season, keeping in mind that the available plant food must not only be retained as much as possible, but that it should be increased and made ready for food supply for next year.

We will say then that a cover crop is of value:

- 1st. By improving the condition of the soil, both physical and chemical.
- 2nd. By regulating to a certain extent the food and water supply.
- 3rd. By bringing about the conditions necessary for the best results at the least expense.

That cover crops are of great value to the soil physically speaking, is apparent even to the most ignorant tiller of the soil. It may be difficult for some of us to understand the chemical changes that are going on under the surface, but it is easily apparent that if a leachy soil is not protected in some way it soon loses its fertility; that a heavy clay soil must have humus and fiber worked into it before it will be productive; that a cold mucky gumbo will not produce until it has been warmed up by turning under a few crops of vegetation. The ordinary plowman may not understand all about the bacteriological and chemical changes that take place when this vegetable matter is plowed under, but he does know by practical experience that it is effectual.

For a soil to be enriched within itself there must be a chemical change. Certain ingredients that have hitherto been insoluble and unavailable as plant food are rendered soluble and available, and for this chemical change to take place conditions must be favorable. An important factor is the physical condition of the soil. It should be such that it will receive moisture without puddling or baking. It should retain this moisture without remaining wet too long on its surface, supplying top soil as needed. It should be sufficiently porous to allow the circulation of air. With these conditions present, the micro-organisms, so essential to the food supply of plants can receive the air, temperature and moisture necessary for their existence. Chemical changes will take place in the organic and inorganic, rendering insoluble substances available as plant food.

The physical conditions of the soil can be regulated to a certain extent, at least, by the scientific use of cover crops.

The chemical study of the soil, even the chemistry of the relation of cover crops to the soil, is too deep, and requires too much time for the ordinary farmer to fathom its depths, but if he will acquire the fundamental principles, and will read and keep pace with what is being done by those who give it their entire time, experimenting a little on his own account, I assure you that he will not be growing the same crop year after year on the same soil, returning nothing and reaping a smaller return each year. He should study the signs of soil debility. If the foliage is generally pale and anæmic when there is a proper supply of moisture, he should know that it is the lack of nitrogen, and that leguminous crops grown on this soil will improve it. It is not necessary that he should know all about the particular family of microbe that lives on the roots of these legumes, making the gathering of this nitrogen from the air possible, or how it is deposited there and held as available plant food.

Aside from the nitrogen gathering power of the legumes, cover crops may be said to enrich the soil. While they really add nothing chemically speaking, yet they bring about a transformation of mineral substances hitherto unavailable and leave this with the soil for the nutrition of other plants. This transformation is brought about by the combined chemical and physiological action of the roots of all plants. At the tip of each root there is through the physiological action of the plant an exudation of chemical substances that act on the insoluble mineral matter rendering it available as food which the same root may take up and store in the same plant. If this plant is placed under or even remains on the soil, the latter is enriched to the extent of such chemical change.

We have said that cover crops were of value in regulating the food and water supply. Take for an example a young peach orchard. In the growing season we cultivate and encourage the trees to avail themselves of all there is in the soil for them. By the middle of the summer they should have attained the desired growth, and must now be induced, if possible, to check their rapid growth, and mature the wood before the winter season. If cowpeas, or some such cover crop, are sown after the last cultivation, some of the available food must be temporarily used to mature that crop. They take the food from the tree then, but give it back in the spring when it is most needed. While they will also take from the soil a large part of the moisture, they shade the soil and prevent baking.

By the proper use of cover crops we not only benefit the soil and produce the conditions most favorable to the proper growth and development of the tree, but we are doing it at the least possible expense. It is true that we might use some crop that could be harvested at a profit, but this would be robbing the soil. Where conditions will admit of it, hogs might be pastured to an advantage, but this would be advised only with caution.

EXPERIMENTS WITH CROWN GALL.

(By W. L. Howard, Assistant Horticulturist, Columbia, Mo.)

A great deal is heard about galls on the roots of apple trees and also on raspberries, especially the reds. The galls are warty-looking excrescences, which on the apple seem most often to attack the trees at or near the crowns—hence the name “crown gall.” It is found, however, that the galls may form on any part of the main root or roots wherever there is a wound. This is why the trouble is generally found at the point of union between scion and stock.

The true galls are warty excrescences which are not to be confused with the knots and enlargements which are caused by woolly aphis or by either the stock or the scion outgrowing the other. All of these last have smooth surfaces, while the tree galls are warty and rough. Galls generally cause a tuft of fine, fibrous roots to form, but in some instances aphis may also do this, but not often.

It must be remembered that crown gall is no new disease, it being so far as we know as old as orcharding, but with the rapidly increasing number of apple trees is becoming more and more prevalent and noticeable.

In our experiments we have tried to answer the following questions: What remedies may be used without injury to the trees? If removed and wounds treated, will the galls grow again? How may trees be treated before planting? Can affected trees be treated while growing in the orchard? Does the kind of soil have anything to do with the occurrence of the galls? Is there any relation between raspberry and apple gall—that is, will one attack the other plant? And will different methods of grafting influence the occurrence of the galls?

The investigation has been carried on for two years. In all there has been nearly 3,000 trees used in the experiment and 275 different remedies and combinations employed. The following materials which are known to be more or less harmful to germs of all kinds were used direct, in combinations and under different circumstances:

Copper sulphate (bluestone), iron sulphate (copperas), sodium chloride (common salt), lime, sulphur, formalin, ammonia water, bichloride of mercury (corrosive sublimate), copper carbonate, carbolic acid, hydrocyanic acid, potassium dichromate, mercuric cyanide, acid, hydrocyanic acid, potassium dichromate, mercuric cyanide, silver nitrate, gas tar, kerosene oil, Bordeaux mixture and hot water.

The remedies were used in three ways: By dipping the roots in the materials; by sprinkling the soil with the solutions until the surface was wet just as trees were being planted; and by cutting away the galls and covering over the wounds with the materials to prevent them growing again.

RESULTS OF DIPPING EXPERIMENT AND SPRINKLING THE SOIL AS TREES WERE BEING SET.

Formalin.—All strengths from 10 per cent. down to 1 per cent., inclusive, killed nearly all the trees. Galls not killed on the few trees remaining alive. Weaker solutions down to one-tenth of one per cent. injured many of the trees, but the galls were apparently unhurt.

By removing the galls and applying the formalin directly to the wounds only, the trees were, in most instances, injured, but the galls grew again.

Bluestone.—Dipping roots in bluestone, as well as sprinkling the soil about the trees with the material in all strengths from one pound to eight gallons of water, down to one to seventy-five gallons, killed all of the trees. From one to 100 down to 1 to 300 injured the trees more or less. Galls on all living trees. Where the galls were cut

away and the solution applied to the wounds only, the one pound to eight gallons strength killed all the trees. Some few of the others were injured, but the galls continued to grow.

Ammonia Water.—Killed many of the trees, but was not as disastrous as formalin or bluestone. Did not stop the growth of the galls. Treatment of the wounds with the strongest solution to be found did not prevent the galls growing again.

Corrosive Sublimate.—Caused but little injury to the trees and did not kill the galls.

Ammoniacal Copper Carbonate Solution, in strengths of 1 to 100 to 1 to 250, killed most of the trees. Weaker solutions affected the trees to a slight extent. This material entirely stopped the growth of galls in some cases and in others seemed to retard it.

Copperas.—Caused no serious injury to trees even where large wounds were made by removing the galls. The galls were very numerous.

Carbolic Acid.—Killed or injured many trees, but seemed to retard growth of galls in some instances.

Hydrocyanic Acid.—Was used only to apply to wounds. It killed most of the trees treated. The galls grew again wherever trees lived.

Potassium Dichromate.—Was used only on wounds. Nearly all trees killed. Galls grew on uninjured ones.

Mercuric Cyanide.—Killed all the trees. Material applied only to wound where galls were removed.

Silver Nitrate.—Applied to wounds only. Trees badly injured, but in most instances galls continued to grow.

Gas Tar.—Was used to paint over the wounds. Killed all the trees.

Coal Oil (Kerosene).—Killed most of the trees with strengths of 1 to 10 down to 1 to 100. Galls continued to grow on the live trees. The 1 to 10 and 1 to 25 on the wounds killed all the trees. Strengths of 1 to 50 and 1 to 100 on the wounds killed much of the gall, but injured some of the trees.

Sulphur.—Mixed in the soil around the trees in quantities of 1 to 8 ounces per tree. Killed over half the trees, but seemed to prevent growth of galls.

Common Salt.—In quantities of 2 ounces or more in the soil. Killed most of the trees, but where trees survived did not prevent growth of gall.

Copperas, Bluestone and Lime mixed together and applied to the wounds was the best remedy of all for preventing a new growth of galls, although this was not entirely efficacious. Several trees were

killed, either by the treatment or as a result of the large wounds made by removing galls.

Copperas and Lime used as a wash on the wounds killed all the trees.

Sulphur and Lime used as a wash on the wounds also killed all the trees treated.

Roots of trees dipped in water of a temperature of 140 degrees F. for one minute were killed. In water of temperature of from 100 to 129 degrees F., about half of the trees were killed, but no galls were formed.

Treatment of trees while growing in the nursery resulted as follows. The soil was scraped away and the remedies applied to the galls:

Bluestone solution of different strengths— $\frac{1}{2}$ to 1 pint to a tree—did not injure either trees or galls.

Copperas solution used as above, caused slight injury to the roots and also to the galls.

Common salt $\frac{1}{2}$ to 5 ounces per tree, killed all trees.

Dry, air slacked lime from 2 to 8 ounces per tree, injured both the galls and roots.

Dry sulphur, 1 to 4 ounces per tree, gave no beneficial results inasmuch as it injured the roots wherever it did the galls.

Formalin in strengths of from 2 to 20 per cent. and in quantities of one-half to one pint per tree, killed all trees treated.

INOCULATION EXPERIMENTS.

Galls are found on the apple, red and blackcap raspberries in Missouri and on the peach in some other states. The peach galls used were obtained from Ohio.

It was desired to learn something of the contagious nature of the different galls and whether those on one species of plant would grow upon another. The different plants, apple, peach and raspberries, were grown in pots—some in sterilized soil and some not, and kept on beds of clean sand so that there were no chances for outside infection. Minced galls from one species were placed in contact with the roots of all the other species. The results of these inoculations are given below:

Apple trees inoculated with apple galls, 30 per cent. were affected.

Apple trees inoculated with raspberry galls, 16 2-3 per cent. were affected.

Apple trees inoculated with peach galls, 22 per cent. were affected.

Peach trees inoculated with apple galls, none were affected.

Peach trees inoculated with raspberry galls, 37 per cent. were affected.

Peach trees inoculated with peach galls, none were affected.

- Red raspberry inoculated with apple galls, 72 per cent. were affected.
 Red raspberry inoculated with raspberry galls, 33 1-3 per cent. were affected.
 Red raspberry inoculated with peach galls, 40 per cent. were affected.
 Blackcap raspberry inoculated with apple galls, 26 per cent. were affected.
 Blackcap raspberry inoculated with raspberry galls, 71 per cent. were affected.
 Blackcap raspberry inoculated with peach galls, 33 1-3 per cent. were affected.

From the above it would seem that red raspberries, which are nearly always affected with galls, should not be planted among either peach or apple trees.

LONG AND SHORT ROOT GRAFTS.

ALSO EFFECTS OF SOIL.

In the spring of 1903 an experiment was started to determine whether more galls are formed when the point of union between scion and root is near the surface of the ground than deep in the soil. Also if there is any difference in the extent of the gall in different soils.

For the above purposes 440 grafts were used, one-half of each variety having short roots, two to three inches long, with eight-inch scions, and the other half with long roots, four to five inches in length, and scions three to four inches long. These were divided into lots and half of each planted in clay soil and the remainder in loess soil on the Missouri river.

The following is a record of the trees affected with galls after one season's growth:

- Ben Davis, long roots, clay soil, 76 per cent. gall; loess, 33 per cent. gall.
 Ben Davis, short roots, clay soil, 25 per cent. gall; loess, 87 per cent. gall.
 Jonathan, long roots, clay soil, 22 per cent. gall; loess, 25 per cent. gall.
 Jonathan, short roots, clay soil, 14 per cent. gall; loess, 37 per cent. gall.
 Gano, long roots, clay soil, 84 per cent. gall; loess, 20 per cent. gall.
 Gano, short roots, clay soil, 14 per cent. gall; loess, 16 2-3 per cent. gall.
 Grimes Golden, long roots, clay soil, 72 per cent. gall; loess, 29 per cent. gall.
 Grimes Golden, short roots, clay soil, 75 per cent. gall; loess, 35 per cent. gall.
 Northern Spy, long roots, clay soil, 39 per cent. gall; loess, 17 per cent. gall.
 Northern Spy, short roots, clay soil, 34 per cent.; loess, 17 per cent. gall.
 Senator, long roots, clay soil, 85 per cent. gall; loess, 50 per cent. gall.
 Senator, short roots, clay soil, 71 per cent. gall; loess, 53 per cent. gall.
 Apple of Commerce, short roots, clay soil, no record; loess, 66 2-3 per cent. gall.
 Apple of Commerce, long roots, clay soil, 40 per cent. gall; loess, 50 per cent. gall.
 Richardson's Red, long roots, clay soil, 33 1-3 per cent. gall; loess, 9 per cent. gall.
 Richardson's Red, short roots, clay soil, 22 per cent. gall; loess, 25 per cent. gall.

The conclusions of the matter from the data at hand must be that the gall develops best where the root is long, thus causing the point of union between the scion and stock to be near the surface of

the ground. Especially is this true of the clay soil. In the loess soil there was more gall on the short grafts. In the aggregate there was far more gall in the clay soil than in the loess.

HOW TO GROW BIG FRUIT FOR THE WORLD'S FAIR.

(Jacob Faith, Montevallo, Mo.)

I have succeeded in growing very large fruit, nearly double its natural size.

Strawberries.—Select from the large varieties the largest and best plants, cut off the fruit stems, leaving the largest one, pinch out the blossoms and smallest berries, leaving two to four of the largest ones, and cut off all runners; cut out all plants within about 16 inches; mulch 3 to 5 inches with straw or hay half rotted; set on each side a tin can with small holes punched in the bottom; fill the cans about half full of well rotted manure; cleanings from the hen-house are best; then fill the cans full of water every day or two; thus the water leaks through the manure to the roots. All plants, vines and trees can be watered with manure liquid, water that has run through the manure.

Raspberries and Blackberries.—Select largest canes; cut off all canes within 3 to 4 feet and have the ground mellow; mulch 3 to 5 inches thick; I use half-rotten manure. Water every three to four days; manure liquid best; cut off all new canes or shoots as soon as they come up. When in bloom or the berries are quite small, pinch off about three-fourths.

Tree Fruits—Apples, Peaches, Pears, Plums, Cherries and Others.—Select trees of healthy growth, cultivate well, have ground mellow as far as the limbs extend; mulch and water as described for raspberries and blackberries. When the fruit is about one-third grown, select the limbs that have the best fruit, pick off all the fruit except two or three. Furthermore, the size can be increased by twisting a wire around the limbs just below the fruit. This checks the downward flow of sap, thus preserves the sap and throws the food back and the fruit appropriates it, causing an abnormal growth and a quicker growth and ripening.

Committees were appointed as follows:

Finance.—T. H. Todd, New Franklin; H. Schnell, Glasgow; W. T. Flournoy, Marionville.

Fruits.—E. J. Baxter, Nauvoo, Ill.; G. H. Powell, Washington, D. C.; W. S. Monger, Mt. Pleasant, Ia.

Final Resolutions.—J. M. Irvine, St. Joseph; N. F. Murray, Oregon; H. S. Wayman, Princeton.

WEDNESDAY, DEC. 9, 2:30 P. M.—ORCHARD FRUITS.

THE APPLE ORCHARD.

(M. Butterfield, Farmington, Mo.)

Shall we cultivate and prune or not? I believe that we are all united on one thing, and this is, cultivate thoroughly up to the fourth or fifth year; after that time we are not a unit. I am not going to lay down any one rule to follow, as each person has to be governed to a certain extent by his own surroundings. I remember twenty years ago in Missouri, there were fewer advocates of low heading and no pruning than you could count on the fingers of one hand. Now, I believe I am safe in saying, nearly all of the large orchardists do not prune, or but little, and that with a small pruning knife while the trees are young. Cultivating is certainly the right thing to do and it must be done well at least from the first to the third or fourth year after setting, as then you are building the foundation for your orchard, and the better you cultivate the better orchard you will have in the end.

Let us go back a little further and see how the young trees were cared for before they came into the hands of the planter. We usually break the ground fourteen inches in depth and then work it until it is like an onion bed, then cultivate and hoe all summer. We often work our grafts fourteen times during the summer, besides the hoeing, and the second summer, not so much, but enough to keep all the weeds down and the ground in good condition. Now, if ever a young tree needs cultivation, it is the first and second seasons, and I do not know of a single commercial orchard in the west that was stunted while young that ever amounted to very much. And I will state right here that corn is one of the best crops to grow in a young orchard. I do not say why. You might say that this is too exhausting on the soil, but I will say if your land is not strong enough to grow three crops of corn, you would better not plant apples on that land. I want good land for apples to start with. Plant two-year old trees on strong land, headed low (say fifteen to twenty inches), cultivate some cultivated crop well for four or five years, never prune except to take away

suckers or cross limbs and that do in the summer time when the sap begins to thicken and you will see how quick they heal over. I think it would be a good idea to mulch the trees with old straw, but never close to the tree; keep away from the tree at least fifteen inches with your mulching. Never plant any crop in the land that will cause the land to be disturbed in the fall, such as potatoes, as that would cause the trees to start a new growth, or at least start a second flow of sap.

In apple orchards where you grow low headed trees there should be good air circulation, which cannot be had behind a growth of timber or hedges.

Now, I do not advocate this system for all parts of the country, as in the east, where I was raised, the fruit on the lower limbs would not color. There must be a different system and higher heads in some localities.

What I wish to say then is this, to cultivate all the time or not cultivate after the orchard comes into bearing. I think a great many orchards are ruined by deep cultivation close to the trees. Breaking off roots, especially the branch roots, near the top of the ground causes the tree to blow over in a wind storm. On the other hand, in the clover and mulching system the roots are near the surface and if you adopt this system you should never plow the orchard.

I am not fully decided how long to cultivate. I think that would depend somewhat on the growth the trees have made, either four or five years. Then seed down to clover and never break up that land again. The year you seed down will be a big check on the growth of the tree and it will nearly always form fruit buds and bear the next season, that will be the sixth or seventh year from planting. Our custom has been to keep the weeds and clover mowed down the first summer after sowing, and the next year you have a crop of clover hay and may also get a crop of clover seed, but after that time we usually keep the ground run over with a mowing machine, say twice a year, and leave all on the ground.

We head low and when the trees come into bearing, the branches will touch the ground, thereby shading the ground and keeping it cool. It keeps the leaves from blowing away, and you will be surprised to get down on your hands and knees and examine the land and see how loose it is and how it retains moisture. We pick three-fourths of the apples standing on the ground, and I have seen gangs of men, fourteen in a gang, that will average 75 bushels per day per man, delivered to the

packing shed. I will state that I know of one orchard of forty acres that was planted in 1884, and has been treated in this way; never pruned or cultivated after seeding it down, and it has made the owner thirty-six thousand dollars.

In conclusion I will say that every one who plants an orchard should think for himself, study his own conditions, study the land and surroundings, and then do the best for his own locality. Take a little time, go and examine the trees in your own locality, and see which would be the best course for you to pursue.

APPLE ORCHARDS.

(J. T. Jackson, Chillicothe, Missouri.)

If we would be successful with our apple orchards we must do as Nature does. Nature does not waste her energies as we do. That is why we are proceeding so slowly in our orchards. A very large part of our work has gone wrong because of badly directed energy. We may be ever so honest in our object, and be ever so industrious in action, but if we pull against Nature we are like the boatman who pulls against the stream. He makes but little headway. But change our course and go with the stream and we soon move rapidly forward.

This is true in everything we undertake. How many large orchards have failed because no notice was or is taken of the forces of nature. An apple orchard is planted, then we proceed to cultivate the soil, or still worse, we plant it in corn, or sow it in oats, and do our very best to rob the soil of what little fertility has been left through many years of wasteful cropping. Now Nature does not build up her soil by keeping it in cultivation until it is as bare as a desert. Neither does she raise large crops of grain and remove them in order to add to her fertility. But she builds up her soil by daily adding to it the leaves that fall, the weeds that grow upon her surface, and the grass that grows. The very air that passes over it, and the water that enters it are but Nature's ways of fertilizing her soil.

We have tried to raise apples with the plow—that is force. It has failed, because it was unnatural. It was a woeful waste of energy. We invested in spraying outfits, dusters, and poisoned mixtures, and neglected Nature's method of keeping in subjection noxious insects and bugs, that too often play havoc with our trees and fruit.

If one-tenth of the funds invested in dusters and spraying outfits, had been used in stocking our orchards with chickens, ducks, and tur-

keys, and in common sense laws which would have protected our birds and quails from the ravages of our hunters, we would long since have rid our orchards of their pests. This would have been working with Nature and not against her.

An orchard should never be cultivated. Let the weeds, grass and clover grow. These should be mown once or twice each year, leaving the greater quantity around the trees until they are seven years old, when the weeds and grass should be left where they fall. No stock should be allowed in an orchard, except hogs which should be let in long enough to eat up the culls, but no longer. The borers should be looked after twice, or thrice each year, but it is not necessary to cultivate an orchard to do this.

This, I conceive, is Nature's way to enrich her soil, and also Nature's way to hold in check the depredations of bugs and insects. Many signs indicate that our wise men are learning that Nature's way is the only successful way to raise an apple orchard.

DISCUSSION ON ORCHARDS.

Mr. Butterfield.—What objection is there to clover in a young orchard?

J. C. Evans.—Does the man who grows mules turn them out to grass or feed them well till they are three years old?

Mr. Butterfield.—We feed the trees all the time in the clover.

D. A. Robnett.—I cultivated for fifteen years with poor success.

N. F. Murray.—The question is what objection to clover in a young orchard? There is danger of fire in the dry clover and it is a harbor for insects. One of my sons has had one hundred acres in orchard for five to nine years. He cuts up the clover with a cutaway disk harrow. This method promises well now. How long it will continue to do well I do not know.

Mr. Baxter.—I still insist that young orchards should be cultivated; but the older I get the less I know how to lay down an iron-clad rule. We have an orchard planted in 1895 that was cultivated in strawberries for several years. Another orchard, in bluegrass has not failed of a crop for ten years. I was the only one in my vicinity who had apples this year. Whether it was because the trees were not cultivated I do not know. I do not believe it is wise to cultivate trees after they are full grown. Our soil is rich. In southern Missouri I certainly would cultivate and keep as good a dust mulch as possible. In northern Missouri I would not cultivate.

C. B. Green.—If you can get the necessary mulch I think you need very little cultivation. We must be governed by the circumstance and adopt the methods that yield the best results.

W. H. Stephens.—A neighbor raised a large crop of fruit in his orchard in clover, but in a few years it was in blue grass and was soon gone. It was fifteen years old when he quit cultivating it.

Mr. Steiman.—Blue grass is very different from clover.

Cooper County Man.—We broke a rich grass sod and planted one year apple trees. The orchard was planted in corn with pumpkins in the tree row. The pumpkins made a fine feed for the hogs. It was also better for the trees than to have all the land in corn. I continued this for six years, leaving a wider space near the trees each year, till the whole ground was in pumpkins. The trees made rapid growth, but they did not bear. Judge Sam Miller suggested that I seed the orchard down to clover for a year or two, which I did. The result was after two years of clover that it began to bear and has not failed to bear since. I am satisfied it is good to cultivate in corn for several years, but to leave a space near the trees for pumpkins. I have since plowed up the clover, taking it from under the trees by hand culture; but I don't see any gain from cultivation.

Mr. Gladdis, Lafayette County.—Several years ago they planted the whole country to apples near Mayview in my county. After two years I planted my orchard entirely in pumpkins. They left the ground in fine condition. Later I seeded it down to clover. My orchard has done better than those of my neighbors. Sentiment in the Mayview district is running to clover, after six or seven years. They have too much humus in that rich soil to continually cultivate the trees. A hail storm this year ruined the fruit.

A Member.—I cut my trees off about thirty inches high making the heads eighteen or twenty inches. I use the pruning shears every year where I see a limb too close or crossing another. I thin them every spring. I continue till the trees begin to bear well; and nearly every year since they began to bear I have pruned some, cutting out the broken limbs, at least, every spring.

Mr. Luke, Wisconsin.—I have about 5,000 bearing trees. I am told to cultivate clean without any crop. My land is strong upland soil—rather an ideal location for Wisconsin. The trees are eleven years old. One man says prune, another says let it alone. I have not pruned. Clover does not last many years in Wisconsin. After clover we have solid blue grass. I would like to know what I am going to do. It is a little quandary, like being between the devil and the deep sea. I do not

know your conditions down here. I have grown some apples and expect to grow many more. Last year I seeded to clover and I will go back home debating whether I shall plow up the clover or let it go to blue grass. What shall I do?

Mr. Butterfield.—I am working for the money I get. Mr. Murray told this morning of an orchard which produced a crop of \$32,000 with good cultivation. I know an orchard of the same size that has been neither pruned nor cultivated which produced a crop worth \$36,000.

A. Chandler.—The friends must remember that clover is a biennial crop, living only about two years. Sow again is the only way to keep ground in clover. I believe in clover.

C. H. Dutcher.—If the clover is allowed to occupy the soil for two years it will reseed itself.

Mr. Chandler.—You must give the clover some help if you wish it to continue. Scratch the ground or work it with a cutaway harrow.

Prof. Craig.—I have been called a cover-crop crank. When we are considering the tillage and the cover crop question we are considering fundamental questions. In New York the majority of the most successful orchardists I know give clean tillage year after year; but we use some kind of cover crop which returns something to the soil and prevents waste of fertility in the winter. There may be cases in which orchards are making so much wood that a greater growth is not desirable. I think the danger of too much growth in New York is very slight. I would emphasize the point that we do need to cultivate. I think every tree needs tillage during the growing season. In 1898-9 I was in Iowa where thousands of trees were root killed. We are learning the evil of leaving the ground bare in the winter.

We will have to wait longer to see what will be the final result of Mr. Hitchings' plan of grass mulch without cultivation. His conditions are unusual. He has water near the surface, but it is not stagnant water, I am not decrying the results of Mr. Hitching's experiment. He gives us just what he has done. They are valuable for his conditions.

J. H. Hale, Connecticut.—I might almost rejoice if you Western men conclude to grow fruit with little or no cultivation. You would make less competition in the markets. Your soil and local conditions may have something to do with the question of cultivation. I have always found that every thing I have ever planted gave the best results where I have given the best tillage. I recommend summer pruning for too rapid growth. In the peach I would cut away the strongest growing upright shoots, leaving the weaker, spreading shoots to bear fruit. I want to give thorough tillage in the early months of the growing sea-

son, and seed down to some cover crop after the middle of the summer. I want culture every year, just when, how and how long may be a local question; but in heaven's name if you want success in the long future, don't let your orchards go to grass.

THE COST OF MARKETING—THE GAP BETWEEN THE GROWER AND CONSUMER.

(G. T. Tippin, Nichols, Missouri.)

The subject for this paper is a question of importance to the fruit growers of the country. As the object of papers of this kind is to bring the subject before you for discussion, and in order to be brief as possible, we have gone into detail on the marketing of the apple only. What is true in this case applies in marketing all our fruit crops and to a marked degree to all farm products. Within the past five years the cost of marketing a barrel of apples has increased in freights, labor and package, about twenty-five cents per barrel, amounting to ten million dollars on an average crop of forty million barrels annually. In discussing a subject of this character we should keep in mind two conditions:

First, that the selling price at the orchard to which all intervening expenses can be added without putting the price to the consumer beyond the reach of the masses may necessarily be so low as not to be profitable.

Second, the selling price of the fruit per barrel at the orchard necessary to insure a profit in production to which all intervening expenses being added would make the price to the consumer above the reach of the masses, thereby destroying distribution, and would be equally as disastrous to the business as selling at a loss in the first instance. Starting with one dollar per barrel at the orchard for number one fruit means three dollars and fifteen cents to the consumer on all apples stored. Over one dollar per bushel for the fruit and only allowing twenty five cents per barrel profit to the men who buy and pack our apples. Cost of apples \$100.00, labor and incidental expenses buying and packing, 25 cents; average freight per barrel to different markets, 50 cents; storage, 50 cents; shrinkage, 10 per cent., 25 cents; cost of barrel, 40 cents (and they cost 50 and 60 cents in many instances, this season) 25 cents per barrel profit. This puts the price to consumer beyond the reach of the majority of the people who consume our products.

The producer should and must receive a price that will give him a profit. The consumer must be able to buy within his reach or our market is gone. In view of the rapid changes of condition, we have every reason

to believe that things are more unfavorable ahead of us than they have been, and what we have to say here applies to the future and not the past. If, with a crop nine million barrels short of last year, the price of barrels advanced from thirty to fifty per cent., what may we expect with a crop of sixty to seventy millions of barrels such as we have had and are liable to have any year? Is there a scarcity of timber from which cooperage is manufactured that causes the shortage in barrel stock during the packing season each year? If so, we may as well turn at once to some other package, making up our minds that our apple crops must be handled in crates, boxes and baskets as the necessity of the case demands. We believe that it is going to become necessary to use what may be termed family or retail packages in order to market our large apple crops. Would not consumption be doubled if apples were put up in small packages like other fruits so the consumer could get them in the original package? If the advance in the price of barrels is due, as many think it is, to a pool or trust, "and I will say there are reasons for this belief," and there is plenty of timber, the remedy lies in the apple-growers of the country through the National Apple Growers' Congress or some organization to put machinery in operation cutting it into cooperage. We are not assuming that there is any trust, but we notice each recurring year that barrels can be had if we pay the advance in price. It is a question, however, if we could secure barrels at 25 cents each again, whether it is the package we should use. We are of the opinion that the extended distribution in a retail way necessary for the consumption of our large apple crops cannot be reached by the use of the barrel. It may be said that for storage and export trade we will have to use barrels. If only barrels are used for this it would relieve the barrel situation that much. Still would not a case holding half a barrel once in use be more satisfactory for storage and export?

Mr. Geo. A. Cochrane, of Boston, in some of his writings referred to the use of a case. We think this worthy of consideration and trial. "A case of two compartments that holds exactly one-half barrel of apples. In its finished state it is $28\frac{1}{2}$ inches long, $13\frac{1}{4}$ inches wide and deep (outside measurements). The two end pieces as well as the middle piece should be of three-quarters of an inch wood, and the sides, bottoms and tops should consist of three pieces of half inch wood. This case is a little too heavy to throw, or to try to walk it on its ends in moving it, consequently it has to be carried or trucked which insures its having more careful handling than the barrel or the smaller case or box.

The bushel basket, such as used in marketing peaches, were used quite extensively this season in Michigan. This basket has a good solid

cover. We think this a very good package for use in the fall during packing season, but not desirable for storing. The bushel box, the third bushel and even the fifth bushel basket should be brought into use. It is not our purpose to call your attention to all the advantages that might come to us in the use of smaller packages, but we desire to mention that a great saving would be made in hauling material of this kind in the knock down from the railroad stations to our orchards and in the making of it up by home help during idle times and bad weather which would forever free us from coopers' strikes. We would not antagonize organized labor nor organized capital. In all this talk about organized labor and organized capital the third man who is identified with neither is usually forgotten. It seems to be assured that the interests of only those engaged in what is termed the "war" are of importance, whereas in reality those of the third man in the aggregate far transcend those of both parties to the conflict. This third man, the producer of the country, largely outnumbers all others. There are about 30,000,000 men in this country engaged in what the census bureau calls gainful occupations. Of these 10,500,000 are engaged in agriculture. Not more than 3,000,000 belong to labor unions, and of capitalists there are not more than 300,000. All the rest are what is called average men or, as above designated, are third men. The 3,000,000 union men and the 300,000 capitalists form the upper and nether mill stones between which all the rest of the 30,000,000 engaged in gainful occupations and all the rest of the nearly eighty millions of people in the country are ground.

We are not impugning the motives of either labor or capital, but we realize that all increases in expenses, either in wages or operating expenses, of those who manufacture our raw material, or those who haul our products to the market, are paid by the producer either by the lowering of the price of the product, or by raising the freight rate on the same. We have a right, as the large majority party, to say we are getting tired of paying the fiddler and getting no revenue from the show. On this point some one may remark what are you going to do about it? I would simply say if we must continue to contribute all the profits of production to the manager of the show and they are not willing to meet us half way, that we take a lay off for a year and only produce what we need to live on from the orchard and farm cutting off the surplus tonnage for one party to haul and manufacture and for the other party to eat and wear. While this would be an awful thing to do and would be very foolish unless forced to do for self-protection, yet it is more sensible than lots of things we are paying dearly for. While this may seem a diversion in the discussion of this subject, yet the conditions



Apple tree 90 years old, 10 feet in circumference. Joe Rodgers, Independence, Mo. A section of which will be exhibited at the World's Fair, in Horticultural building.

referred to have a good deal to do with widening the gap between the producer and consumer. We are not saying that freight rates are too high, but, we cannot pay them. We are not saying that cooperage people are charging too much for stock, but, we can't pay it. We are not saying that coopers charge too much, but, we can't pay it, and we will have to make our own cases, boxes and baskets. It does seem just to us as producers that a barrel of 160 lbs. of apples produced on one side of our farm should be hauled as cheap as a barrel of 200 lbs. of flour produced on the other side of the farm, but the 200 lbs. of flour is hauled for less money than 160 lbs. of apples. The gap between the producer and the consumer must be narrowed some way so that the producer may receive a little profit without putting the selling price above the reach of the masses who consume our products. This is the great work to be accomplished, and when accomplished will enure to the good of all concerned.

DISCUSSION ON PACKAGES AND SHIPPING.

C. B. Green.—Could we not procure a plant and manufacture our own packages?

M. Butterfield.—One year when I could not get barrels I rented a room about as big as this and piled the apples in it about five feet deep. I did not lose five per cent. of them. I just poured them upon the floor. This may help some one out a little sometime.

Mr. Gladdis.—I do not pretend to be able to solve this question, but it is appalling the way we are wasting our lumber. There is room for economy in this direction. Just look how the barrels are destroyed, when empty! It is the same way with boxes. Some one has suggested that we might ship apples in flaring crates that could be nested and returned. The boxes I used this season cost fifteen cents. We ought to encourage the return of the boxes.

Mr. Richardson.—I think fruit growers should get together and tell the railroads they want lower rates. It costs five times as much to send a load of strawberries to Kansas City as it does to send a load of live stock. We may have to pay more for a car of strawberries than stock, but it ought not to be five times as much.

DISCUSSION ON PRUNING.

G. B. Lamm.—I find in my low headed orchard many dead and dying limbs which I have to take off. I prune out the limbs that are dying in the under part of the tree.

N. F. Murray.—It is impossible for a man to prune an apple orchard when it is young in such a way that it will not need more or less prun-

ing when it gets older. These lower limbs should be cut out. When the time comes we cut them out. From a 19 year-old orchard we cut loads and loads of limbs, and that orchard is now fine and healthy. It has produced one crop of \$40.00 per acre; one of \$140.00, and one of \$150.00 per acre. We cut the limbs off at their union with the tree. I never leave a stub and cut it again.

J. H. Hale.—I plant trees upon high land where they get fresh air. I believe trees should be properly pruned and tilled. When trees have been neglected they should not be too heavily pruned at one time. I believe in a little annual pruning of the tree. Paint the cut with a heavy coat of white lead paint. I do a certain amount of summer pruning, cutting out the stronger branches of the peach in the growing season. I am not as familiar with the apple. My apple orchards are of more recent planting. I give my five-year-old orchard a good pruning each winter.

Mr. Stewart, Rushville.—I hesitate to say anything upon the subject. I am what will be called a crank upon pruning. I eliminate every thing that should not be there. No man can successfully grow fruit upon a sickly, weak tree, or upon weak branches. My rule is to eliminate useless branches just as close to the body of the tree as they can be cut. I want to show that this can be done with practical results. I have cut off two thirds of the top of a fourteen-year-old Ben Davis tree with good results. In the summer also I remove useless limbs. In a badly infested tree-hopper orchard I cut away one-half of the wood, and the trees are now healthy and doing well. If a tree is healthy I can cut out one-half the wood and do it no harm. This could not be done with a sick tree. To get the best results apple trees should be kept open. My orchard treated in this way has borne five successive crops and has the promise of another crop.

ORCHARD EXPERIENCE.

(L. J. Slaughter, Grain Valley, Mo.)

Mr. President, Ladies and Gentlemen.—It seems, from the task your honorable secretary has placed upon me, that he wishes you, gentlemen, who have been in the fruit business for years and thoroughly understand the spraying and caring for trees, to now take your first lesson from a man who has had but little experience and knows comparatively nothing about the fruit business. This being the case, it leaves your instructor in a very embarrassing position, yet this being my task, I will give you

near as possible the treatment my orchard has received; believing other things are equally as essential to make a profitable orchard as spraying, I shall begin at the foundation and tell you as best I can the treatment this orchard has received to the present time.

I set this orchard in the spring of '95, the land then being in clover, this clover was left the first year, the trees hoed around for a distance of nearly three feet from the body of the trees, this space was left well pulverized and free from weeds. The second, third and fourth years the middles were broken with a turning plow and planted in corn, checking the corn so the rows of trees could be plowed both ways. This was done with a one-horse cultivator, wrapping the end of the single-tree near the tree rows and using all precaution to protect the bodies of the trees. The hoeing was continued same as previous years, since that the land has been in clover, mowing it twice during the season, each time mowing with a scythe near the trees where it could not be reached with the machine.

Next the pruning. These trees have been pruned once a year from the time they were set, keeping all water sprouts out, allow no forks, and always prune to keep the tree as well balanced as possible, cut out all limbs that interfere with each other.

Next to protect the bodies of the trees from rabbits and tree borers. I use a whitewash, applying it in April and in October. To a peck of lime, I use four pounds of sulphur, one-half gallon of coal tar, and one-fourth gallow crude carbolic acid. In spring I omit coal tar and use two gallons of soft soap. This I know to be a positive remedy against these pests.

Now to the spraying. I aim to spray from four to five times during the season. First before the bloom opens, second immediately after the bloom falls and at intervals of near ten days after that, owing to the season, I use the Bordeaux mixture exclusively, using five pounds lime, four pounds of blue vitriol and five ounces of Paris green to fifty gallons of water. My method of preparing this spray, is different from any I have heard of and may be called the lazy man's way, yet it has been tested for the last three years, and gives excellent results.

Before spraying season, I get quite a number of paper sacks, sizes to suit bulk I wish to put in them. I weigh out quite a number of them, placing five pounds of lime to a sack, four pounds of blue vitriol and five ounces of Paris green. I have my pump mounted on a fifty gallon barrel. I place two other fifty gallon barrels in my wagon; this makes up as much as we can use in a half day. I have a long strainer which I place over the opening in the top of my spray barrel. Before com-

mencing to fill my spray barrel I empty one sack of vitriol in the strainer, then pour the water through this strainer, until the barrel is near half full, then remove the strainer and empty one package of lime and one package of Paris green into the barrel, replace strainer and finish filling barrel; by this time the vitriol in strainer is near two thirds dissolved.

I then place the spray nozzle over the vitriol so that the liquid will pass through strainer and back into barrel, now putting the force of the spray against the vitriol soon dissolves it, and the agitator at bottom of barrel thoroughly agitates and mixes the spray.

So it takes but a short time to prepare fifty gallons of spray for use.

Next spring I will be compelled to make some changes in my spraying outfit, as I will have over six thousand trees to spray, but will prepare the spray as described.

This last spring there were a number of orchards in this vicinity troubled with the canker-worm, some of the trees being entirely stripped of their foliage, and the fruit in these orchards was of a low grade; these orchards were not sprayed.

This same trouble was in these orchards last year, while in my orchard there was no trace of the canker worm to be found.

My observation has proven to me beyond a doubt that the spraying has enabled me to keep my orchard rid of the insects and fungus pests. A great many people seem to think that their orchard should receive no attention unless they can see prospects of a paying crop in sight, then do but little until picking time, then should the fruit be of poor quality and the number of bushels less than expected they are ready to condemn the orchard business, and to show how willing they are to do their part, they will gather this fruit in the roughest manner possible, then turn in their cattle, horses and sheep to graze the orchard until another bountiful crop will be expected.

This is quite a mistaken idea of the way a profitable orchard should be handled, and the men that expect to handle an orchard in this manner, I would advise them the first time they plow their orchards to place a heavy chain on their plow and see how neat a job they can make of turning their trees under. This would save much future disappointment.

In conclusion would advise good cultivation, regular pruning and thorough spraying and the results will be gratifying and profitable.

DISCUSSION ON SPRAYING.

J. H. Hale.—There is some lime so good, clean and pure that it slacks with no grit or sediment, and may be successfully used in the spray pump without straining; but that kind is very rare. We have had some of it from Tennessee which we used in our Georgia orchard.

Mr. Steiman.—Is it best to spray little trees with the barrel sprayer?

Sec. Goodman.—I would use a small duster upon little trees. We add one pound of Paris green to twenty pounds of lime dust.

C. H. Dutcher.—In mixing lime with the copper sulphate what proportion would you use? I have not tried to make Bordeaux dust. I have bought it in the powdered form, using one pound of Leggett's powder to twenty pounds of lime dust at first, and later one pound to forty of lime.

Mr. Chandler.—I would not slack the lime with the copper sulphate solution.

Sec. Goodman.—That would destroy the effect of the mixture.

C. H. Dutcher.—Lime and copper sulphate ground together in a dry powder proved effective.

Mr. Johnson.—We have tried to get a dry Bordeaux in which the copper sulphate is held in suspension till it goes to the tree. We are after information.

Mr. Baxter.—Dry dust is a good insecticide, but not good fungicide. I say the liquid spray is the proper thing for fungus diseases. By means of it I controlled the grape rot completely for thirteen years, upon five hundred acres, never losing a crop in the thirteen years. If you try to prevent grape rot with dry dust you will fail. I have not tried it and I don't want to try it, for I know it will fail. I believe Mr. Moore of West Virginia claimed that he saved his grapes by dusting them, but I don't believe it until it is proved by repeated experiment. A young man who had worked for me leased a vineyard from a man who had lost his crop by rot for several years. He was ready to dig up his vines. The young man sprayed it carefully and gave it good culture and had a fine crop of grapes except upon two rows which he left without spraying. These two rows had no grapes at all upon them.

LETTER ON PEACHES IN NORTH MISSOURI.

St. Joseph, Mo., December 7th, 1903.

J. M. Irvine, Esq., St. Joseph, Mo.:

Dear Sir—Regarding peaches in Northwest Missouri, you can say that in the bluffs on the Missouri river from Boonville to the Iowa line there is no better locality in the west so favorable for peach growing. There is something in our soil that is adapted to peach growing which produces the most perfect and finest flavored peach

grown. Like all crops they require cultivation and the more the better. From my observation as a resident of this locality since 1867, I have known of fourteen peach crops in the past thirty-two years and nearly all profitable ones.

I suppose our mutual friend, Mr. J. H. Hale, will enlighten all on the cultivation of the tree. I have followed his advice on these lines as closely as I could and his vast experience and knowledge of the business leaves but little one could say. We have planted our orchards 13x13, giving 260 trees to the acre, pruning closely, and will thin our fruit closer now than we have ever done. Our crop was light this year and as a result our peaches were as large as Ben Davis apples. We like a low head and have our trees spread out as much as possible. In this way the expense of gathering is much less, and trees set 13x13 and headed back are less liable to be broken down by heavy winds, and they form a wind break and protect each other.

In planting an orchard for commercial purposes in Northwest Missouri, would plant for a successive crop Carmens (which with me have proved to be nearly the equal of Elbertas in size and as prolific) Champions, Crosbys (if you will thin them) Elbertas, Chair's Choice, Stump the World, Fox Seedling, Salway, Pickett's Late and Heath cling. These have all done well with me and are good prolific peaches.

Yours very respectfully,

F. P. HALSEY,

THE PEACH IN NORTH MISSOURI.

(H. W. Jenkins, Plattsburg, Mo.)

North Missouri is not looked upon by fruit men generally as a peach country where it would pay to go into the business of trying to raise peaches extensively. Yet I think when the specimens that were put up this fall for the World's Fair exhibit, grown in Platte county by Mr. Gano and others, are shown to the public it will have to be admitted that North Missouri can produce peaches even in an off year, and while the peach may not have the commercial value in North Missouri that it has in the Ozark region, yet very few fruit growers would consider their orchard complete if they did not have some peach trees growing, for when they do bear the fruit is equal if not superior both in size and color and flavor to anything that comes from the south land. Better peaches don't grow than are grown

along the bluffs of the Missouri river. It is true enough that failures come, sometimes several in succession; already now we have had two successive failures. But these disappointments only whet the appetites of the consumer so that when a crop comes they taste so good and look so tempting that we simply cannot do without them, and people will continue to plant regardless of failures. But it is a singular thing that whenever it is discovered that the crop is winter killed right then and there the sale for trees that spring practically stops and planting of peach trees does not resume its normal condition until another crop is assured. Curious things us people are! But speaking of failures in North Missouri, do they not come in South Missouri, in Georgia or Texas, Delaware and Michigan? Perhaps not as often, yet they come. One peculiarity of our failures in North Missouri, they hardly ever come from spring frosts; if your buds get through the winter safe we are nearly sure of a crop. Now for a few points on the growing of a peach orchard, the varieties, etc., and I am through.

In North Missouri, as every place else, the peach orchard should be planted on good land on an elevated location, north or eastern slope. Trees should be well cultivated each season. Of all the fruit trees the peach should be the best cultivated and kept growing, forming new wood and kept headed back each season, keeping the tops low and within bounds.

The borers are a great enemy of the peach tree and all trees should be gone over twice each season and the borers taken out. A great help to keep away borers is to keep the ground perfectly clean of all weeds and grass around the trunk of the tree. To meet with success in growing peaches is to be careful in the selection of varieties. Do not plant but very few of the real early ripening varieties. Plant the bulk of your orchard in varieties that will ripen from August 15 to October 10. The following list will cover that season and is sufficient for all purposes. Plant enough of each variety to do some good; if you can only plant a few trees cut out the varieties. The following have done well for the writer at Boonville: First, Champion, next Elberta, then Henderson, Stump the World, Dewey Cling, Heath Cling, Smock and Salway. For real early, Sneed, Triumph, Alexander and Foster. What will succeed best at my new home, Plattsburg, I can tell better later on.

PEACHES IN SOUTH MISSOURI.

Koshkonong, Mo., October 20, 1903.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir—Replying to your favor of the 12th instant will say I feel that I am not a competent enough writer to undertake to write a paper on any phase of the peach business. I am very sorry for this, because I feel a deep interest in the work of the Missouri State Horticultural Society, and would be pleased to be able to contribute to its usefulness.

The commercial side of the question is all I know anything about. I know nothing about diseases of peach trees or remedies for diseases; I know very little about pruning except that I have learned to do very little of it. I know how to keep the soil in condition best adapted to peach culture, but don't know how to tell it in a paper before the society. I am sure the peach business is profitable to a man of ordinary intelligence who has patience enough to wait for a crop. I am sure the peach business is very hazardous to the man who is visionary and full of figures, but who lacks patience. I deserve no great credit for what success I have made in the peach business. I went into it blindly, but after getting what capital I had invested in it, I was forced to make some money out of it or "go broke." If you will pay our orchards a visit they will tell of the mistakes I have made as well as the right things I have done better than I can tell it. Wishing you a successful meeting, I am

Yours truly,

T. M. CULVER.

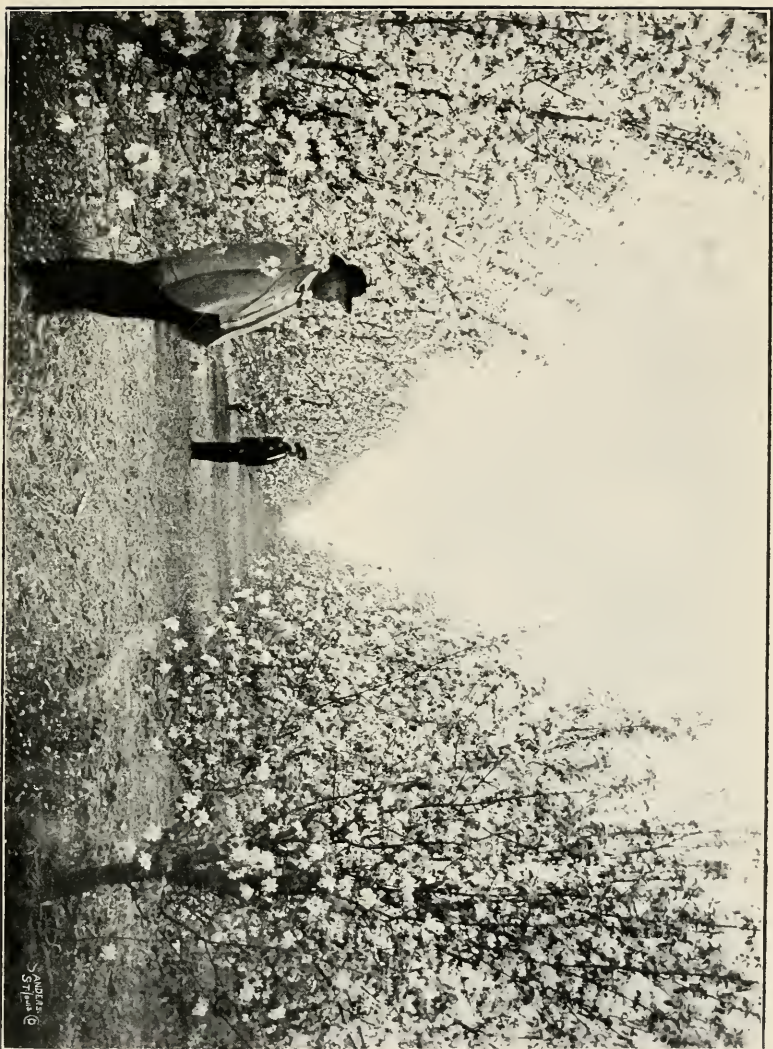
BEST VARIETIES OF PEACHES.

(G. L. Sessen, West Plains, Mo.)

To the Members of the State Horticultural Society:

From a commercial standpoint, I would plant nothing but Elbertas in Howell county. It succeeds in all localities and in all kinds of soil, rich or poor, better than any other variety of peach. The markets all demand Elbertas, we get better prices for Elbertas and the yield from this variety is enormous. From Georgia to Michigan and from Texas to Colorado peach tree planting is mostly of Elberta.

If we should plant St. John, Mountain Rose, Family Favorite



T. M. Chinn. Apple Orchard in Bloom. Mayview, Mo.

and other varieties in their season we find in the market Texas and Arkansas Elbertas to take the top prices. Then when the Salway, a fine peach in its season, comes in the market, we find that Elbertas from Colorado and Michigan are still in the lead.

I find by experience that the Elberta season can be prolonged fully two weeks by cultivation, which would give it a season of nearly four weeks. Without plowing the orchard in the spring the peaches will ripen earlier, and will be of high flavor, but not so large. One good plowing in the spring will make the peaches larger and they will ripen a week later. A thorough cultivation, five or six plowings, during the season before ripening, will cause the peaches to bear two weeks later, give the tree more growth and foliage and the peaches will be very large, more juicy, but not of much color and liable to rot in wet weather. By all means plant the Elberta in the Ozarks.

DISCUSSION OF THE PEACH.

Mr. Atwood.—I visited Mr. Culver not long since. He told me of getting from 27,000 trees \$22,000 worth of peaches in one crop. He has now 240 acres planted to Elberta peaches. Some of his land is so stony that he has made arrangements with the 'Frisco railroad to supply them with crushed stone for ballast. In this way he clears his land and gets paid for his labor.

Mr. Gano.—I have not written a paper upon peach varieties, but in the first place I would avoid the whole Hale family in peach growing. None of them are profitable. Here is the list for family use which I would plant: Early Rivers, Troth's Early, Mt. Rose, Family Favorite, Carmen, St. John, Reeves, Early York, Champion, Capt. Eads, Elberta, Crosby, Keyport White, Pickett's Late, Salway and Henrietta. Wilkin's Cling is superior to the old Heath if you want a late white cling.

J. H. Hale.—Mr. Gano's list is an excellent one. If I were to grow only one peach for home use it would be the Champion. It is extremely hardy in bud, always inclined to overbear, and hence needs thinning, and is of delicious quality. It is going to be one of the most profitable peaches in the country. I am a peach crank. That is my favorite branch of horticulture. There has been a tremendous peach craze for the last few years. There are already more than 18,000,000 peach trees in the State of Georgia, and from 3,000,000 to 5,000,000 more will be planted before next spring. There have also been very heavy plantings in Alabama, South Carolina, Texas, Ar-

kansas and South Missouri. If they had all chosen good market varieties ripening in succession it might not be so bad, but they are all planting Elberta and the whole thing will go to smash as soon as all these trees come into bearing. I was foolish enough to plant 60,000 Elbertas in my Georgia orchard of 300,000 trees. The most profitable varieties are the same north and south. Our old sorts were mostly of the Persian type, but they are being superseded by the North China type, of which Elberta and Chinese cling are examples. Waddell, Hiley, Carmen and Belle of Georgia are all of this class, and all profitable kinds to grow, only the Carmen is very susceptible to the rot. Waddell is earlier, of delicious quality and will stand up under adverse conditions. Belle of Georgia is white with red cheeks, and is very profitable. Hiley is of the same type, but smaller. Greensboro is the best of the very early kinds. Chair's Choice, of the Persia type, is the best to follow Elberta. Matthew's Beauty is a poor type of Smock. Crosby and Hill's Chili are hardy in bud, but are usually small and woolly, not handsome. They require careful culture and close trimming: under such favorable conditions a Crosby tree bore the largest peach I ever saw in my life. I grow Chair's Choice rather than Salway, which is too late for my latitude. Triumph is too subject to the rot. Don't plant it for profit.

Mr. Baxter.—In our part of Illinois we have a peach called Chalmer's Yellow Free, earlier than Elberta, large size and better quality. This year we had a thousand bushels of Chalmer's to ten of Elberta. It approximately reproduces itself from seed.

WEDNESDAY—8 P. M.

Wednesday night's session was one of the most interesting of the meeting. The new horticulture building was dedicated, the addresses being by Prof. Craig and Mr. Hale. Dr. Jesse, president of the University of Missouri, presided, and Prof. Mumford, acting dean of the Agricultural College, introduced the speakers. Both of the visitors referred in the highest terms to the work in horticultural lines which is being done in Missouri, and the whole affair was a most pleasant dedication service.

After the addresses Dr. Jesse declared the new building dedicated to horticulture and the allied sciences of botany and entomology.

UNIVERSITY WORK IN HORTICULTURE AND RELATED SCIENCES.

(John Craig, Professor of Horticulture, Cornell University, Ithaca.)

Agriculture is the dominant force of this great empire. If agriculture thrives, business life throbs, with vitality; if agriculture languishes, material life weakens and degenerates, says a prominent writer. Agriculture is the original, natural, necessary, single and universal business of mankind, says Kerrick. "There is nothing before, nothing higher, nothing beyond agriculture." The character of agriculture of any country more nearly expresses the advancement of civilization of a country than any other means of comparison. We may further admit that horticulture is the refinement of agriculture; therefore, the development of fruit and ornamental plant culture in any country may be looked upon as an accurate indication of the culture and refinement of its people.

Where does Missouri stand in the role of the great agricultural commonwealths of the Union? The twelfth census tells us that Missouri is the fifth State in the Union, graded upon the basis of agricultural wealth. The same census tells us further that, in acres of improved land, Missouri leads all but three States, having more than twice as much improved land as all New England with New Jersey and Delaware thrown in. In the number of farms, Missouri is exceeded by only one State in the Union. In fruit growing, the position held by Missouri is one of commanding importance, and if I can read aright the signs of the times, she has but made a small impression upon the vast possibilities concealed in the lap of the future. The census again tells us that in production of nursery trees, her position is eighth; in orchard products, eighth; in forcing fruits, flowers and vegetables, ninth; in number of bearing peach trees, eighth; in number of bearing apple trees, first, or 200,000,000. In the face of these facts, it is not surprising that Assistant Pomologist Taylor of the United States Department of Agriculture, should prophesy that the next ten years will see the apple bin of the United States moved from the east to the west of the Alleghanies.

The completion of this structure dedicated to horticultural teaching, horticultural science and allied sciences of botany and entomology at once places the State on record as a commonwealth appreciative of its inevitable destiny and mindful of the cultural influences of plant

studies. The day is past when men who study art and literature are considered the elite of the cultured set. The time has come when any object, however lowly, can be made a means of education; when a study of the unfolding of the apple blossom is known to possess as great pedagogic value as the critical examination of a Greek syllogism. The time is coming—perhaps here—when pigs and peaches may be regarded as no less divine than Latin and logic. The opening of this building premises a sound conception on your part of this change in pedagogic point of view. And is it not a happy metamorphosis? Why should not a State with over a quarter of a million farms, and certainly over a million people living on farms, make the fullest endeavor to teach these people in the terms of their daily lives? And these terms are the soil, the plant, the animal. Will not this new teaching bring greater contentment than the old? Will it not raise up men and women who will advance agriculture in proportion to its importance as a producer of national wealth and a bulwark of national capital? For we know that one-third of the population of the United States work the land, and the other two-thirds live by reason of this fact. The colleges are teaching how to grow crops. In the future the burden of teaching must be shifted from the crops to the man who grows them. Bailey says the voice of the school house will say:

"I teach
 The earth and soil
 To them that toil
 The hill and fen
 To common men
 That live just here.

 "The plants that grow,
 The winds that blow,
 The streams that run
 In rain and sun
 Throughout the year.

 "And then I lead
 Thro' wood and mead,
 Thro' mould and sod,
 Out unto God.
 With love and cheer
 I teach!"

The pedagogic point of view must be shifted from the crop to the man.

The horticultural field bristles with problems; the management of plants; the treatment and control of plant diseases; the prevention of insect enemies. Our efforts in these directions are often painfully feeble, lamentably superficial and ineffective.

Why is one soil fertile and another barren? Most soils contain plant food enough, but do we know how to make it available to the plant?

There are problems in production. Some orchards yield well, others are unproductive. The same varieties, apparently the same soil, with similar treatment.

There are great problems in plant development. We need better fruits. The old varieties have been vastly improved, but the new are not perfect. Who will give us a Ben Davis in appearance and productiveness, with a McIntosh flavor? Who will come forward with a Concord in vigor and yield a Golden Chasselas in quality? How much would a gift of this kind be worth? Who has estimated the value of Ephraim Bull's benefaction to mankind, or Gideon's gift of the Wealthy apple to Minnesota and other northern states? Have you, men of Missouri, given due meed of praise to the faithful and patient investigators of your own State—your Miller, Rommel, Jaeger. Zellner, your Evans, Goodman, Gano?

Let us glance for a moment at the relation of plant-breeding to wealth. Professor Hays of Minnesota estimates the world's wheat crop at 2,500,000,000 bushels, grown on 125,000,000 acres, at twenty bushels per acre. Ten years' effort of the Minnesota Station produced a variety of wheat yielding twenty-five per cent. more grain than its parent variety—the best variety grown in the state. Twenty-five per cent., or five bushels per acre, would add to the world's supply 625,000,000 bushels at eighty cents per bushel equal to \$500,000,000 each year. If breeding will increase the yield five per cent., nay, as much as one per cent. per acre, there would be an annual increase of \$100,000,000, or in ten years an increase of 1,250,000,000 bushels.

Plants, annual biennial and perennial, are in a constant state of mutation (change). Man, the gardener, must ever be alert to take advantage of favorable variations, and the struggle for economic improvement constantly needs assistance.

FEDERAL AND STATE ASSISTANCE.

We hear much of the vast enterprises of the Federal Department of Agriculture and the great sums of money being expended to further the industry. The sums now expended in behalf of agriculture would make our forefathers stand aghast. But after all have they kept pace with the other expenditures? Let us look at some of the figures. In 1903, the government expenses amounted to almost \$600,000,000. What share of this did agriculture, the foundation of all wealth, receive? \$4,579,990. We may compare this appropriation

with those given to other departments. The United States is supposed to be a peaceful nation, yet the same year the War Department spent \$114,657,246—about twenty-five times as much as for agriculture. The one fosters production, the other destruction. In addition to this, the Navy Department received \$68,303,025, a total for the war side of \$184,960,271. Just think of \$180,000,000 more for the fighting side of our national life than the peaceful side of agriculture and kindred industries! Given a tithe of this sum for a period of years, what magnificent work might not be accomplished in agriculture! In 1900, \$20,500,000,000 of capital were invested in agriculture; the annual output was \$1,470,000,000.

Fruit growers and farmers, compare the figures for national defense with those for national development upon a sure foundation of a sound and stable agriculture, and well may we ask, when will agriculture come to her own?

THE PAST AND THE PRESENT.

But there is abundant reason for congratulation. In the early days of scientific investigation, the individual labored alone, unaided by state or community. His theories were assailed on every side; his discoveries were met with derision. His light went out when he died. There was no pupil, no institution to develop his discoveries and immortalize his name. There was no continuity of effort. How impressive is the change that has come over the face of scientific research! How significant the difference in the attitude of the now expectant public! Notwithstanding the striking transfiguration, the conditions surrounding the investigator are not always ideal, even in this twentieth century. There are places where, instead of working in an atmosphere charged solely with the investigational and pedagogic spirit and freed from petty executive trammels and financial annoyances, his every step must be attuned to the key set by local or State politics. No man can do good work who is obliged to work with one eye on the plant or crucible, and the other on the political barometer. To do good work, the investigator must give his undivided attention to the problem before him, and then he must possess certain fundamental requisites. The first essential of every investigator is absolute unswerving honesty. The next is scrupulous exactitude; and a third should be a free, open and unbiased mind. Given these three, coupled with an inborn spirit of investigation for the love of truth, backed by a generous support, moral and financial (for men must live), what a cheering expanse opens before the scientists.

We have reached a time in the history of horticulture when some of the great underlying problems must be attacked, problems which may need more than a man's lifetime to solve—when the continuity afforded by a State institution is needed to insure their completeness. We have reached an era when patience, skill and perseverance are, more than ever, a part of the investigator's capital; when considerate patience is expected of the fruit grower. The day of superficial experiment and hasty result is past; the period of slow, but sound, fruition has arrived.

I would enter a plea, then, for a fuller consideration of the substantial needs of horticultural science as it stands today. Give its devotees opportunity—free untrammelled opportunity—to investigate fundamental questions, expressing no impatience though five or fifteen years instead of five months are required to solve a problem. They need more than opportunity; they need more than financial support. They need your counsel, your loyal support and your encouragement. The promise of all these is amply vouchsafed by your presence and your interest, which have made possible the erection of this building.

CO-OPERATION BETWEEN FRUIT GROWERS AND EXPERIMENTERS.

To bring forth the fullest fruition, this must be of the close and personal kind. Co-operation of the best type is possible when sympathetic relation between farmer and scientist are developed and sustained. The experiment stations of this country sprang into existence, mushroom-like, on the passage of the Hatch act. The responsibility of speedily justifying their existence pressed heavily upon many of them at first, and perhaps the obligation was driven home by their farmer constituents with the result that here and there undigested bulletins were offered to an expectant and subsequently disappointed public. Fortunately, the experiment station is approaching a basis of action at once stable and satisfactory. There is, in the main, no longer the feverish desire on the part of the experimenter to rush into print, nor impatience on the part of the beneficiary for the results of loosely conducted experiments. Both fruit grower and investigator alike realize that he who deals with the soil, plants and animals works in a realm fraught with exceeding great difficulties, because he is studying living things. Life forces are in constant mutation, and the problems connected with the phenomena of life are vastly more intricate and difficult than those of the abstract sciences. For this reason, more skill and patience are required. Let us realize this. Let us live up to our knowledge.

The dedication of this building is more than a matter for mere congratulation. It is a significant step in the progress of horticulture in this State. A great master in the arena of scientific research has said that "Laboratories and discoveries are correlative terms. Suppress the laboratory, and the physical sciences will become the image of sterility and death. Henceforth they will be only sciences of instruction, restricted and powerless, not sciences of progress and with a future. Demand that they be multiplied and equipped. They are the temples of the future wealth and of well being. It is there that humanity develops, strengthens itself and grows better." But given the most elaborate of workshops, the most complete of libraries, something yet may be lacking. This temple of science must have its high priest. The work of the laboratory must be quickened; the dry pages of the text-book must be illuminated by the man, the teacher. For behind all must be the man, the brain. He must furnish the motive, the stimulus and the inspiration. No matter how perfect the machine, how large the endowment, it is of no avail unless guided by a master spirit. In the final analysis, it is the man that must be relied upon. In America, as elsewhere, the highest product can never be things—must always be men. I venture to believe that this statement meets a responsive chord in your hearts. It is a pleasure for an outsider like myself to have an opportunity of testifying to the spirit of progress and enthusiasm which is recognized as an integral and characteristic part of the work of the horticultural and related departments of this great University.

Fruit growers of Missouri, you are to be congratulated on the quality of the work given to the world by the departments of your college and experiment station which bear upon your life efforts. The publications you have received are the kind that add permanent contributions to the sum of our knowledge of natural science. They have explored new fields, they have shown originality of conception and ingenuity of execution, and the findings are marked by the quality of practicability, so important to the grower. To you of these departments, congratulations are also due, that the completion of this imposing laboratory expresses in large measure the interest and cooperative aid of your brethren in the field. It demonstrates a unity of effort and a coherence of idea between field worker and laboratory worker, without which an institution of this character fails lamentably of accomplishing its great mission in the broad field of farm husbandry. This building stands for the advancement of horticultural and kindred sciences and the promotion of the teaching. You of the Departments of Horticulture, Botany and Entomology are the instru-

ments whereby the program of the future is to be executed. May the fullest success attend your efforts, and the fruits of your labors will assuredly bless the State.

THURSDAY, DECEMBER 10—9:30 A. M.

After the call to order by President Robnett, the Rev. Thomas made a short talk and offered prayer.

Delegates Dr. T. J. Burrill, dean of horticulture, Urbana, Ill., was introduced to the society; also Mr. R. M. Kellogg of Michigan.

To Whom It May Concern:

This is to certify that Hon. R. M. Kellogg of Three Rivers, Michigan, is the accredited delegate of the Michigan State Horticultural Society to the Forty-sixth Annual Meeting of the Missouri State Horticultural Society, held at Columbia, Missouri, Dec. 8, 9 and 10.

Attest:

C. E. BASSETT, Secretary.

THE AMERICAN POMOLOGICAL SOCIETY.

(J. M. Irvine, St. Joseph, Mo.)

As your delegate to the last meeting of the American Pomological Society, held at Boston in September, 1903, it becomes my duty and pleasure to tell you something of what I saw and heard while there. I am glad we have the new president, Mr. Hale, and the new secretary, Mr. Craig, here with us today. I think they are here to secure votes for the next election.

There were only a few western men present at the meeting. Perhaps Boston is too far away for western men to attend, but I think they lost something worth while by not attending.

There was a nice show of fruit. The exhibit made by the Minnesota Horticultural Society was especially noteworthy. They are making great effort and progress in finding and producing new apples suited to their cold climates. We certainly can do some work along the same line. These seedling apples were the finest there except some from Quebec. I was surprised to find the Quebec apples of such high color. They were brilliant, while the New York apples were much lacking in color.

There were many interesting papers read and discussed.

The Wilder medal was given to the Hiley peach which Mr. Hale has given us in the list of most profitable peaches. There were a number of other new fruits, but the medal was not awarded to any of them. It was thought best not to give a medal to new fruits which have been grown and tested in only one locality. A wonderful new strawberry, the Cardinal from Garrettsville, Ohio, was shown by Mr. M. Crawford.

Prof. Waugh's paper on judging fruits by score cards and including the plant may make a new era in fruit shows. Mr. Van Deman called attention to the fact that at the New Orleans cotton exposition the citrus fruits of Florida and those of California were shown at different times and hence could not be compared with each other directly. Hence the necessity of a score card. Waugh's paper upon the subject was most excellent. One reason why it took so well was because it hit the Ben Davis apple so hard. I think Craig and Hale should be locked up in a room and made to eat a Ben Davis apple or two apiece to show them that a Missouri Ben Davis is fit to eat.

Prof. Craig.—I have an engagement next week that I would not like to miss.

Mr. Hale.—You need not lock me up. I have been here a day or two and have not been able to get an apple of any kind to eat, although attending a meeting of the State Horticultural Society of a State that boasts of twenty million apple trees.

Mr. Irvine.—Mr. Waugh called attention to a score card from Ontario in which thirty points were given to quality. He thought that was too much for quality alone and not enough was given to shipping points.

J. H. Hale was elected president; John Craig, secretary, L. R. Taft, treasurer; and Col. J. C. Evans, vice-president for Missouri.

A committee was appointed to recommend a score card. I think it will be adopted and will be of special value to experts so they can see the differences in their fruits. I think ultimately we will have a score card for each species of fruit and perhaps for each variety. I think the meeting will be held nearer home next year and I hope there will be a good attendance of western members.

J. H. Hale.—I want to indorse everything Mr. Irvine said. The American Pomological Society is the great representative of the fruit growers' interests of America. It rounds up the final points from all over the country. We wish we had more members from Missouri. The new catalogue of American fruits, upon which the

society is now engaged, will be a most thorough and valuable work. Every fruit grower should have it.

Col. Bracket's History of Horticulture in the Middle West should be in the hands of everybody. "The Ideal in Horticulture" is a little gem. One man said it alone was worth one hundred dollars to him. I am sorry to say that the society has less than fifteen members in Missouri. It is possible we will have a special meeting in connection with the World's Fair in St. Louis next year. Prof. Craig and I are going to St. Louis to-morrow morning. If we have a meeting there next year, Missouri ought to have five hundred biennial members and at least two hundred life members.

Mr. Powell.—I have something upon my mind in regard to the study of psychology. When I was in the University, we learned that a man's conscience might be alert and correct in some things and altogether callous and wrong in other things. I would like to know what kind of a conscience a man can have who is always declaiming against the Ben Davis apple and then proceeds to market the product of 300,000 Elberta peach trees in New York.

Mr. Craig.—I would like to say that everything friends Irvine and Hale have said of the American Pomological Society is strictly true. That meeting in Boston was an epoch making meeting. Every fruit grower in the country should have the report of it in his library. Every man who has it will have something of real value to practical horticulturists. This is especially true of the historical side. It has something of inspiration for the east, the middle west and the Pacific coast. If the St. Louis meeting is held we will have something of definite value. We shall have an opportunity to study varieties and their behavior in various localities, superior to anything we have ever had.

Mr. Baxter.—Senator Dunlap of Illinois, who was commissioner of horticulture at the Paris exposition, reported that at the sale of fruit at the close of the fair the Ben Davis apple brought the highest prices.

Letters and invitations were read by the secretary.

Washington, D. C., November 11, 1903.

Mr. L. A. Goodman, No. 4000 Warwick Boulevard, Kansas City, Mo.:

Dear Friend Goodman.—I have just returned from a western trip and find yours of the 31st ultimo awaiting me. In reply I will say that I am having a great many calls from the different State Horticultural Societies for some scientist from this office to attend their meetings. I have just had a consultation with Prof. Powell, in charge

of cold storage investigations and he has consented to address your meeting on the second or third day of the session. As you have one of the largest societies in the country I am making this a special favor for you. I suppose you are aware that the expenses of a scientist sent from the department have to be borne by the society. If these terms are satisfactory to you Prof. Powell will be on hand at the appointed time. His subject will be along the line of Cold Storage of Fruits.

Hoping you will have an interesting and profitable meeting and with my best regards, I remain

Yours truly,
G. B. BRACKETT, Pomologist.

Columbia, Mo., Dec. 9.

To L. A. Goodman, Secy. Mo. State Horticultural Society:

I regret extremely my inability to attend your meeting. Please convey my compliments and wish for an interesting and profitable session.

F. W. TAYLOR.

Grand Rapids, Mich., Nov. 3, 1903.

Secy. L. A. Goodman—Your favor at hand this morning. I did miss you at Boston, but the next best thing was your paper which came all right and helped make the evening of ideals the most attractive program ever enjoyed for a single session of the society. At least this was the tribute paid to it by the veterans. How I would like to be with you at Columbia in December, and I thank you for remembering me. The truth is, as I get older, I find it impracticable to lead quite so strenuous a life, and a lot of things have to be eliminated that I would enjoy doing. I would especially like to go to Columbia, because Prof. Mumford is one of my favorite boys, and I would enjoy seeing him in his own field of work. Then there are so many old friends who will be gathered at the meeting and it would be an unalloyed pleasure again to grasp their hands. But I am not very strong and I have some home responsibilities which I have great anxiety about. My own mother and Mrs. Garfield's are very aged people and very frail recently, and I shall confine my engagements to places from which I can return at night. With regrets and sincere personal regards and good wishes for your anniversary meeting, I am,

Yours sincerely,

CHAS. W. GARFIELD.

Columbia, Mo., December 10, 1903.

D. A. Robnett, President Missouri State Horticultural Society:

Dear Sir—I take pleasure in tendering to the State Horticultural Society an invitation to visit the Herald office during their session in Columbia, either individually or collectively.

Very respectfully,

E. W. STEPHENS.

Invitation was also extended to any members of the society so desiring to visit the rooms of the State Historical Society, by

F. A. SAMPSON, Secretary.

Moberly, Mo., Dec. 8th, 1903.

Mr. L. A. Goodman, Secretary State Horticultural Society, Columbia, Mo.:

Dear Sir—It is the desire of the Moberly Commercial Club, as well as that of all the citizens of Moberly, that your society meet in Moberly in 1904. We will consider this a great honor to have you do so and assure you that nothing will be left undone to make this your banner meeting. You will have free access to our spacious club rooms during the time and all other privileges of our little city. Kindly present this to your society, and we will thank you to do all that you can to bring the next meeting to Moberly.

Very truly,

C. B. CLAPP, President M. C. C.

P. S.—We would prefer the winter meeting.

Hannibal Mo., Nov. 24, 1903.

Mr. L. A. Goodman, Secy. Mo. State Hor. Society, Westport, Mo.:

My Dear Sir—I enclose you a copy of the resolution passed at St. Louis and which I have sent to Secy. Wilson. I am sending this to the various states for presentation to their meetings and I hope that each society will take action on the matter. I would be glad to have you present the resolutions at your meeting in Columbia for consideration. It is not certain at this time that I can be with you, but I am greatly in hopes that I can.

Very truly yours,

T. C. WILSON.

Whereas, American apple growers and exporters have sustained much inconvenience and loss from the rejection of American apples by officials of the German government on account of the alleged infection of the fruit with the San Jose scale, and

Whereas, It is believed that this rejection is largely a subterfuge on the part of the German officials to discourage the importation of American apples, and

Whereas, It is a well established fact that there is no danger whatever from infection of orchards from fruit infested with scale, therefore be it

Resolved, That it is the sense of the American Apple Grower's Congress that our Department of Agriculture furnish some system of inspection either of the orchards or of the fruit before leaving the port, and be it further

Resolved, That the department try to convince the foreign authorities that there is no danger of infection of orchards from fruit infested with the scale.

Holt, Clay Co., Mo., October 19, 1903.

Mr. L. A. Goodman, 4000 Warwick Boulevard, Kansas City, Mo.:

Dear Sir—Received card announcing meeting at Columbia. I am intending to be there if able. But there is one subject that I have become much interested in, and that is blue grass sod keeping down some fungus diseases in orchards. The only apples I have seen this season clear of scab are in an orchard with very heavy sod. I have one tree standing in very heavy sod for several years; while every tree in the orchard is affected with scab this tree is entirely exempt.

I have an old Willow Twig tree which has borne apples entirely worthless from rot. So this spring I bored a hole in each side of it and put in an ounce of calomel and drove pins in the holes. Result, as fine a tree of apples as one would wish to see. I got some very fine show apples off it. Question: Which did it, the holes or the calomel? Now another question, when you read from some facile pen telling some old farmer how to raise strawberries he generally begins and ends up with manure. So the old farmer gets disgusted and don't plant; he wants his manure for his corn and hogs. Now all this makes me very tired. Spring before last I planted some strawberries on land that will not make ten bushels of corn with the best of cultivation. Result, the finest and best crop of berries I have ever grown; they beat anything on the place, and that isn't all, the same vines have been having ripe berries for the past month and plenty big green ones, and some blooms now; they are Clydes and Haverlands.

Perfect apples, it is very hard to find them. I have some 600 bushels, but 19 out of 20 are freckled-faced, and like the freckle-faced

girls, while it doesn't hurt their value or quality, I should have said they are not fit for show purposes. I will send in two more boxes in a few days; I will donate the two boxes for the good of the fair. Wishing you success, I remain, yours truly,

G. T. ODOR.

Baring, Mo., November 27, 1903.

Hon. L. A. Goodman:

Dear Sir—The program for the meeting of our State Horticultural Society received. Thanks. I anticipate one of the best meetings ever held by our great society, although any of them are always interesting, no matter where held. Although I may not be able to meet with you, I will be with you in heart and spirit. I have become so hard of hearing that I do not expect that I could understand the drift of the essays and the experiences given by members and others in the good work, but am always pleased to read the proceedings in the annual report which you have always sent me, for which I am ever grateful to you. I think and believe we have the best horticultural society in this great country, of which every Missourian can and should be proud and should be thankful to its officers for their unselfish efforts to make it so.

My dear Mr. Goodman, this has been rather an off year in this part of our State, so far as fruit is concerned. Trees of the different sorts were in bloom early for this part of the country, and we had a pretty wet spring. On the night of May 1st, we had a severe freeze, which no doubt caused the abortion of a large number of blossoms. Then it was wet and cool through most of the month of June, presenting the very condition favorable for an epidemic of scab, consequently the fruit was undersized and generally scabby. I had nothing worthy, nor did I see anything in my neighborhood worthy of saving for the World's Fair, but there were now and then exceptions on some young orchards. There are several parties in our county seat, Edina, who have gathered all fine specimens they could and are preserving them for the World's Fair. There was also a gentleman working through here in the interest of the World's Fair, gathering all good specimens of fruit worthy to show. He said North Missouri had finer fruit this season than South Missouri. Trees have gone into winter quarters in fine condition, and I hope next year will be a good fruit year so we can show to the world what Missouri is capable of producing and we can hold our old-time reputation. I believe the Louisiana Purchase celebration will be the greatest World's Fair in history, and everybody should do what they can,

be it much or little, to show to the world the capacity of our grand State. If possible I would be pleased to visit the fair. I have not seen St. Louis since the year 1858. There were no street cars then and only two steam fire engines. Wonderful changes have occurred since. With best wishes for a happy and interesting meeting, I am truly yours,

PETER DAILING.

Otterville, Mo., Dec. 12, 1903.

Secretary Board of Horticulture, Columbia, Mo.:

Dear Sir—There was a man at my home today selling and delivering a liquid for vaccinating fruit trees. He claims he can vaccinate a fruit tree against all kinds of insects the same as vaccinating man against smallpox, and he said the board of horticulture had indorsed and recommended it to the people. He said he was working on a good salary, but he was walking and he came back walking carrying a 5-gallon can on his shoulder. So I did not take it, because if he was getting a good salary and working for a good company he would not be walking. I write you to know if there is such liquid; if there is I would be willing to give five times his price. I believe him to be a grand fraud. He told me and showed me papers that he started from Jefferson City, Mo., and traveled over most of South Missouri; said he had sold 6,000 gallons at \$1.50 per gallon. Now if he is a fraud I think he should be in prison, for he is surely getting the peoples money. He said his name was Mr. George and belonged to Odd Fellows lodge at Blackwater, Mo. I have a 'phone in my house and I 'phoned to the secretary of my lodge at Otterville and asked him to telegraph to secretary of Blackwater lodge if they had a man by the name of George. We received an answer there was no man by that name on their books. Now if the board has not endorsed and recommended this liquid I think they should take some steps to stop him, for he is surely deceiving the people. There is quite a snow raging and this man may stay in this section for some time, and if you need any further information, either write or telegraph me at Otterville, Mo. Respectfully yours,

J. WILL SMITH.

Answer: Better let him alone. There is no medicine of that kind that will do what they claim. It is an impossibility and this matter has been written up a number of times exposing these frauds.

L. A. G.

THE NIXONITE APPLE.

Hopewell, Mo., September 10, 1903.

Rev. H. W. Cook, Potosi, Mo.:

Dear Sir—Referring to the conversation we had a few days ago concerning what is known as the Nixonite apple, I will try to give you as briefly as possible what I know to be the true origin of the apple.

In 1854 (I was then a boy of fifteen) my father, the late John Evens, of this place, became owner of the lands on which was a small orchard of 15 or 20 trees; a few acres of cleared land, but no house or fences (it is in Sec. 6, T. 36, R. 3. E. and now occupied by Mr. A. F. Nixon). Father had some men at work in the lead mines nearby and a Mr. Wm. P. Nixon was in charge. Father had a house built near this orchard and Mr. Nixon moved into it, fenced up the old field, trimmed up the apple trees, so that he controlled all the fruit. In 1856, during the time the I. M. R. R. was being built, the trees were loaded with fruit and large quantities were brought to father's store for sale. Father called them the Nixonite simply because Mr. Nixon lived on the place and no one had a name for the apple. There were other varieties there; some of the trees bore a large red striped sweet apple which mother and the women of the neighborhood esteemed highly for apple butter. The Nixonite was considered a good cooking apple, but was too sour to eat. Capt. Fred Will of Potosi took considerable interest in fruit growing; he sent some of the Nixonite apples to Norman J. Colman and others of St. Louis. They pronounced it a seedling of little value. As to origin of the apple, Mr. Alexander Begutte, an old man of 90 years or over, tells me that he was married in 1837 and moved into a little log house that stood on the place; that the trees were then there and bearing apples and were of good size. Miss Biddie Begutte, an old maiden lady living with him, says Robert Cain (of near the Clear Creek farm), an aged man who died several years ago (likely you knew him) told her that a man named Davis settled the place when he, Cain, was a small boy and that he assisted Davis in setting out the trees; that they dug them up in the different mines near by, mostly at what is known now as the Sand diggings; the land at that time belonged to the late John Perry, at one time a large land owner in this county.

I remember when Mr. Harvey Hutchins had his nursery near Caledonia he started it a few years before the war; he was in the habit of visiting the orchards of the county and getting grafts for his nursery; he had an apple he called the Ismealite; it originated in the mines near Palmer known as Ismeal diggings; it was a fall apple of good size and fine flavor; until a few years ago I had several trees of it and the Nixonite in my orchard, both of which came from him. One of the old Nixonite trees is still standing. Mr. Begutte lived on the place until 1842 or '43; he then settled on the farm now known as the Gersie farm; he took some 25 or 30 little seedlings from the Nixon place and set them out and a few years ago there was a fine lot of apples grown on that place; all of one variety, all Nixonites. A Mr. Sauter, who owned the place at one time, cut them all down, as he wanted the land for a vineyard. Yours truly,

WM. H. EVENS.

REPORTS OF OFFICERS.

Pres. Robnett.—I am glad to say that I have received all I could wish or ask in the way of kind treatment from the members of this society. I have tried to impartially discharge the duty that has been laid upon me. Where I have failed I hope you will pardon me. I assure you I appreciate the honor you have done me and the kindness you have shown me. We have had a year of harmonious and successful work, and I now heartily thank you for all you have done for me.

REPORT OF TREASURER, W. G. GANO, DEC. 10, 1903.

July 1	Postoffice bill	\$9.40
	Express	1.90
	Scotford Printing Co.	15.50
	Cleaning jars	6.65
	Evans Drug Co.	1.80
	Summer meeting	30.75
	Treasurer's bond	10.00
	Burnap & Co.	4.55
	Mrs. Dugan	3.70
	C. H. Dutcher.....	8.40
	Salaries of Secy. and Typewriter for June.	86.66

Warrant No. 532..... \$179.31

Aug. 1	Express and Dray.....	\$14.95	
	Telephone and telegram.....	1.31	
	June meeting	5.50	
	Salaries of Secy. and Typewriter for July.	86.66	
		<hr/>	
	Warrant No. 533.....		161.42
Aug. 1	Expense of G. T. Tippin, Summer meeting, R. R. fare.....	\$13.35	
	Expense of G. T. Tippin, Summer meeting, Hotel	5.00	
	Expense D. A. Robnett to St. Louis.....	10.85	
	Expense D. A. Robnett to Pertle Springs and St. Louis, R. R. fare.....	13.30	
	Expense D. A. Robnett, hotel.....	4.15	
		<hr/>	
	Warrant No. 534.....		46.65
Aug. 30	Scotford Printing	\$2.50	
	Scotford Printing	3.40	
	Scotford Printing .....	.35	
	Salary of Secretary for August.....	66.66	
	Salary of Typewriter for August.....	20.00	
		<hr/>	
	Warrant No. 535.....		92.91
Oct. 26	Expenses J. M. Irvine, Am. Pomological...	\$90.00	
	Expenses G. T. Tippin, Executive Com..	30.00	
		<hr/>	
	Warrant No. 536.....		120.00
Oct. 26	Express	\$1.85	
	Express .....	.65	
	Express .....	.90	
	Salary of Secretary for Sept.....	66.66	
	Salary of Typewriter for Sept.....	20.00	
		<hr/>	
	Warrant No. 537.....		90.06
Oct. 26	Scotford & Co., printing and post cards...	\$6.50	
	Scotford & Co., paper.....	1.00	
	Salary of Secretary for Oct.....	66.66	
	Salary of Typewriter for Oct.....	20.00	
		<hr/>	
	Warrant No. 538.....		94.16
Nov. 23	Telegrams. 43c, 50c.....	\$0.93	
	Express .....	.75	
	Scotford, stamps .....	.75	
	Scotford, ream paper.....	1.00	

Nov. 23	Scotford, 2,000 programs.....	\$13.00	
	Scotford, 1,500 slips.....	2.25	
	Post-office bill	30.00	
		<hr/>	
	Warrant No. 539.....		48.68
Nov. 23	Typewriter repairs	\$1.50	
	D. A. Robnett, expenses to Executive Com.	13.80	
	C. H. Dutcher, expenses to Executive Com.	3.60	
	Salary of Secretary for Nov.....	66.66	
	Salary of Typewriter for Nov.....	20.00	
		<hr/>	
	Warrant No. 540.....		105.56
Dec. 10	Expenses R. M. Kellogg of Michigan.....	\$23.12	
	Hotel bills of Kellogg, Hale, Powell, Burrill, Goodman and Asst., Dutcher, Tippin, W. S. Monger, Baxter, Murray, Nelson	96.50	
		<hr/>	
	Warrant No. 541.....		119.62
Dec. 10	Expenses G. T. Tippin, annual meeting....	\$12.45	
	Expenses C. H. Dutcher, annual meeting..	7.10	
	R. E. Bailey, stenographer.....	30.00	
	Expenses G. B. Lamm, annual meeting....	6.30	
	Expenses T. J. Burrill, annual meeting....	22.00	
		<hr/>	
	Warrant No. 542.....		77.85
Dec. 10	Expenses G. H. Powell from Washington..	\$76.70	
	Expenses J. H. Hale, Glastonbury, Conn..	80.50	
	Expenses J. S. Butterfield to annual meeting	7.90	
	Expenses A. T. Nelson and J. S. Butterfield	14.30	
		<hr/>	
	Warrant No. 543.....		179.40
Dec. 10	Premiums awarded, annual meeting.....	\$102.85	
	Pencils, pens, tablets, etc.....	2.65	
	Scotford, printing.....	3.00	
	Horticultural papers.....	9.00	
	Express	1.50	
	Express	3.75	
	Expenses L. A. Goodman and assistant, annual meeting.....	16.75	
		<hr/>	
	Warrant No. 544.....		139.50

Dec. 26 Telephone, 40; express, 70, 70.....	1.80	
Rubber bands.....	1.40	
Salary of Secretary for Dec.....	66.66	
Salary of Typewriter for Dec.....	20.00	
		89.86
Warrant No. 545.....		89.86
Total		\$1,544.98

RECEIPTS.

May 30 Balance on hand.....	\$450.81	
June Memberships by W. G. Gano.....	11.00	
June Cash from State treasury.....	757.84	
Nov. Cash from State treasury.....	480.29	
1903 Membership by L. A. Goodman.....	34.00	
Dec. meeting Membership by W. G. Gano....	52.00	
		\$1,785.94
Total		\$1,785.94
Total expenses		1,544.98
		\$240.96
Balance		\$240.96

Of the above amount \$238.84 was paid out of the funds in the hands of the society.

The society also has on deposit in the Mississippi Valley Trust Co. at St. Louis \$992.62 and accrued interest.

We, your Committee on Finance, have examined the report of the Treasurer together with the vouchers and bills, and find all correct as reported.

(Signed) T. H. TODD, New Franklin,
 HENRY SCHNELL, Glasgow,
 W. T. FLOURNOY, Marionville.

NOTE.—The bills paid after the meeting were ordered by the Executive Committee.

Secretary.

REPORT OF SECRETARY L. A. GOODMAN.

Our society and its work are still the admiration of our State workers, and our sister States and their workers, and it has become such because of the enthusiasm of our fruit growers and their determination to make it the best that can be made; not the best that they could do, but better than they could do, namely the best that could be done by anyone. There is a great difference in doing the "best you can do" or doing

the "best that can be done." In the first case it is the best that one man can do, while in the other, it is the best that the combined wisdom of you and your associates can do. I am glad that this society has done the latter.

THE FRUIT RECORD.

Up to May 1st the prospects for a crop of fruits were never better. Every tree in the land said we will do our best, but on that night the devastating blast of frost passed over the land and not only the first born buds were taken, but the whole number were blasted as by the breath of fire. Trees in their prime with all the vigor of youth, trees in their old age with all of their strength, trees in their decline, trees in their first budding, hardy fruits, tender varieties, productive trees, shy bearing; fruitful trees, trees which bring single fruits. Orchards on high lands, where low lands, prairie lands, timber lands, north, south, east or west slopes, on good soils or poor soils; wherever there were trees loaded with the bud promises of fruits, there the devastating death-angel, frost, passed by and left not a vestige of fruit life. From the sunny slopes of the Ozarks to the grand Missouri River hills, to the rich north land of our State, nothing was left for the husbandman, with some few exceptions, but the blackened leaves on our trees.

When we read of the destructive blast which came from Mt. Pelee and the terrible destruction of life which came in a moment, we can understand this destruction of a night to the fruit buds. We can but stand in awe of the power and forces of nature when thus shown in a moment, and wonder at them, nay stand in utter amazement at her power, but always forget the greater power, the greater force and influence, and the grand results of nature in the growth of plant, leaf, bud, blossom and fruit. Much more should we wonder at the latter than the former.

The injury to the berry crop was much less than expected, and where the floods did not interfere with the marketing, good prices were realized. The peach crop was virtually a failure. Cherries, only a small part of a crop. Plums, in a few localities, did well. The pear crop, only a shadow of itself. Grapes, in some localities, did finely for second crop. Apples were as bad a failure as was known for years. All these results from just a few hours of blighting frost.

We found in a few isolated places, a few protected localities, a few specially favored situations, some peculiar elevation, some congenial subsoil or soil, or a combination of all these features have produced a fine crop of apples; and their owners have reaped a rich harvest if they have been able to reach a good market early. But these are exceptions

and we need not change our location, nor think we are in the poorest place in the State because of our failure to find a profit from our orchard this year.

The work of the society has been a continuation along the lines of previous years, answering questions from our fruit growers, helping to settle this question of varieties, and its mixture, assisting many new comers to find homes, locating fruit growers in lands favorable for their purpose, giving planters the result of our experience in planting, as to soils, locations, varieties, age of trees, conditions for planting, etc., etc., day by day until often you wonder when will this seeking for information cease, and the answer comes, never! no, never!

The growth of Missouri, in this orchard work, has been a wonder to the orchardists of our land and other lands. The value of our fruit products in a full crop year will more than astonish them. The developing of new locations specially devoted to fruit growing, our investigations along these newer ideas, the plans for marketing, the opening of a foreign market, the picking, packing and handling of fruits, the kind of packages, the transportation problem, the distribution of the crop, best plan of selling, have all come up for more or less of study and information. All of these items come to us over and over again, and by the reports of this society, containing the articles written by the members of our society these facts are scattered and I am happy to be one with you in doing this work.

Our report for 1902 was received with as much favor as many of our last volumes, and they are called for every day from many different states, lands and countries. These reports are valuable because of the experience of our fruit growers given in an intelligent, practical, systematic way, so that any one can understand.

Employing good judgment in the use of this information, is, then, the correct application of these items of experience to their own individual cases.

You cannot make good fruit growers out of every one, any more than you can make a good lawyer or doctor or merchant or farmer from every person who wishes to be such.

OUR WORLD'S FAIR EXHIBIT.

Steps were taken about one year ago by this society to start the work. Your secretary put in an application last January for space for our exhibit, with the understanding that there would be official action taken by the commission in due time. Knowing Mr. Taylor and Mr. Stinson, we were given the promise at that time that Missouri should

have a good space and all she would fill and keep full. Before any action was taken by the commission, we issued an appeal as early as last February for the beginning of work for the fruit show. Preparation was what was urged upon our fruit men, by the fertilizing of our trees for their work. This little booklet was called for from nearly every State throughout the North and some through the South. It opened the way for future work and made the work easier when ready.

In March another appeal was made to our fruit growers, and this call was responded to most faithfully and well by hundreds of our large orchard growers, promising their hearty co-operation in every thing to be done.

The following circular was sent out in February, 1903, before any decision was given by committee or appointment for superintendent of horticulture was made:

Rules for the Care, Cultivation and Fertilizing of Fruit Plants, Vines and Trees, to Produce the Largest and Finest Fruits for Exhibition at the World's Fair in 1904, and for a General Collection to Put up in Jars for 1903.

Definite directions of where to send and when to send will undoubtedly be sent out later, but at this time the Missouri State Horticultural Society has thought best to prepare a series of instructions to our fruit growers, helping them and advising them what to do in order to secure the best results in obtaining show fruits for our State exhibit at St. Louis.

No appointment has yet been made as to who shall be in charge of this work, but it seemed to be the province of the State society to take the matter in hand and have things in readiness.

If we can prepare our plants, vines and trees so as to give us the wonderful results we so much desire and at the same time secure some good practical facts and successful experiments which will be of lasting benefit to our fruit growers, we shall, in addition to getting some grand specimen fruits, give the state some mode of treatment that would be worth many times more to our State than all the money we have to spend for the display.

- 1st. It should be the plan, this coming summer, to produce and secure during 1903 as large a collection of varieties of the highest possible type and largest size and put them up in glass jars to use as occasion demands.
- 2d. All fruits that can possibly be held in cold storage should be collected and placed there for use as needed.
- 3d. A large variety show should be made so as to give the exhibit an educational feature.



Mercer County. Ten Jonathan on One Twig

- 4th. A commercial exhibit should be kept prominent, as every exhibit for commercial fruit growing gives us the name, the honor, and the money.
- 5th. Exhibits should be made by counties or districts or local organizations or county societies so that each county may get credit for all its display. Appeal is made to our county pride for the success of our county exhibit.
- 6th. Every man who contributes to the display should have due credit to himself, and to his county, for all his work.
- 7th. The State should pay the expense of collecting, gathering, packing, wrapping, express, processing in glass jars and cold storage on all these fruits, and yet each individual and each county get credit for all fruit furnished. Every shipment should be plainly marked with the name of county, name of grower, post-office, kind of fruit, variety and date of shipment.
- 8th. A small but characteristic display should be kept up at all times in the State Building as well as the large and complete display in the Horticultural Building.
- 9th. Every county or district should be represented, so that all parts of the State may have the honors, and not a few localities only.
- 10th. There should be 1,000 barrels of apples, 100 barrels of pears, quinces, and a number of bushels of native nuts of all kinds, put into cold storage in the fall of 1903.
- 11th. As fast as fruits ripen during the year 1904 there should be the most complete exhibit made that it is possible to secure while the fruits are ripening and in their prime. And every kind and variety of fruits and nuts, both tame and wild, which grows in Missouri, should be on the tables during the year, while each particular fruit is in its season.
- 12th. There should be enough fruit secured so that we could give to those people who are interested, some specimens for testing, or to take to their homes as a good advertisement for the State. Acting as host, the State will often be called upon to do the honor of the occasion by the giving of an apple to the visitor.

IN GENERAL.

In order to secure the best results, therefore, we must begin the preparation this spring and continue this care and preparation for not only this year, but this year and next year also. Like the stockman in the preparation of his cattle for show, it often takes not only one year, but two years and three years if he secures his ideal. Just so must the fruit grower begin his preparation now and continue his care for the

whole of the two years. Ofttimes results do not show the first year, but will show the second year in increased size, color, and quality of fruit, and this is the ideal we shall try and secure above all things.

We shall then appeal to you in the name of our State, for the honor of the State society, for the glory of your own county, for the reward to yourself individually, that you do your very best this year and next to grow and select the highest type of specimens that it is in your power to secure with all the knowledge you have and with the assistance and the advice and instruction given you by the society.

We appeal to you, for your own benefit and instruction, for the grand return it will give you individually, for the increased knowledge it will give you personally, for the good opportunity it will open to you for experiment, for the new insight it presents for the study of plant growth and plant feeding, and for the securing of new facts in fruit growing that may be of untold value to you in your work and to our State in its development.

If, in making this display, we shall discover some facts that will help to make horticulture a success, what a reward that will be.

Putting aside a few vigorous, healthy, prolific, individual trees, or vines, or plants, which shall receive the proper care, and cultivation, pruning, girdling, thinning, spraying, covering, sheltering, protecting, fertilizing, gathering, handling, packing and shipping, you will secure a great, the greatest, lesson you have ever received, and the State the greatest show ever made by any people in the world.

A blank should be furnished so that a record can be kept of the steps taken in the production of the specimens sent for display, and then these experiments will be immensely valuable to us all.

Strawberries should be planted this spring in good land thoroughly subsoiled, the best of care and cultivation given during the summer (water if needed), all runners kept off so as to secure good strong crowns. The next year at blossoming time all stalks cut off, except two, or three, or four, and the berries on these thinned to three, or four, or five berries. The plants should be fertilized after blooming time with three pounds of muriate of potash and one pound of nitrate of soda per square rod, put on the ground not too close to the plant and hoed in, and you may be sure you will have some berries that will astonish even yourself. Mulch plants well and then you can water them if necessary.

For putting up in jars this next summer, we want the thinning of the plants in the row to one foot apart, and then thinning the stalks and berries the same as above. Fertilize the same as above also. Leave stem on each berry.

When packing to ship this year, wrap each berry, or cluster of berries, in two thicknesses of paraffine paper, each thickness separately, and pack in the usual berry box and crate, sending at once to the place appointed for processing them and putting into jars.

The raspberry, blackberry and dewberry will need careful thinning out and short pruning of the bearing canes, and then, after the fruit is well set, take off one-half or two-thirds of the berries, and keep down the young sprouts and canes so that the strength will go to the berries. Fertilize with four pounds muriate of potash and two pounds of nitrate of soda per square rod.

For next year's fruiting, grow the canes for this especial purpose, retaining about one-fourth as many canes as usual and then treat the same as above: picking, handling, wrapping and packing the same as for the strawberry. Fine clusters and branches where they can be retained should be shipped as clusters after wrapping.

Twisting the canes often causes them to produce larger fruit, and water is often used with 1 lb. muriate of potash and $\frac{1}{2}$ lb. nitrate of soda to twenty gallons of water to help increase the size especially if the weather is dry. Mulching is necessary and watering can then be done safely.

Large paper bags put over the clusters of fruit, will cause them to ripen evenly and color up beautifully as well as keep much better after gathering.

The currant and gooseberry will need the same care as the other small fruits, the bushes well thinned out and the berries or bunches reduced to half the crop or even less. Clusters of them when ripe will be wanted both for jar exhibit in 1903, and for the fresh exhibit in 1904. Fertilize with $\frac{1}{4}$ to 1-3 lb. muriate of potash and $\frac{1}{8}$ to 1-6 lb. nitrate of soda per bush and keep them well mulched with old straw or hay.

The grape will need special care in pruning for the $\frac{1}{2}$ crop this year and special preparation of the canes for the crop of 1904, when the grapes are to be shown fresh on the tables. Use the best canes for crop this year but not so many nor so long as usual. After the grapes are well set, tie a wire tightly around the canes below the bunches and then thin out the bunches so as to secure the largest size of bunch and berry. The very best of cultivation should be given to the vines during the whole summer and the use of fertilizer, 1-3 to 1-2 pound muriate of potash and 1-6 to 1-4 pound of nitrate of soda per vine. Summer pruning should be closely followed, care being taken to leave enough leaf surface to shade the fruit well. Put 2 lb. or 3 lb. paper bags on all specimen bunches before June 1st. each year.

The apple, pear and quince will require about the same treatment, and these rules are to be followed with some modification, perhaps, for different soils and locations. Select a healthy tree or two of each variety, which would seem to justify the experiment, because of its favorable location, or congenial soil, or peculiar surroundings, or its previous good crops; trees which have given the largest size, richest color, and best quality of fruits, and use these individual trees for this work.

Plow shallow or dig about such trees as far as the branches reach, early this spring; cultivate and hoe about them once every two weeks during the whole spring and summer, or mulch the trees heavily, if you prefer, as far as branches extend after fertilizer is applied. Fertilize these trees about April 1st: 7 to 10 years, with 1 lb. of muriate of potash and $\frac{1}{2}$ lb. nitrate of soda; 10 to 15 years, with 2 lbs. muriate of potash and 1 lb. nitrate of soda; 15 to 20 years, with 4 lbs. of muriate of potash and 2 lbs. nitrate of soda.

Before the buds start spray these trees thoroughly, if possible, with 1 lb. of blue vitriol to 10 gallons of water; or, dust them twice with 20 lbs. of air-slacked lime and 1 lb. of sulphur when the trees are wet with rain, so that the trees and ground are white with the lime. As soon as the blossoms fall, spray with Bordeaux and Paris green or dust with 20 lbs. lime, 1 lb. Paris green, 1 lb. sulphur. Repeat this every two weeks until they ripen.

As soon as fruits are well set and the surplus dropped off, about June 1st, girdle the trees or branches by taking a ring of bark off entirely around the tree, from 1 to 4 inches, depending upon the size of the branch or tree. This girdling will not injure the trees, but only check their growth. Then at once thin out the fruits so they will not be closer than 10 inches. Another thinning may be advisable later if we wish to secure abnormal specimens. Put some of these single specimens in paper bags, fastening with a pin and cutting the corners off of the bags so they will hold no water; or, cover some of the branches with mosquito netting. If fruits become very large, then place a sling under them to hold them on the trees; make it of cloth, fastened at the corners with cords and tied to the branch above the specimen. Where a bunch of fruit is very choice and the cluster is a notable one, then save the bunch or cluster and send them to the places appointed, well wrapped and packed in cotton.

If the orchard has been in clover, and is now in clover, then use the fertilizer and the girdling and thinning and other helps, especially if the trees have been giving good crops of fruit, and make a notation of which gives the best results. These fruits should be gathered when

well colored and ripe, not soft, wrapped at once in two thicknesses of tissue paper and one of paraffine paper, and at once sent to the places designated, with the variety, your name and county marked plainly on the package.

The peach, plum, cherry, apricot and nectarine need much the same treatment as outlined for the apple, in care, cultivation, pruning, thinning, girdling, picking and packing. The peaches should be thinned to 8 inches, except where clusters are wanted, and then thinned to 3 inches. The plums need selecting and thinning to 4 inches, except for clusters, and in that case to 2 inches. Cherries need clusters taken off so as to make the other clusters much larger; and specimens, except clusters, need to have not more than three to five in a cluster. All these fruits need to be well wrapped the same as apples and then packed in berry boxes, peach baskets and crates or one-third bushel boxes. All clusters packed in cotton after wrapping. Cherries and plums should have their stems.

Fertilize the peach, plum and cherry: trees from 3 to 4 years, 1 lb. muriate of potash and $\frac{1}{2}$ lb. nitrate of soda; 5 to 7 years, 2 lbs. muriate of potash and 1 lb. nitrate of soda; 7 to 10 years, 3 lbs. muriate of potash and $1\frac{1}{2}$ lbs. nitrate of soda. Fertilizer for all the above fruits will depend upon the vigor of the trees or plants. If very vigorous, then leave off the nitrate of soda.

EXTRA EFFORT FOR DISPLAY.

- 1st. During the summer train some extra strawberry plants in pots for pot exhibit.
- 2d. Raspberry, blackberry, currant, gooseberry and grape can be grown through the bottom of pots and caused to root well enough so that the next year when wanted the vines can be cut off after the fruits ripen and the bushes will be beautiful pot plants loaded with fruits for show in 1904.
- 3d. The apple, pear, peach, plum, cherry and quince, even, can be taken, and a fine fruiting branch put through the bottom of a large pot and filled with soil and kept moist with moss about the pot so that the branch will be well rooted in the pot by fall, if the branch is cut or lipped in the proper way so that it will root. After the fruits ripen the branches can be cut off and this will give beautiful little trees that will be a curiosity and an attraction when filled with fruit and placed on the tables.

4th. Such apples as Ewalt, Gloria Mundi, Wolf River, Culp Mammoth, Twenty Ounce, Pewaukee, Tulpehocken, Pumpkin Sweet, can be brought to extraordinary size, as also some of the larger varieties of pears and peaches by extra care and attention to the details under apples.

RULES FOR THE SELECTION OF FRUITS FOR EXHIBITION.

Apples and Pears.—Should be in their natural state. Picked when ripe, not soft, handled very carefully so as not to bruise or injure in any way, the fruit wrapped in two thicknesses of tissue paper and then in paraffine paper and at once packed for shipment closely and tightly so that they will not move in the package nor settle so as to bruise in shipment. Each specimen should be perfect; not specked, bruised, eroded, nor wormy; should have all its parts, stem, calyx, segments, clean, well preserved; not wilted nor shriveled. The size should be large or very large. The form should be regular, except for abnormal specimens. The color and markings should be characteristic.

Peaches, Plums, Cherries.—Size large, regular form, ripe but firm, well colored, perfect condition, with all the characteristic markings, well handled, no bruises, wrapped as above and packed in small packages firmly so that no movement can take place.

Grapes, Currants, Gooseberries.—Good large bunches, fine, plump, large berry, well-colored, good bloom on the berry, perfect condition, carefully gathered, more carefully wrapped, as above, not injuring the bloom or berry, bunches packed in cotton and in single layers, in small packages, well covered with cotton so not to bruise, boxes marked "this side up."

Strawberries, Raspberries, Blackberries.—Size of berry or bunch of first importance, perfect form, well-marked and good color, solid and firm in berry, but ripe so as to get proper color, stem and calyx adherent, wrapped as above and packed in berry boxes as directed for grapes.

In general, then, all these perfect fruits need the most careful selection, painstaking packing, prompt shipment, whether made in 1903 for putting up in the jar exhibit or for cold storage, or whether collected and sent in for the fresh fruit display during the ripening season of the year 1904. Remembering these cautions and these suggestions, fruits are sure to arrive in splendid condition and give a grand display.

FERTILIZERS FOR FRUITS.

No hard and fast rules can be given for fertilizing fruits, so as to secure fine specimens. The kind and the quality of fertilizer to be

applied depends upon the kind and condition of soil. The following facts are important, however, in determining how to fertilize a given fruit plantation:

1. The effects of fertilizers upon orchard trees are usually more apparent in the second year than they are during the year in which the fertilizer is applied. For that reason, if it is desired to fertilize special trees, in order to secure fine fruit for the St. Louis Exposition, the fertilizers should be applied this spring to trees from which it is expected to secure fruit for 1904 as well as for 1903.

2. Nitrogen promotes wood growth, leaf growth and general vigor of the tree itself. Potash and phosphoric acid, especially the former, promote fruit production.

3. If a tree is making weak growth, if its leaves are pale and sickly and if the annual wood growth of the main limbs is less than one foot in length, it probably needs nitrogen. On the other hand, if wood growth is strong and vigorous and the leaves are of a dark, rich green color, and especially if fruit is not forming sufficiently, potash and phosphoric acid are probably needed. Too much nitrogen tends to cause the tree to run to wood and leaf growth at the expense of fruit.

4. A good all-round fertilizer for trees that are normal with respect to wood growth and to fruit is, for each mature tree above 15 years old:

Nitrate of soda, 2 pounds; superphosphate, 2 pounds; fine ground bone, 3 pounds; muriate of potash, 4 pounds. Apply half this quantity to each ten-year-old tree.

5. Where weak growth indicates that the tree needs nitrogen, apply a liberal dressing of well-rotted barn-yard manure or four pounds of nitrate of soda to each mature tree.

6. If the tree is making strong wood and leaf growth, but fruit is not satisfactory, apply either of the two following to each mature tree:

(a) One peck of unleached wood ashes, or (b) 5 pounds of muriate of potash, 3 pounds of superphosphate.

The above fertilizers should not be applied in a mass, at the trunk of the tree. They should be spread uniformly, from near the trunk, outward to just beyond the outer spread of the branches and worked into the soil.

Old trees, even if making fair growth, usually need the complete fertilizer mentioned in No. 4, but young, vigorous trees usually require only the potash and phosphoric acid fertilizers mentioned in No. 6.

Small fruits should be treated the same as the tree fruits with respect to fertilizers, using nitrogen when plant growth is weak, a com-

plete fertilizer where plant growth and fruiting characteristics are normal, and potash and phosphoric acid where plant and leaf growth are strong but where the plants do not fruit in satisfactory manner.

Generally speaking, potash is the most important fertilizer for fruits of all kind. For this reason wood ashes, where they can be had, are useful. If commercial fertilizers are applied the muriate of potash should be applied in excess of the others.

Where used for small fruits, about one-half of the amount mentioned in No. 4 or No. 6 can be used per square rod of plants, care being taken to not put it on the leaves but scattered on the ground not too close to the plants and then well hoed in.

SPECIAL.

Select vigorous plants, vines and trees for the growing of these show fruits, so that there will be no necessity for using nitrogen or nitrate of soda for the leaf growth, but only the muriate of potash and superphosphates for the development of the fruits themselves, and results can probably be more easily obtained.

CONCLUSION.

Hear, then, the conclusion of this whole matter. Serve the State and obey the instructions given you. A successful show will depend wholly and entirely upon the good-will and assistance, and energy, and enthusiasm with which we take hold of the work. It will require the hearty co-operation of every fruit grower of the State. If we will all pull together and every one do what he can there will be no question as to results. It is because of neglect or carelessness that failure comes. It is because we think that some one else will do the work that we fail to do our part and results are disastrous. It is just as important for you to send in one variety or one kind of fruit as it is for the great orchardist to send in one hundred. We are glad that our State society has been a unit in all its work during the last twenty years since we have been working together and we feel sure that this same unity will prevail in this, the greatest display, the greatest opportunity, the greatest privilege we have ever known in our history. We feel sure that you will do your best part in the work for the next two years, and all the honor and the glory, and the reward will be yours.

Directions, instructions, labels, shipping tags, where to send, when to send, and all needed information will probably be sent out as soon as arrangements are completed by the commissioners.

L. A. GOODMAN,

Secretary.

SECOND CIRCULAR SENT OUT IN MAY, 1903.

Missouri Fruits for St. Louis World's Fair.

The delay in securing glass jars and arranging matters for the processing of the fruits has been unavoidable, but work in earnest must now atone for it.

We appeal to you to use every effort you can to grow and secure and collect any fruit that is worthy a place in our exhibit.

A large collection of varieties will be needed to show how great is our adaption for varieties. Any variety of fruit that is of value in a commercial way will be needed to show its peculiar worth for this purpose.

As the strawberries, raspberries, blackberries, currants, gooseberries, cherries and other fruits ripen, be sure to send them where they can be put in glass jars for our display. The selections of these specimen fruits or clusters, and then the picking and packing, are very important steps in their preparation, and I speak for the utmost diligence and care in every step of this work so that there will be no failure of success.

The perishable nature of all these fruits makes it necessary that we do this promptly and carefully.

An extra effort will be needed at the hands of all our old stand-bys, and an extraordinary effort by all others who are willing to be represented in this Fair and want their county to have a hand in the great display.

Shipping tags and paper wrappers will be sent to all who call for them, but do not wait for them if you are ready to send anything to us. Send as follows by express, and charges will be paid at the delivery point. Always send to the place you can reach easiest and quickest by express:

L. A. Goodman, 7th and Wyandotte Streets, Kansas City; or 609 Boonville Street, Springfield; or 712 North Main, St. Louis; J. C. Whitten, Columbia.

As soon as fruits are ready to go into cold storage, paper wrappers will be sent to all who will take the time and care to put them up.

On this apple display we will depend for the greater part of success, and this apple show will be worth more to each county, according as they make the effort to be well represented by it, and have a truly characteristic display of every variety grown in the county.

Plans for growing and packing have been sent out in a former cir-

cular, and in order to insure success it is necessary that attention be paid to every detail. Armour's Tree Fertilizer has been sent to some two hundred persons, and the benefit of this fertilizer will not all show this year, so we want to consider the care for next year also. Use for the berries of all kinds about 4 to 6 lbs. per square rod; currants, gooseberries and grapes from $\frac{1}{2}$ pound to $\frac{3}{4}$ pound per plant; for apple, pear, peach, cherry and plum use: $1\frac{1}{2}$ pounds per tree 4 to 6 years old; 3 pounds per tree 6 to 10 years old; 4 pounds per tree 10 to 12 years old; 6 pounds per tree 12 to 16 years old.

Good care and attention is needed as well. Spraying to keep the fruit free from insects and fungus diseases will demand your best effort also. Fertilizing, cultivation, spraying, is the rule of three for the production of good fruits.

COUNTY SOCIETIES.

The re-organizing of our county societies where they are sleeping, and the organizing of others where there have never been any, is such an important matter that I want to strongly urge you to take this step. You are stronger, your community is better represented, your county is a power, if you have an organization. Just as one hundred are stronger together than each are separate, so will your county get its best results if there is unity of effort and zeal and work.

If only twelve persons can be found who will unite, then form a society. Your county will reap its reward and you the glory much more easily than if each works alone.

If you have not a county organization, then have a local order which will pull together for its own community. We want to assure all and every one that they will get recognition for whatever they may do, however little or much, and it will be our aim to keep a record of all who have a part with us in this grand display. If no organization can be had, then do not wait, but each individually do what he can himself, and due credit will be given.

NEW FRUITS.

New fruits of all kinds will be one of the features of our display, both in glass jars, putting them up this summer, and showing them next year in their fresh state. Anything new or worthy should be sent to us so as to have some of the crops of 1903 as well as that of 1904. A history of the origin of the fruit, and how long it has been in bearing, its hardiness, productiveness, and any other facts in regard to its value, should be submitted when the fruit is sent.

The injury to our fruit has been a severe one in many parts of the State, but because of this we shall have to work the harder to make a complete collection of all our fruits as they ripen. A little work by each person, where anything can be found that will pass muster, will make the united effort of all result in a grand and noble display.

DIRECTIONS.

Strawberries.—Pick with stem on and wrap in tissue or paraffine paper. Select good clusters and pack in the berry boxes in cotton after wrapping.

Raspberries, Blackberries and Dewberries.—Wrap each berry or cluster and pack as above.

Gooseberries and Currants.—Pick with stems and wrap also. Clusters of each of them make a nice showing in the jars. Pack everything so it will not shake in the package.

Grapes, Cherries and Plums.—All need their stems, and each bunch, cluster or specimen needs care in wrapping, packing and shipping, as above.

Apples and Pears.—Need to be gathered with stems on the fruit. Fruit should be firm but ripe, well colored and large. Wrap each fruit in tissue paper and then in paraffine, and pack tightly in boxes or barrels, filling up spaces with plenty of old paper, so they will not move. When ready to send apples, pears, peaches, plums and quinces, ask for shipping tags and wrapping paper, if you want them, but do not wait for them—use old newspapers if you can do no better.

Be sure to put your name and the variety on each package.

L. A. GOODMAN,

Supt. of Missouri Horticulture,
7th and Wyandotte, Kansas City, Mo.

THIRD CIRCULAR SENT OUT IN AUGUST, 1903,

Some Rules for the Gathering and Packing of Apples for Cold Storage for the Missouri Exhibit at the World's Fair.

PACKING.

The ripeness of the fruit is the very first and the most important matter for us to consider when we are gathering fruit of any kind for either processing in glass this year or sending in fresh to go on the tables next year or for cold storage. The fact is that fruit must be in the ripening stage, that is, just ripe, not fully ripe; just colored or coloring, not fully

colored; perfectly firm or hard, not beginning to soften; showing its ripening characteristics partly spread over its surface or fully so, depending on the kind of fruit, whether it be a strawberry, blackberry or grape, or if it be a plum, pear, peach or apple, telling us plainly it is ripe by its parting easily from the branch, as in the case of the pear, peach, apple or from its receptacle as in the case of the raspberry or blackberry. In fact, all these items are important and should be carefully heeded when we are gathering for the honor of the State, and it includes every kind that we grow from the strawberry to the apple.

The condition of the fruit is the next point of consideration and is very closely allied to the ripeness. Close examination and experience will help us to solve this, as it does all other problems. Nature provides a correct and suitable covering outside of our fruits, and the nearer we can keep this without injury the better it is for the preservation of the fruit in its perfection, whether it be the little fine hairy covering on our berries, or the bloom on cherries, plums or grapes, or the fuzz on the peaches, or the greasy covering under the bloom of our apples. As nature provides this covering, we may be sure it should not be removed if we want the fruit to keep, hence an apple should not be rubbed unless it is dirty. The condition, therefore, must be sound; no specks, spots, bruises, blotches, worms or worm holes; not rubbed, no scab or bitter rot, no rust or mildew, no broken seed cell to our berries to let the juice out, no broken skin to the grapes or cherries; always leaving the stem on all fruits where the stem is a part of the fruit or where the stem can not be removed without breaking the skin of the fruit; keeping the calyx or blossom end on all fruits where it is part of the fruit, whether it be on the apple at one end or the strawberry at the other. The condition should be as near perfect as it is possible to secure it. The perfect fruit from its home to the exhibition table is the end we wish to secure.

The Size.—Not size at a loss of either of the other requirements, but size, normal, characteristic, fully up to or above the usual, above common, extremely large, extraordinary and yet maintaining its own peculiar features, at least so it can be recognized; size even, symmetrical, uniform, well shapen, correctly marked in its coloring and shading or bloom. Any monstrosities are always desirable, but to be shown as such and not with the general collection of the same variety.

Picking and Packing Winter Apples for Cold Storage.—The first thing to remember is that the least handling of the apples the better. From the tree to the box or barrel is the ideal way. Of course this cannot always be done, for we often have to do the best we can. But you may be sure that all fruit should be wrapped just as soon as it is

picked, wrapped in the orchard if possible, just as you gather them. Oft-times we have to select, after they are gathered from the piles in the orchard, or from the packing sheds, or from the wagons as they are hauled into the towns or to the packing sheds, but you may be sure this is not the ideal way.

We shall want from one peck to six barrels of a variety.

I realize, more fully than any of you, that this is about the worst year we have ever had to make such a selection of winter apples as we know we are capable of making, and therefore it will take the most extraordinary effort to secure a creditable exhibit.

Barrels are the best packages, and can in most cases be secured; but whenever you cannot get these, then use cracker boxes or other boxes holding about one bushel. If using boxes they should be well lined with a number of thicknesses of old newspapers before packing.

Select, as above directed, smooth, typical, well colored, ripe, sound, firm, and as near perfect specimens as possible, leaving the stem and calyx adherent. Wrap them at once in tissue paper and then in wax paper, and they can be handled easily or carried to the barrels or hauled to the packing sheds in baskets or boxes, where they can be packed in barrels. Barrels or boxes should be lined with paper and some paper or excelsior put in the bottom of the barrel, if possible, and then these wrapped apples packed close together in layers in the barrels or boxes. Every time that two or three layers are put in, the barrel should be well shaken, holding the hand upon the apples so that they will not lose their places. This shaking process is very important to get the apples closely together and well settled. Fill the barrel even to the chime, and then put on some two or three inches of excelsior or old papers before pressing in the head. If thus properly packed there will be no bruised apples, and every apple will do to go on the table when opened.

Too much stress cannot be laid upon this proper packing, for too many times we find the best of fruit ruined because of poor packing. When you do find some good fruit, see to it that it is packed well so it will not shake in the barrel after being hauled to the station or loaded into the car.

After thus packing put the name of the grower, the packer, the county, the postoffice and the variety on the barrel or box, so there will be no danger of losing the record.

We shall want 1,000 barrels of these fine apples for our display next year, and these directions are thus explicit, so that there can be no mistake about packing them.

Shipping.—As soon as all the apples at any one place be gathered,

they should at once go forward into the cold storage, so that they can quickly be cooled off. A wait of two weeks before going into storage is often fatal to the fruit. Within a day or two after packing they should be hustled off to cold storage.

We shall provide storage for one car of 200 barrels at Artesian Ice and Cold Storage Co., St. Joseph, one at Armour Packing Co. cold storage, Kansas City, one at Springfield Ice and Cold Storage Co., Springfield, and two at St. Louis Refrigerating and Cold Storage Co., St. Louis, so that we can easily and quickly get them into storage.

In all this, remember well that quality is what is wanted as well as quantity. Barrels may be made up of one, two, six, eight or more varieties. If it be more convenient oftimes to fill a barrel with a number of varieties, then do so, but be sure they are up to the standard. Many times it will be more convenient to have a variety in the barrel, when we are putting them on the table. Quality first, quantity second.

SUMMARY.

1. Good, sound, hard, ripe fruit.
2. Large, smooth, free from scab and worm marks.
3. Stem, calyx, bloom on the fruit.
4. Handled with the greatest of care and as little as possible.
5. Wrapped at once in tissue and then in wax paper also.
6. Packed closely in boxes or baskets or barrels suitable for the fruit.
7. Shipped at once to the nearest place designated.
8. Marked with owner's name, postoffice, county and the variety of fruit.
9. From the tree to the box or barrel.

B. H. BONFOEY, Ch'm.

L. A. GOODMAN, Supt.

Wrappers will be furnished from St. Louis, 712 North Main, or Kansas City, corner Seventh and Wyandotte, on application.

FOURTH CIRCULAR.

MISSOURI AT THE WORLD'S FAIR.

Later another circular was sent out by the commission, entitled "Missouri at the World's Fair," and under the department of horticulture, these directions, rules and requests were repeated. Also some additional points were touched upon.

HORTICULTURE.

Chairman, B. H. BONFOEY.

Superintendent, L. A. GOODMAN.

To this department the official classification assigns:

Fruits of all kinds—apples, peaches, pears, berries, grapes and nuts.

Trees, shrubs, ornamental plants and flowers.

The various methods and appliances for cultivating and caring for same.

The fruit exhibit will be made on a strictly commercial basis, that is, with a view of showing the value of our fruits, and our fruit lands, developed and undeveloped. We expect to create a demand for Missouri-grown fruits in every market of the United States and Canada, and to induce the investment of thousands of dollars in the fruit-growing industry of the State.

PLAN FOR THE EXHIBIT.

First—Secure from this year's crops not less than 1,000 jars of the finest specimens, put up in handsome exhibit jars by the best processes known.

Second—Secure this season 1,000 barrels of cold storage fruits, which we will care for this winter, and exhibit and distribute during the Exposition.

Third—Maintain a complete exhibit of fresh fruits, as fast as they ripen during 1904. This fresh fruit will be attractively displayed and enough secured to enable us to distribute samples liberally to those interested.

SOME SPECIAL EXHIBITION PLANTS.

Raspberry, blackberry, currants, gooseberries and grapes can be grown through the bottom of pots and caused to root well enough so that the next year, when wanted, the vines can be cut off after the fruits ripen, and the bushes will be beautiful pot plants loaded with fruits for show in 1904.

NUTS.

We want several barrels of every kind of nuts grown in Missouri. If you know of any that can be secured, write us.

TO NURSERYMEN.

A special letter will be addressed to nurserymen regarding their exhibits.

NUTS WANTED FOR THE WORLD'S FAIR.

In connection with the fruits, it is essential that the nuts be included also. All the nuts of every kind and description which grow in Missouri, are desired in this collection. Any quantity, from a quart to a bushel, can be used. Some of the special, large nuts, thin shell, fine quality, are wanted.

If you have any collected, or can collect one, two or a dozen varieties, we should be very glad to have you send them to us, by express, to 712 North Main Street, St. Louis.

It would be a great showing if every county could have at least a small display in the nut exhibit, for every county cannot have a show in the apple exhibit. Put your name, postoffice and county, and variety, on every package. Send in sacks or boxes.

L. A. GOODMAN,
Supt. Missouri Horticulture.

The request for photograph views has also been generously responded to.

If you have any photographs or views of orchards, trees, berry plantations, packing scenes or nursery views, please send such in, so that we can have them enlarged and put into our portfolio at the World's Fair.

MY APPOINTMENT.

Many members of our society, the Executive Committee of our society and the county societies seemed to think that your secretary should take the work of organizing the fruit display at the World's Fair, and the appointment was made in accord with these wishes. And then, as a result, if you were responsible for the appointment, you were to be held responsible for the display, and now, we say further, you will be held still more responsible for the completion of this display next year.

As soon as any appointment was made and before authority was given even, we bought all the glass jars to be had in St. Louis and Kansas City, and also all that the various drug companies had ordered for their year's supply for their own trade, by this fortunate purchase we secured about 2,000 jars. It was fortunate that we did so, for a few weeks later none could be had from any parties at any price. We thus secured and now have filled something over 2,000 fine jars, with all kinds of fruits which grow in Missouri.

This collection was made at Kansas City, St. Louis, Columbia and Springfield. At Kansas City we had the assistance of W. G. Gano:

at St. Louis we had the assistance of J. C. Evans, Jr., and G. D. Schulte; at Columbia we had the assistance of Dr. J. C. Whitten and L. F. Childers; at Springfield we had the assistance of Earl Hopkins and H. H. Park.

As fine a collection of fruits has been secured as it was possible to secure under the conditions we had. In fact I think no better collection could be made any time..

Promises were made for a fine collection of winter apples, but some of those who promised failed to keep their promises and for no fault of their own, because there was no fruit in that land. Over and over again has this cry come to me and yet *we must* have the fruit, was my response. What were we to do, but to hunt more earnestly for them. Some of our fruit men have put in faithful time for this cause and thus saved their county from "losing out." We had 62 of these faithful workers in the field at picking time. We now have a fine supply on hand for next year's use, consisting of nearly 1,200 barrels, and hope to see them work out the glory of Missouri.

I also give here a list of names of those who have, during the fall so faithfully helped to gather the large and fine collection of apples for use next summer. To these men the State and each county owes a debt they will never repay.

This list, of course, does not attempt to give the names of every contributor and only the list of the collectors or large growers are attempted, and even then, perhaps, there may be some errors.

Secretary.

W. G. Gano, Parkville,	N. F. Murray, Oregon,
C. A. Emery, Carthage,	D. A. Robnett, Columbia,
J. H. Marion, Fulton,	H. H. Parks, Springfield,
J. H. Murphy, S. St. Joseph,	A. T. Nelson, Lebanon,
S. H. Van Trump, Elmira,	B. Logan, Logan,
Wm. Mooney, Montreal,	W. S. Crouch, Carrollton,
G. A. Atwood, Springfield,	C. T. Mallinckrodt, St. Charles,
J. W. Tippin, Nichols,	J. H. G. Jenkins, Spring Garden,
J. E. May, La Platta,	H. S. Wayman, Princeton,
Polster Bros., Warrenton,	C. H. Williamson, Utica.
H. W. Jenkins, Boonville,	E. L. Mason, Trenton.
F. H. Speakman, Neosho,	Geo. Meyer, Orchard Farm,
J. S. Butterfield, Lee's Summit.	Henry Meyer, Bridgeton,
Chas. Teubner, Lexington,	J. C. Whitten, Columbia,
D. Lowmiller, Parkville,	H. Goehrig, Boonville,
C. Thorp, Weston,	M. Butterfield, Farmington,
S. R. Walker, Liberty,	Wild Bros., Sarcoxie,

C. W. Steiman, Dalton,	G. H. Shepard, LaMonte,
T. H. Todd, New Franklin,	R. E. Downing, Bowling Green,
C. C. Bell, Boonville,	A. W. Zimmerman, Amazonia,
S. Y. Thornton, Blackwater,	J. E. Roberts, Maysville,
A. J. Davis, Jefferson City,	L. H. Tucker, Marshall,
G. W. Null, Maryville,	L. T. Davis, Miami,
W. H. Skinner, Bethany,	J. E. Gladdish, Higginville,
C. Jewell, Nevada,	Ozark Orchard Co., Goodman and Lanagan.
B. F. Stuart, Rushville,	Wm. Mooney, Montreal,
S. P. Bailey, Versailles,	J. Daniels, Lake City,
C. H. Dutcher, Warrensburg,	H. W. Cook, Potosi,
B. H. Bonfoey, Unionville,	L. J. Slaughter, Grain Valley.
Homan and Davis, Easton,	

I append a list of the names and addresses of those who so kindly and promptly, during the summer, sent us various fruits for processing and helped to make the finest collection of 2,200 glass jars that was ever put together.

We have tried our best to keep this record correctly and yet it is possible probably that some names have been omitted and other names are incorrect, but if so, we assure you it is entirely an oversight. In many instances it was impossible to make out the names on the boxes.

Secretary.

LIST OF CONTRIBUTORS AND FRUITS IN KANSAS CITY COLLECTION.

County.	Name.	Address.	Fruits.
Andrew.....	F. Snyder,	Avenue City—	Apple: Wolf River.
Atchison.....	C. W. Andrews,	Tarkio—	Apples: Wolf River, Duchess.
	W. R. Littrell,	Tarkio—	Peppers.
Bates.....	Darby Fruit Farm,	Amoret—	Plum: Gold; blackberry: Snyder; gooseberry: Sandusky.
	E. E. Laughlin,	Rich Hill—	Strawberry: Parker Earl; wax beans.
	P. P. Lawlan,	Rich Hill—	Peach: Forest Rose.
	Wm. Marsh,	Merwin—	Apple: Red Beitigheimer.
	H. H. Taylor,	Culver—	Apple: Colvert.
Buchanan.....	R. E. Bagley,	St. Joseph—	Peach: Elberta.
	J. C. Bagby,	St. Joseph—	Peach: Pickett's Late.
	Mr. Bissell,	Rushville—	Peach: Clarence.
	A. Vooris,	St. Joseph,	Peaches: Crawford Late; Stump.
	D. Davis,	Easton—	Plum: Burbank.
	W. T. Davis,	Easton—	Plum: Damson.

County.	Name.	Address.	Fruits.
Buchanan.....	J. Y. Elliott,	Rushville—	Apple: Maiden Blush.
	F. P. Halsey,	St. Joseph—	Peaches: Carmen, Champion, Elberta.
	L. J. Hartman,	St. Joseph—	Pear: Seckel; plum: Damson.
	Homan & Davis,	Easton—	Apple: Wolf River; peaches: Seedling; Whitney and Wild Crab.
	J. Kendricks,	Easton—	Apple: Transcendent Crab.
	A. Leftwick,	Easton—	Pear: Seedling.
	J. A. Mallory,	St. Joseph—	Apples: Hislop Crab, Wealthy.
	J. M. Mallory,	St. Joseph—	Peach: Crawford's Late.
	Mrs. Morrison,	St. Joseph—	Peach: Elberta.
	R. L. Parish,	St. Joseph—	Peach: Henrietta.
	B. F. Stuart,	Rushville—	Apple: Fallawater; peach: Seedling; plum: Damson; pear: Kieffer.
	H. A. Squiers,	Wallace—	Apples: Wealthy, Yellow Transparent, Duchess; peach: Greensboro; cherries: Sandusky Gooseberry.
	H. Vooris,	St. Joseph—	Peach: Crawford Late.
	T. J. Waddell,	Easton—	Peach: Champion.
Carroll.....	Dr. C. R. Woodson,	St. Joseph—	Peaches: Champion, Elberta.
	J. B. Reynolds,	St. Joseph—	Peaches: Champion, Elberta.
	E. Heim,	Carrollton—	Apples: Wolf River, Fallawater.
Cass.....	V. S. Traughber,	Roads—	Apple: Yellow Transparent.
	W. Welkin,	Norborne—	Apple: Wolf River.
Charlton.....	J. M. Powell,	Peculiar—	Apple: Wolf River.
Clinton.....	A. Cox,	Dalton—	Apple: Pewaukee.
Clay.....	W. L. Culver,	Grayson—	Apple: Yellow Transparent.
	R. E. Bowman,	Turney—	Pear: Kieffer.
Clay.....	Mrs. M. A. Adams,	Liberty—	Apple: Red Streak.
	H. J. Black,	Liberty—	Peach: Seedling.
	R. Bracklin,	Liberty—	Grapes: Wilder, Champion, Concord, Amber.
	J. J. Caryl,	Liberty—	Peaches: Champion, Yellow St. John.
	P. Dagley,	Kearney—	Apple: Haas.
	J. C. Evans,	Harlem—	Quinces: Beans, Okra, Pawpaw, Damson.
	B. B. George,	Liberty—	Plum: Wild Goose.
	Clem George,	Missouri City—	Plums.
	A. W. Goss,	Kearney—	Apple: Yellow Transparent.
	W. E. Harbaugh,	Liberty—	Apple: Wealthy.
	C. D. McCoy,	Missouri City—	Apple: Wolf River.
	M. Lindarvis,	Liberty—	Apple: Colvert.
	S. M. Roades,	Liberty—	Apple: Strawberry; plum: Gold; strawberry: Wilson.
	H. Schroeder,	Harlem—	Cherries; Lawton Blackberry, Gregg Raspberry.
C. C. Tapp,	Kearney—	Peach: Early Rivers.	
Davless.....	S. R. Walker,	Liberty—	Apples: Golden Sweet, Early Margaret; quince; Peach: Foster, Seedling; plums: Wild Goose, Weaver, Damson, Burbank.
	G. B. George,	Liberty—	Cherries.
DeKalb.....	S. S. Brodbeck,	Gallatin—	Pear: Kieffer.
Greene.....	G. W. Null,	Mayville—	Peach: Triumph.
	A. L. Zimmerman,	Weatherby—	Peach: Conover.
	G. A. Atwood,	Springfield—	Apple: Yellow Bellflower.

County.	Name.	Address.	Fruits.
Grundy.....	E. L. Mason,	Trenton—	Plum : Abundance.
	J. B. Wilsey,	Spickards—	Peach : Smock.
Holt.....	N. F. Murray,	Oregon—	Apples : Wealthy, Duchess ; peach : Alexander.
Henry.....	J. B. Newberry,	Montrose—	Apple : Early Margaret.
Jackson.....	Mrs. Beecher,	Kansas City—	Plum : Hawkeye.
	J. S. Butterfield,	Lee's Summit—	Apples : Benoni, Yellow Transparent ; strawberry : Warfield ; cherry : Marianna.
	Fred Bricher,	Kansas City—	Cucumber.
	C. B. Collins,	Independence—	Currants ; corn ; strawberries : Mary, Gandy.
	Collins & Jenkins,	Independence—	Cherries : Wragg, English Morello, Early Richmond.
	J. Daniel,	Buckner—	Quinces.
	A. Davis,	Kansas City—	Cucumber, carrots, cauliflower.
	E. M. Frye,	Sheffield—	Raspberry : Cumberland ; strawberry : Splendid.
	L. A. Goodman,	Kansas City—	Chestnuts ; timothy.
	W. G. Grove,	Blue Springs—	Apples : Yellow June, Maiden Blush.
	C. W. Helm,	Kansas City—	Rhubarb ; gooseberry : Sandusky.
	Dr. J. G. Hollingsworth,	Kansas City—	Peach : Old Mixon Cling.
	N. M. Huges,	Buckner—	Peach : Old Mixon.
S. Harris,	Lee's Summit—	Pear : Kieffer.	
A. A. Kennedy,	Kansas City—	Blackberry ; cherry : Early Richmond ; straw- berries : Dunlap, Excelsior, Bubach, Par- ker Earl ; raspberries : Schaffer Red, Doo- little, Columbian.	
Sallie Lane,	Kansas City—	Blackberries : Erie.	
Lee's Summit Fair Ass'n,	Lee's Summit—	Beaus : Sweet Mingo.	
J. A. Martin,	Kansas City—	Apple : Allsbright.	
J. H. Nichols,	Lee's Summit—	Apples : Summer Bell, Summer Pippin.	
J. Rice,	Buckner—	Pear : Duchess.	
Mr. Smith,	Kansas City—	Tomato.	
G. M. Smith,	Kansas City—	Apple : Jonathan.	
G. H. Tippin,	Lee's Summit—	Plum : Weaver ; cherry : Regal Annie.	
A. Volker,	Kansas City—	Pear : Sheldon.	
J. R. Webb,	Independence—	Apple : Pelopenessus.	
J. W. White,	Kansas City—	Chestnuts.	
Mr. Warfield,	Sheffield—	Strawberry : Aroma.	
Johnson.....	C. H. Dutcher,	Warrensburg—	Apples : Wealthy, Northern Spy.
	A. H. Gilkeson,	Warrensburg—	Peach : Heath Cling.
	Mr. Miller,	Warrensburg—	Blackberry : Taylor.
	Mrs. J. Sendifer,	Warrensburg—	Peach : Elberta.
J. Smaltz,	Warrensburg—	Apple : Ewalt.	
Linn.....	J. Richards,	Brookfield—	Apple : Wolf River.
Lafayette.....	W. H. Burns,	Concordia—	Apple : Wolf River.
	Chas. Teubner,	Lexington—	Apple : Western Beauty ; peach : Elberta.
	W. M. Davis,	Aullville—	Apple : Wolf River.
Nick Hurley,	Lexington—	Grapes : Niagara, Worden.	
McDonald.....	Ozark Orchard Company,	Goodman—	Peaches : Alexander, Amsden ; black- berry : Snyder.
Mercer.....	S. J. Wayman,	Princeton—	Quinces.
Monroe.....	W. E. Flanders,	Paris—	Apple : Yellow Transparent.

County.	Name.	Address.	Fruits.
Nodaway.....	W. Audt,	Pickering—	Apple: Duchess.
	W. O. Awalt,	Pickering—	Gooseberry: Sandusky.
	W. W. Carnsey,	Maryville—	Apple: Duchess.
	H. A. Forcade,	Graham—	Apple: Duchess.
	H. Henderson,	Hopkins—	Peach: Triumph.
	J. A. Johnson,	Hopkins—	Peach: Carmen.
	W. E. Johnston,	Graham—	Apple: Jonathan.
	R. S. Masseys,	Kearney—	Pear: White Doyenne.
	G. W. Null,	Maryville—	Mango.
	Null Brothers,	Maryville—	Apple: Yellow Transparent.
	J. C. Pistoli,	Hopkins—	Apple: Duchess.
	L. G. Sheewater,	Maryville—	Apple: Yellow Transparent.
	J. Wagner,	Pickering—	Strawberries: Jesse, Capt. Jack; raspberry: Ohio.
Pettis.....	J. Cully,	Sedalia—	Apples: Wolf River, Maiden Blush, Eng. Russett.
	W. J. Dement,	Sedalia—	Plums.
	J. Fleming,	Lamonte—	Apple: Shephard.
	Lamonte Nursery,	Lamonte—	Apple: Wolf River.
	J. H. Monsees,	Beaman—	Apples: Wolf River, Wealthy, Red Streak.
	F. Nesbitt,	Lamonte—	Apple: Wealthy.
	Dr. Novis,	Lamonte—	Grapes: Perkins.
	C. Price,	Dresden—	Apple: Fallawater.
	G. H. Shepherd,	Lamonte—	Apples: Rome Beauty, Maiden Blush.
	Mrs. Ursi,	Lamonte—	Apple: Wagner.
Platte.....	H. A. Caps,	Weston—	Peach: Carmen.
	A. Cox,	Weston—	Grapes.
	H. D. Cox,	Weston—	Cherry: Early Richmond; peach: Greensboro; blackberry: Snyder.
	H. G. Craig,	Parkville—	Apple: Summer Queen.
	J. M. Drake,	Parkville—	Apple: Smokehouse.
	J. A. Durkes,	Weston—	Apple: Duchess; pears: Howell, Bartlett, Golden, White Doyenne, Sugar, Kieffer, LaBonne, Anjou, Seckel.
	N. P. Eckles,	Parkville—	Plum: Lombard.
	W. G. Gano,	Parkville—	Apples: Flora Bell, Pumpkin Sweet, Rome Beauty; peaches: Lemon Cling, Troth's Early, Crawford Late, Salway, Triumph, Henrietta, Wilkins, Alexander, Capt. Eads, Elberta, Susquehannah, Carmen, Mathews, O. M. Free, Allbright; Plums: Botan, Clyman, Miner, Pooles Pride, Abundance, Damsou, Burbank, Green Gage, Potawatomie; grape: Concord; pear: Seckel; *strawberry: Windsor; gooseberry: Sandusky; cherries: Wragg, Eng. Morello, Early Richmond.
	Sam Graden,	Parkville—	Apple: Smokehouse.
	Fred Harpst,	Weston—	Peaches: Salway, Smock, Columbia, Susquehannah, Mammoth Cling, Chinese Cling, Wonderful, Wheatland, Keyport, Kalamazoo, Bonanza; plums: Wickson, Botan, Burbank, German Prune.
	Higgins Bros.,	Parkville—	Grapes: Niagara, Telegraph, Concord.
	Dr. J. C. Hammond,	Platte City—	Plums: Cockville, Lombard, Dawson.

County.	Name.	Address.	Fruits.
Platte.....	Daniel Lowmiller.	Parkville—	Apples: Golden Pippin, Wolf River, Lowell, Red Astrachan, Ortley, Hawley, Early Harvest, Milam, Jonathan; plums: Abundance, Damson, Burbank, Green Gage, Wild Goose, Milton; cherry: Montmorencie; Strawberries: Sharpless; Beans.
	J. F. Level,	Parkville—	Apple: Wagener.
	G. A. Laurle,	Weston—	Apple: Benoni.
	W. McAdow,	Iatan—	Apples: Ohio Pippin, Maiden Blush; peach: Heath Cling.
	J. McRuer,	Parkville—	Apple: Yellow Transparent; cherries; blackberry: Snyder; strawberry: Bubach; grape: Champion; gooseberry: Sandusky; raspberry: Hopkins; quinces.
	A. Miller,	Platte City—	Hews Crab.
		Park College,	Parkville—Cherry: Eng. Morello; raspberries: Kansas, Turner.
	F. Payne,	Platte City—	Apple: Wolf River.
	L. N. Stephens,	Weston—	Plums: Gold, Majestic.
	T. H. Todd,	Platte City—	Pear: Flemish Beauty.
Putnam.....	A. Bradshaw,	Unionville—	Apple: Wolf River.
	B. H. Bonfoey,	Unionville—	Plum: Damson; raspberry: Gregg; cauliflower.
	C. W. Kingsberry,	Unionville—	Plum: Damson.
	Martin Livesey,	Unionville—	Plum: Abundance.
	J. McAnelly,	Unionville—	Apple: Wolf River.
	J. McKinley,	Unionville,	Apple: Wolf River.
	C. N. Monroe,	Unionville—	Peach: Gen'l Lee.
	W. F. Noel,	Unionville—	Apple: Wolf River.
	J. A. Scott,	Powersville—	Apples: Colvert, Mother.
	John Stall,	Unionville—	Plums; gooseberry: Sandusky.
	H. R. VanHörst,	Unionville—	Plum: Marianna.
	D. F. Woodruff,	Unionville—	Apple: Wolf River.
Saline.....	R. G. Robinson,	Marshall—	Apples: Salome, Mann, Rome Beauty.
Vernon.....	W. A. Bates,	Nevada—	Peach: Seedling.
	C. Jewell,	Nevada—	Pear: Duchess.
	H. Keithly,	Nevada—	Pear: Duchess.
	H. Kneifley,	Nevada—	Apple: Wealthy.
	J. Leake,	Nevada—	Apple: Wolf River.
	H. H. Taylor,	Nevada—	Apple: Wealthy.

LIST OF CONTRIBUTORS AND FRUITS IN ST. LOUIS COLLECTION.

County.	Name.	Address.	Fruits.
Adair.....	Mrs. E. W. Imoler,	Kirksville—	Pear: Kieffer.
Cooper.....	S. B. Fisk,	Otterville—	Apple: Sweet.
	M. P. Wakefield,	Clifton City—	Apple: Early Harvest.
Dent.....	F. C. Pellett,	Salem—	Grape: Wild.
Franklin.....	W. C. Davis,	New Haven—	Persimmons.
Gasconade.....	Gus. Fischer,	Hermann—	Grape: Marsala.
	Hermann Grape Nursery,	Hermann—	Grape: Elvira.
	J. Mueller,	Hermann—	Grape: Norton Virginia.
	Robyn Bros.,	Hermann—	Grape: Elvira.
	S. Simon,	Hermann—	Grape: Catawba.

County.	Name.	Address.	Fruits.
Laclede.....	Mrs. R. P. Bland,	Lebanon—	Apple: Sweet.
Linn.....	C. S. Welsh,	Laclede—	Apple: Grimes Golden.
Miller.....	W. A. Gideon,	Spring Garden—	Apple: Orange.
	Mrs. A. Jenkins,	Spring Garden—	Plum: Seedling.
	J. H. G. Jenkins,	Spring Garden—	Apples: Red June, Jeffries, Yellow Horse, Red Astrachan, Lawver, Beitingheimer, Lowell, Jonathan, Maiden Blush, Grimes Golden, Wealthy; blackberry; plums: Golden, German Prune.
	Darius Pierce,	Eldon—	Apple: Wolf River.
	G. M. Selkin,	Eldon—	Apples: Red June, Baldwin, Unknown.
	C. A. Tate,	Eldon—	Apple: Maiden Blush.
	Chas. Taft,	Eldon—	Apples: Northern Spy, Maiden Blush.
Nodaway.....	J. E. Alexander,	Maryville—	Crabs.
	Chas. Ballenger,	Maryville—	Apple: Russian.
	W. Blackford,	Maryville—	Plum: Wild Goose.
	Mrs. C. L. Bracken,	Maryville—	Plum: Green Gage.
	Anna Belcher,	Maryville—	Beans.
	H. Clark,	Maryville—	Plum: Lombard.
	A. Crecelius,	Maryville—	Plum: Lombard.
	J. C. Curfman,	Maryville—	Plum: Burbank.
	M. Craig,	Maryville—	Kohlrabi.
	A. Craig,	Maryville—	Peas.
	T. Curran,	Maryville—	Apple: Wealthy; peach Columbia.
	Thos. Cirm,	Maryville—	Crab.
	Ambrose Collins,	Maryville—	Peach.
	J. L. Charles,	Skidmore—	Apple: Yellow Transparent.
	Riley Dakin,	Skidmore—	Apples: Maiden Blush, Fall Queen, Russian.
	J. D. Ford,	Maryville—	Plum: Burbank.
	Bert Gailpellain,	Maryville—	Apple: Grimes Golden.
	Virgie Guthrie,	Wilcox—	Plum: Lombard.
	Laura Gates,	Maryville—	Crabs.
	A. Hardisty,	Maryville—	Apple: Wealthy.
	Logan Holt,	Maryville—	Apple: Russian.
	Rodney Hamlin,	Maryville—	Peach.
	C. R. Lamar,	Elmo—	Peach: Champion.
	A. T. Lichey,	Barnard—	Apple: Fall Pippin.
	W. P. McCormas,	Maryville—	Apple: Pewaukee.
	John Miller,	Maryville—	Apple: Summer Pearmain; plum: Shipper's Pride.
	J. W. Miller,	Barnard—	Apple.
	J. F. Miller,	Maryville—	Plum: Wild Goose.
	John Neal,	Maryville—	Apples: Duchess, Wealthy; and Kohlrabi.
	B. F. Neal,	Maryville—	Apple: Russian.
	G. W. Null,	Maryville—	Apple: Lawver; grape: Wyandotte.
	R. S. Polly,	Maryville—	Peach: Columbia.
	Mrs. Lou Robinson,	Maryville—	Plum.
	Mrs. Tillie Shelton,	Maryville—	Apple: Gano.
	N. Sisson,	Maryville—	Apple: Russian.
	Loss. Scott,	Maryville—	Apple: Russian; pear: Seckel.
	W. J. Sinebaugh,	Clearmont—	Peach.
	Martha A. Turner,	Maryville—	Grape: Elvira.

County.	Name.	Address.	Fruits.
Nodaway.....	G. S. Townsend, Maryville—		Plum: Wild Goose.
	J. H. Thompson, Maryville—		Blackberry; Red Raspberry.
	M. Tobin, Maryville—		Apple: Yellow Transparent.
	John Vert, Wilcox—		Apples: Benoni, Red Detroit.
	J. C. Woodburn, Maryville—		Apple: Wealthy.
St. Charles.....	Elmer Young, Maryville—		Crab.
	G. J. Armenian, St. Charles—		Siberian Crab.
	Dr. H. F. Achelpoe, St. Charles—		Apple: Orange.
	Casper Beesman, Orchard Farm—		Apple: Bellflower.
	Otto Fuhr, Augusta—		Apples: Red Streak, Russett, Jonathan; Pear: Duchess; grape: Norton Virginia; plum: Prune.
	H. Gronefield, St. Charles—		Apple: Maiden Blush.
	Geo. H. Holbreh, St. Charles—		Apple: Bellflower.
	Wm. Hieldman, St. Charles—		Pear: Duchess; grape.
	Mary Kemble, St. Charles—		Pears: Howell, Bartlett.
	Dr. Osmer Morgan, St. Charles—		Pear: Howell; apple: Seedling.
	Herman Moetman, St. Charles—		Apple: Bellflower.
	C. T. Mallinkrodt, St. Charles—		Apple: Yellow Bell.
	J. C. Mallinkrodt, St. Charles—		Plum: Damson.
	H. F. Meyer, St. Charles—		Apple: Russian.
	R. W. Mueller, Augusta—		Apples: Red Streak, Vandevere, Jonathan; pear: Howell.
	Peter Minges, St. Charles—		Grapes: Herbemont, Virginia, Concord, Elvira.
	Mt. Pleasant Wine Co., Augusta—		Grapes: Virginia, Herbemont, Louise.
	H. D. Meyers, Jr., St. Charles—		Grape: Delaware.
	Boettler Nurseries, St. Peters—		Pear: Jap Sand.
	Alfred Nahm, Augusta—		Apples: Northern Spy, Rome Beauty.
	Geo. C. Pirt, West Alton—		Apple: Fall Pippin.
	W. V. Patton, St. Charles—		Apples: Northern Spy, Baldwin.
	A. Paul, St. Charles—		Pears: Duchess, Garber.
	Edward Paul, St. Charles—		Pear: Bartlett.
	J. W. Rohlŕing, St. Charles—		Pear: Seckel.
	H. Ruge, Augusta—		Grapes: Virginia, Herbemont.
	John G. Schubert, St. Charles—		Pear: Kieffer.
L. Schaffer, St. Charles—		Plum: Damson.	
T. C. Salviter, St. Charles—		Tomato.	
H. Sielerberger, St. Charles—		Peppers; egg plant.	
L. J. Schaeffer, Portage Des Sioux—		Apple: Maiden Blush.	
Fritz Schaeffer, Augusta—		Apples: Gano, Jonathan; grape: Concord.	
C. Wellbrandt, St. Charles—		Apple: Wellbrandt Favorite.	
H. Weers, St. Charles—		Apple: Maiden Blush.	
H. T. Worminghand, St. Charles—		Pear: Kieffer.	
St. Francois....	Mrs. Guy Richardson, Bonne Terre—		Peppers.
St. Louis.....	Tom. Blake, Pattonville—		Apple: Benoni; plum: Wild Goose.
	H. Brameky, Pattonville—		Apples: Wealthy, Maiden Blush.
	J. J. Blake, Bridgeton—		Plum: Willard.
H. Crecellus, Mehlville—		Apples: Sheep Nose, Early Harvest; pears: Early Harvest, Williams Seedling; peaches: Heath Cling, Smock, Settley, Old Mixon Cling, Troth, Family Favorite, Krummel, Mrs. Erett, Banard, Gold Dnst, Ponds; plums: Prune, Wild Goose, Forest Rose.	

County.	Name.	Address.	Fruits.
St. Louis.....	John Crecelius,	Oakville—	Peaches: Henrietta, O. M. Free, Krummel, Elberta, Globe, Chinese Cling, Susquehannah, Stump.
	Aug. Crecelius,	Aftton—	Peaches: Carpenter, Newington.
	Wm. Crecelius,	Mehlville—	Plum.
	G. G. Fairham,	St. Louis—	Apples: Red Streak, Western Beauty; Currant: Peaches: Triumph, Champion; pear: Tysoon; grapes: Early Ohio, Campbell's Early; gooseberry; cherry; pepper; carrots; garlic; cauliflower; cucumber; rhubarb.
	H. H. Hackman,	Creve Coeur—	Peaches: Champion, Early Rivers; plum: Damson.
	J. M. Kemff,	Stratman—	Grape: Niagara.
	B. J. Koenig,	Normandy—	Apple: Wealthy; pears: Tysoon, Seckel.
	Chas. Kern,	Clayton—	Apple: Sheep Nose.
	H. Meyer,	Bridgeton—	Apples: Yellow Transparent, Talman Sweet, Russia Crab; grapes: Concord, Moore's Early; plum: Wild Goose; blackberry.
	H. Pruet,	Pattonville—	Apple: Trenton Early.
	A. Peterson,	Wellston—	Apple.
	H. W. Rudolph,	St. Louis—	Grapes.
	J. C. Rudder,	Vulcan Station—	Apple: Porter; peach: Triumph; pears: Howell, Kieffer, Seedling; grapes: Elvira, Moore's Diamond, Agawam, Perkins, Concord, Mo. Riesling; plums: Golden, Lombard, Whalen, Downing, Golden Beauty, Seedling.
	St. Louis County Horticultural Society—		Apple: Red Streak; pear: Early Harvest; peaches: Heath, Krummel, Elberta, Carpenter, Mt. Rose, Stump; grapes: Concord, Wild; plum: Royal Apple, huckleberry, currant, blackberry, gooseberry, red raspberry, cherry, dewberry, apricot, cabbage, egg plant, beans, peas, asparagus, okra, pepper.
	John Schultz,	Stratman—	Apple: Vandevee.
	John Shuetz,	Clayton—	Pear: Howell.
	Wm. Schaffner,	Mehlville—	Pear: Seckel; peach: Family Favorite.
	Arthur Siegel,	Kirkwood—	Plum.
	Shaw's Garden,	St. Louis—	Figs; balsams.
	Henry Trampe,	Spanish Lake—	Apple: Trampe Favorite.
	H. W. Thies,	Wellston—	Apples: Summer Queen, Benoni, 20-Ounce Pippin; pears: Howell, Early Harvest, Tysoon, Bartlett, Jap Sand; grapes: Eaton, Concord, Pocklington, Niagara, Telegraph, Ives, Queen; plum: Damson; blackberry.
	Mrs. W. F. Warner,	Kirkwood—	Apple: Pound Pippin; plum: Damson.
	W. F. Warner,	Kirkwood—	Apple: 20-Ounce Pippin.

County.	Name.	Address.	Fruits.
St. Louis.....	Henry Wallis,	Wellston—	Apples: Wolf River, Seedling, Blight Proof; grapes: Amber, Hicks, Elvira, St. Louis, Mo. Tokay, Big Red, Moore's Early, Muscadine, Mo. Riesling, Columbia, Woodruff Red, Green Mt., Columbian Imperial, Mo. Mascot; plum: Shropshire.
	Otto Wallis,	Wellston—	Peach: Champion.

LIST OF CONTRIBUTORS AND VARIETIES IN COLLECTION AT COLUMBIA, MO.

County.	Name.	Address.	Fruits.
Adair.....	J. E. May,	La Plata—	Apple: Wolf River; plums: Burbank, Miner Gold, Wild Goose, Newman.
	F. L. McClary,	Kirksville—	Apples: Bell' Flower, Rambo, Flora Bell.
	Amos Probs,	Kirksville—	Apple: Fameuse.
	D. G. May,	La Plata—	Plum: Wild Goose; black raspberry.
Bates.....	Joseph Wix,	Pleasant Gap—	Apple: Wolf River.
Boone.....	Zeno Stocks,	Brown Station—	Apples: Wolf River; unknown.
	N. D. Robnett,	Columbia—	Apple: Jonathan.
	G. W. Roberts,	Rocheport—	Apple: Red June.
	E. J. Batterton,	Columbia—	Potato.
	Mrs. E. J. Bannerton,	Columbia—	Peppers.
	Dr. J. W. Carrier,	Columbia—	Pawpaw.
	Mrs. J. Dabb,	Columbia—	Crabs.
	J. M. Hampton,	Centralia—	Plums: Shropshire, Damson, Marion; cherry: Montmorencie; gooseberries.
	W. T. Harvey,	Columbia—	Potato.
	Mrs. S. A. Flemming,	Columbia—	Grape: Niagara.
	Henry Kirklin,	Columbia—	Pumpkin, tomato, kohlrabi, peppers, squash.
	O. C. Roby,	Rocheport—	Crabs.
	J. K. Reid,	Columbia—	Plum: Damson.
	Mrs. John Schnable,	Columbia—	Bull Nose pepper.
	Stanley Smith,	Columbia—	tomato.
	Mr. Watlington,	Columbia—	Crabs.
	Mo. Exp. Stat.,	Columbia—	Apples: Red Astrachan, Due Mellow, Minnesota, Primate, McHonie White, Ohio Pippin, Melon, Lowell, Francis and Florence Crabs; plums: Marion, Miner, Wayland, Moore's Arctic, Bradshaw, Burbank, Niagara, Quaker, Chas. Downing, Moreman; pears: Duchess, Japanese; Wineberry; Snyder and White Blackberry; grapes: Black Pearl, Faith, Massoit, Perkins, H. Jaeger, Cottage, Marion, Worden, Othello, Carmine, Rentz, Pocklington, Hartford, Dia- mond, Green Mt., Moore's Early, Concord, Duchess, Wyoming Red, Beacon, Rochester, Superb, Cynthia, Amber, Muscadine, Amer- ica, Dr. Collier, Ives, Greis, Golden, Catawba, Taylor Bullit, Elvira, Noah, Martha, Cam- bridge, Moore's Diamond, Eaton, Wilding, Mo. Riesling, Dracut Amber, August Giant, Lindley, Neosho, Pokeepsie Red, Beauty, Hays, Elvicand, Venaugo, Gold Coin, Vir- ginia, Mason.

County.	Name.	Address.	Fruits.
Boone.....	State Farm,	Columbia—	Unknown apple.
Chariton.....	Geo. Hetchler,	Dalton—	Unknown apple.
	Wm. Brandt,	Dalton—	Apple.
	Geo. Gratzen,	Dalton—	Apple.
	J. H. Gratzen,	Dalton—	Apple.
	H. Gall,	Dalton—	Apple.
	Wm. Gall,	Dalton—	Apple.
Cole.....	Albert Davis,	Jefferson City—	Grape: Concord.
Cooper.....	Walter Brown,	Bunceton—	Apples: Smith's Cider, Clayton, Northern Spy, Grimes Golden, Rox Russet, unknown.
	C. R. Cartner,	Boonville—	Apples: Jonathan, Janeton, Winesap, Grimes Golden, Huntsman, Rome Beauty, Willow Twig, Ben Davis, Dominic.
	Marion Davis,	Boonville—	Apple: Wolf River.
	S. L. Jewett,	Clarks Fork—	Apples: Wagener, Jonathan, York.
	H. W. Jenkins,	Boonville—	Strawberries: Aroma, Bubach, Warfield, Haver- land, Seedlings.
	G. W. Ware,	Prairie Home—	Apples: Northern Spy, Mo. Pippin, Capt. Mil- ler, Cold; peach.
Grundy.....	E. L. Mason,	Trenton—	Plum: Burbank.
Jasper.....	J. T. Tease,	Carthage—	Chinese Pear.
Knox.....	Geo. Tompkins,	Locust Hill—	Apple: Wolf River.
Salline.....	Jas. T. Buck,	Marshall—	Apple: Wolf River.
	L. E. Smith,	Appleton City—	Apple: Jonathan.
	Lucy Crawford,	Appleton City—	Peach: Heath Cling.
	Mrs. S. C. Sturtevant,	Appleton City—	Peach.
St. Francois.....	M. Butterfield,	Farmington—	Rhubarb.
Texas.....	A. E. Leavett,	Houston—	Ginseng.

LIST OF CONTRIBUTORS AND FRUITS IN SPRINGFIELD COLLECTION.

County.	Name.	Address.	Fruits.
Barry.....	C. D. Manley,	Cassville.	
Camden.....	Wm. Mooney,	Montreal—	Apple: Wolf River.
Dallas.....	E. N. Staples,	Buffalo.	
	S. A. Hull,	Buffalo.	
	J. S. Haynes,	Buffalo.	
Greene.....	Judge Bennett,	Springfield—	Apple: Seedling.
	M. O. Cole,	Springfield—	Grapes: Rommel, Wapanka, Niagara, Beacon, Bailey, R. W. Munson, Gold Coin, Delaware, Hicks, Fukfata, Moore's Diamond, America Presley, Manitou.
	Alice E. Chandler,	Springfield—	Peach: Heath Free.
	A. F. Davis,	Springfield—	Apple: Wolf River.
	Miss Everingham,	Springfield—	Blackberry: St. Jo.
	Mrs. Fry,	Needmore—	Apple: Benoni.
	A. M. Glass,	Bois D'Arc—	Apple: Kirkbridge White.
	Greene Co. Horticultural Society,	Springfield—	Crabs: Early Cider, Trans- cendant; plums: Gold, Abundance, Burbank, Damson, Wild Goose.

County.	Name.	Address.	Fruits.
Greene.....	Mrs. Hancock,	Springfield—	Plum: Wild Goose.
	L. F. Hilt,	Springfield—	Plum: Wild Goose.
	A. W. Howell,	Springfield—	Blackberry: Taylor.
	Mr. Hefferman,	Springfield—	Gooseberry: Industry.
	Mr. McCullough,	Springfield—	Plum: Newman.
	Mr. Milligan,	Springfield—	Apple: Transparent.
	O. H. Mitchell,	Springfield—	Apples: Benoni, Queen of the West, Bellflower.
	Mr. O. Neal,	Republic—	Plum: Wild Goose.
	M. R. Norman,	Brookline—	Peach: Elberta.
	Walter Nash,	Springfield—	Blackberry: Kittatiny.
	H. H. Park,	Springfield—	Apples: Red June, Red Astrachan, Transparent, Seedling; crab; Transcendent; pear: Kieffer; peaches: Elberta, Champion, Seedling; grapes: Worden, Concord, Elvira, Delaware.
	Geo. Schleifer,	Springfield—	Peach: Susquehannah.
	Mr. Savage,	Springfield—	Peach: Seedling.
	Mrs. Stuart,	Springfield—	Blackberries: Lawton, White.
	G. T. Tippin,	Nichols—	Peaches: Elberta, Champion.
H. Theime,	Springfield—	Grapes: Hicks, Virginia, Delaware, Brighton, Campbell's Early, Cynthiana, Goethe, Columbian, Green Mt., Uncle Sam, Niagara, Woodruff, Clinton.	
		Mrs. W. Witte,	Springfield—	Blackberry: Snyder.
	W. T. Zink,	Springfield—	Gooseberry: Keepsake.
Lawrence.....	B. Logan,	Logan—	Apple: Maiden Blush.
Newton.....	Louis Zellner,	Granby.	
Stone.....	W. E. Short,	—————	Indian Peach.
Texas.....	L. Southworth,	Sargent—	Apple: Maiden Blush.
Wright.....	Geo. Kiser,	Mansfield—	Peaches: Mt. Rose, Elberta.

FUTURE WORK FOR THE WORLD'S FAIR.

This work will be the great burden which every State society seems ready to take up for the next year, and the success of our State exhibit will depend upon how well and faithfully we do our part next year in sending these fruits to the building just as fast as they ripen. We shall want abundance of them, not berries by the box, but berries by the crate, yes by the hundreds of crates daily, and then for strawberry day a car load of strawberries packed in pint boxes for exhibition purposes and to give away to every visitor on strawberry day. We shall want fifty crates to 100 crates of strawberries, raspberries, blackberries, cherries, plums, currants and gooseberries every day as long as they last. We shall be glad to see these come from an hundred different towns or counties and not all from a few localities.

We shall want 100 crates of peaches daily, 40 boxes of early apples, 50 baskets of grapes, 20 cases of plums. During peach season we shall want two peach days, one at Elberta time and one at Salway

time, when we shall give to every visitor a peach that is good to eat and one to remember our State by.

Again in the fall as Jonathan and Grimes ripen we shall want a car load of these to let the people know that the State of the big red apple grows them of the finest quality known to the world. At the windup, then, during the month of October, we want the grandest apple show ever made and shall need 1,000 bushels to be on our tables during October and November.

The following is the official classification of the exhibits under the department of horticulture:

The work is divided into seven groups as follows:

HORTICULTURE—DEPARTMENT J.

GROUP 105.

Appliances and Methods of Pomology, Viticulture, Floriculture and Arboriculture.

- Class 622. Tools for gardeners and nurserymen: spades, picks, hoes, lawn mowers, garden rollers. Tools for pruning, grafting, gathering, packing and transporting produce: pruning and grafting knives, ladders. Watering apparatus.
- Class 623. Apparatus and objects for ornamenting gardens: vases, pots, chairs, seats, fountains, labels, etc. (See Department D, Group 41.)
- Class 624. Glass houses and their accessories: heating apparatus, mattings, etc.
- Class 625. Aquariums, ferneries, etc., for use in dwellings.
- Class 626. Landscape architecture: plans, drawings, models, books, pictures, etc.

GROUP 106.

Appliances and Methods of Viticulture.

- Class 627. Types of buildings used in connection with viticulture.
- Class 628. Implements used in the culture of the vine: implements for deep plowing; vineplows, hoes, tools for grafting, pruning, gathering, etc.
- Class 629. Collections of vines.
- Class 630. Appliances for vineyards, wine sheds and cellars: Vehicles; grape pickers; wine presses, etc.

- Class 631. Methods of wine-making. Appliances and materials for preserving wines. Ferments.
- Class 632. Diseases of vines and methods of checking them.

GROUP 107.

Pomology.

- Class 633. Pomaceous and stone fruits: apples, pears, quinces; cherries, plums, peaches, apricots, nectarines, etc.
- Class 634. Citrus fruits: oranges, lemons, limes, shaddocks, pome-
los, etc.
- Class 635. Tropical and sub-tropical fruits: pineapples, bananas,
gauvas, mangos, tamarinds, figs, olives, sapodillas, etc.
- Class 636. Small fruits: strawberries, raspberries, blackberries, dew-
berries, gooseberries, currants, etc.
- Class 637. Nuts: almonds, chestnuts, filberts, pecans, hickorynuts,
walnuts, etc.
- Class 638. Casts and models of fruits in wax, plaster, etc.

GROUP 108.

Trees, Shrubs, Ornamental Plants and Flowers.

- Class 639. Ornamental standard trees, seedlings or grafted.
- Class 640. Ornamental shrubs, deciduous or evergreen.
- Class 641. Plants for the park or for the garden.
- Class 642. Herbaceous plants grown in open ground; dahlias, chry-
santhemums, etc.
- Class 643. Masses and baskets of flowers. Bouquets of natural
flowers.

GROUP 109.

Plants of the Conservatory.

- Class 644. Specimens of culture used in different countries for use
or for ornament.
- Class 645. Forced culture of vegetables and fruits; specimens of
products.
- Class 646. Specimens and varieties cultivated for ornaments; plants
from houses of moderate temperature; plants from hot-
houses.

GROUP IIO.

Seeds and Plants for Gardens and Nurseries.

- Class 647. Collections of seeds of vegetables, plants and trees.
 Class 648. Young trees, seedlings or grafted. Plants and flowers grown for perfumes or extracts.

GROUP III.

Arboriculture and Fruit Culture.

- Class 649. Ornamental trees and shrubs. Methods of propagating, growing, training, pruning, etc.
 Class 650. Fruit trees. Methods of propagating, planting, growing, training, pruning, etc.
 Class 651. The vine. Methods of propagating, planting, training, pruning, etc.
 Class 652. Small fruits: strawberries, blackberries, raspberries, etc. Methods of propagating, growing, transplanting, training, etc.

Some special features will be in our exhibit that have never been attempted before and some things so attractive that they will be for the attention of every one. All these details are not yet completed, but we are working on them as fast as possible and hope, soon after the first of the year, to begin work on the installation and fixtures.

We are determined that this display shall be one of abundance, plenty, quantity, and above all, quality, so that we shall have the record of doing the most and best that has ever been done by any State. We shall have this not only an educational feature, but a public attraction as well, so that the general public may remember that Missouri grows good fruits in abundance.

THE MISSOURI STATE BUILDING.

The work of grading and laying out and planting and beautifying the grounds about the Missouri building has fallen to our lot or into our hands, not probably because they thought we had nothing to do, but more likely because they thought we could and would have it done in proper shape and in good time.

This has fallen to me, and among other things I asked our nursery-men to send me a list of such shrubs and trees as they would be will-

ing to donate to this work. They have responded promptly before and have done so now. I append a list of shrubs wanted and will divide this list up among our nurserymen as they see fit to give.

Shrubs, about	800
Roses, about	250
Climbers, about	50
Evergreens, about	150
Evergreens, Southern, about	160
Trees, about	50
Herbaceous, about	600
Total.....	2,060

These plants, trees and vines have thus far been furnished or promised by the following nurserymen, but no doubt there will be a number more who will respond to the call before the season has passed:

J. B. Wild & Bros., Sarcxie; Blair & Kauffman, Kansas City; J. S. Butterfield, Lee's Summit; J. P. Sinnock, Moberly; Stark Bros., Louisiana; G. T. Tippin, Nichols; M. Butterfield, Farmington; W. J. Weber & Sons, St. Louis.

The following flowering and ornamental shrubs and trees have been contributed by these nurserymen:

Altheas, Forsythia, Snow Balls, Weigelas, Syringias, Spireas, the Fringes, Hydrangea, Double Plum and Cherry, Deutzia, Flowering Almond, Lilacs, Snow Berry, Dogwoods, Red Buds, Japan Maples, Double Crab, Privets, Silver Thorn, Japan Quince, Mahonia, Euonymus, Barberry, Tamarix, Laurel, Exochordia, Daphna Alba, Chaste Shrub, Pepper Bush, Andromeda, Tree Peonies, Honey Suckles, Sumach, Box Tree, Cedar of Lebanon, European Larch, Rosa Rugosa, Roses, Wistaria, Virginia Creeper, Norway Spruce, Retinospora Plumosa, Arbor Vitae, Hemlock, Junipers, Pines, Cedars, Ash; Birch, Beech, Catalpa, Salisbury, Elms, Willows, Yucca, Pampas, Eulalia, Cannas, Rudebeckia, Peonies, Hollyhocks, Desmodium, Bleeding Heart, Trilium, Day Lily, Narcissus, Iris.

It is just twenty-two years ago that we met in the hall of the old agricultural building to take up anew the work of fruit growing and its development in our grand old State with a renewed interest and zeal and vim and enthusiasm. A time when we needed every help for matters were at rather low tide in putting forward the work or the workers; a time of very little interest except along the western border; a time when it seemed rather a risky matter to put thousands of dol-

lars in the fruit interests; a time really when what there was of interest to the fruit grower or to the new settler needed an awakening into new life. This society at that time began a new life of work and the twenty-two years of effort are shown in the results we now see about us. To outline even, not to say mention, the matters which this society has brought forward, in the State's development and improvement, the number of men who have become men of power and ability in the horticultural world, the bringing into the world's notice, the advantages of the State, the exhibitions we have made everywhere, the facts of horticultural experience which have been given to our growers through our society during these last twenty-two years would be telling the story of our work before that work is completed. You all know it, have felt it, and now profit by it. I am glad that you and I have had a hand in this part of it.

L. A. GOODMAN, Secretary.

REPORT OF COMMITTEE ON FRUITS EXHIBITED.

We, your Committee on Fruits, have carefully examined and compared all the fruits, nuts and vegetables on exhibition and beg to report the following awards:

W. W. Higgins, Parkdale, Mo., 21 varieties.....	\$14.00
R. E. Bailey, Fulton, Mo., 8 varieties.....	4.00
Stark Bros., Louisiana, Mo. 4 varieties.....	3.00
H. W. Cook, Potosi, Mo., 10 varieties.....	5.00
C. H. Dutcher, Warrensburg, 12 varieties.....	5.00
D. Lowmiller, Parkville, Mo., 18 varieties.....	12.50
L. J. Slaughter, Grain Valley, Mo., 2 varieties.....	1.25
D. A. Robnett, Columbia, Mo., 10 varieties.....	4.50
M. V. Walker, Liberty, Mo., 3 varieties.....	1.50
S. R. Walker, Liberty, Mo., 5 varieteis.....	2.25
Mrs. Ira Stevenson, Liberty, Mo., 6 varieties.....	2.75
F. Bandy, Liberty, Mo., 1 variety.....	.40
W. E. Harbaugh, Liberty, Mo. 1 variety.....	.40
A. N. Bird, Liberty, Mo., 3 varieties.....	1.25
J. W. Wigley, Liberty, Mo., 3 varieties.....	1.20
W. Manly, Liberty, Mo., 1 variety.....	.30
L. Lightburn, Liberty, Mo., 3 varieties.....	1.30
L. Hardin, Liberty, Mo., 1 variety.....	.30
Mrs. C. W. McCannin, Liberty, Mo., 1 variety.....	.30
J. C. Pfeister, Liberty, Mo., 1 variety.....	.30

J. E. May, LaPlata, Mo., 3 varieties.....	1.00
A. W. Lightburn, Liberty, Mo., 1 variety.....	.45
W. H. Benedict, Richards, Mo., 3 varieties; 1 col. Evap. apples	1.50
E. J. Baxter, Nauvoo, Ill., 9 varieties; 1 variety pears.....	3.70
W. Va. Hort. Society, 14 varieties.....	10.50
F. G. Henley, Spring Garden, Mo., 4 varieties.....	2.20
H. Schnell, Glasgow Mo., 6 varieties; 3 varieties chestnuts; 2 varieties hickorynuts; 6 plates sweet potatoes.....	3.00
S. Y. Thornton, Blackwater, Mo., 2 varieties.....	.80
Joseph Gamble, Brookfield, Mo., 7 varieties.....	3.50
D. M. Hulen, Hallsville, Mo., 1 variety.....	.50
C. M. Williams, Laclede, Mo., 7 varieties; 3 plates potatoes..	4.00
Chas. W. Steiman, Dalton, Mo., 7 varieties.....	3.25
L. J. Hartman, St. Joseph, Mo., 5 varieties.....	2.40
Henry Kirklin, Columbia, Mo., 1 variety carrots; 1 variety parsnips; 2 varieties celery; 1 jar strawberries.....	1.75
John M. Surface, Kansas City, Mo., 1 variety.....	.40
J. B. Wild & Bro., Sarcoxie, 4 varieties.....	2.00
Miss Wheeler, Columbia, Mo., 1 variety.....	.40
Total.....	<u>\$102.85</u>

We also desire to give honorable mention to the excellent display of imitation fruits by Miss Rubart.

E. J. BAXTER, Chairman,

G. H. POWELL,

W. S. MONGER, Secretary,

Committee.

ELECTION OF OFFICERS.

G. T. Tippin spoke of the importance of the coming year on account of the World's Fair, and the necessity for an able and fully equipped man to meet the obligations that would fall upon the president. He nominated Dr. J. C. Whitten and moved that the rules be suspended and the secretary be instructed to cast the ballot of the society for Dr. J. C. Whitten for president.

C. H. Dutcher seconded the motion.

The motion was carried without dissent and the secretary cast the vote of the society for Dr. J. C. Whitten, and he was declared elected president.

J. C. Whitten.—My friend, Tippin, could not have surprised me more than by nominating me for president. I have always felt that

it was fortunate that active fruit growers have held the offices in this society. The work has been in the hands of men who do the things they teach. It is comparatively easy to tell how the work should be done, but you know it is not always easy to do it successfully. I have always felt that it was the right thing for actual fruit growers to fill the offices and my first thought was to decline; but I thank you for the honor and accept, with the thought that to preside over the meetings will be about all that will be required of me. Sometimes bad results have followed the election of some one outside the ranks of practical fruit growers; but I promise to be upon my guard to avoid trouble. In any event I feel that the secretary is the head and the frame work of the society, and as long as we have our present secretary I think the work will be carried on successfully. I thank you for the honor of presiding at your meetings.

Mr. C. H. Dutcher was nominated for first vice-president, and Mr. Baxter moved that the rules be suspended and the secretary cast the entire ballot for Mr. Dutcher as first vice-president. The motion was seconded and carried; the secretary cast the ballot and President Robnett declared the election.

Jas. M. Irvine nominated Mr. W. G. Gano for second vice-president. J. L. Erwin made the second and moved to suspend the rules and have the secretary to cast the vote for Mr. Gano. The motion was carried and the secretary cast the ballot, and Mr. Gano was declared elected second vice-president.

N. F. Murray placed Mr. W. T. Flournoy in nomination for treasurer and moved that the rules be suspended and the secretary instructed to cast a unanimous vote for Mr. Flournoy. The motion carried, the secretary cast the vote and the president declared Mr. Flournoy elected to the office of treasurer.

L. A. Goodman was nominated for secretary and the motion was made for the president to cast the vote for Mr. Goodman as secretary. The motion was carried, the president cast the ballot and declared Secretary Goodman re-elected to the office.

On motion of Mr. Atwood a vote of thanks was given the retiring officers.

Pres. Robnett.—I feel better going out than I did coming in. The honor of being your president was far more than I expected when I began to grow an orchard.

Vice-Pres. Tippin.—I thank you for the recognition I have been shown. I will still work for the best interests of the society as I have done in the past.

REPORT OF COMMITTEE ON BLACK BEN DAVIS AND GANO.

December 10, 1903.

To the Missouri State Horticultural Society:

Gentlemen.—Your committee appointed to investigate the origin and characteristics of the Black Ben Davis and Gano apples respectfully beg leave to report as follows:

Inasmuch as some horticulturists are positive in their opinions that Black Ben Davis and Gano are two distinct varieties and others were equally positive that they are one and the same variety, the committee decided to secure all possible data concerning the origin of Black Ben Davis and Gano, to visit bearing orchards where the trees and fruit could be compared and to secure fruit that could be kept in storage and compared from time to time during the winter and spring.

A letter was addressed to the introducers of Black Ben Davis, asking for data concerning the origin of this variety and the location of the trees from which they secured their scions, in order that the committee might visit these trees. This request was promptly responded to by the introducers. One of the leading members of their firm accompanied the committee to the Arkansas orchard from which they secured their Black Ben Davis scions. Every possible effort was made by them to put the committee in possession of the necessary facts and materials for the investigation and they co-operated with the committee throughout with enthusiastic zeal to facilitate a thorough and impartial investigation.

It was found that the nine trees from which the Black Ben Davis scions were secured were growing on the farm of Mr. John Bain of Lincoln, Ark. These nine trees were propagated in 1883 by Mr. G. L. Guthrie, now of Pauls Valley, Ind. Ter., but who in 1883 lived on the Bain farm where nine trees now stand. Mr. Guthrie secured his scions from a tree which grew on the old Parson Black farm, near Lincoln, Ark., and which was occupied and owned by John Reaman at the time when the scions were taken but which now belongs to Nathan Thomas.

The next step was to find out if possible where the trees came from on the old Parson Black place, from which Mr. Guthrie secured his scions for propagating the nine trees which furnished the scions

from which Black Ben Davis was introduced. It was found that this latter tree was destroyed some years ago, to make room for an addition to the house, and that the trees propagated from it by Mr. Guthrie were said to be the first that had been propagated from it. The committee visited the spot where the old tree stood. From Mr. Thomas, the present owner, from old friends and neighbors of Parson Black and of Mr. Reagan and from others we learned that this tree began growth there sometime between 1865 and 1869. No one of them would venture a statement as to where that tree came from or whether it came from a seed or was brought there from some other place. They were all well acquainted with its having been there, with the fact that it was one of the best varieties in the neighborhood, that it produced very regular crops of its well known, large, highly colored, beautiful apples, but were not sure as to whether or not the tree was a seedling.

A letter from Mr. Guthrie, who first propagated from it, confirmed the statements made by the people who have lived in the vicinity of the old Black home, together with the additional statement that the tree was a seedling. The evidence which he gave in support of the statement that it was a seedling was that it did not seem probable that anyone would plant a tree so close to the house and the cellar, so he judged that it came up accidentally. The committee found other cases, however, where trees had been planted as close to other houses in the neighborhood as this one formerly was to the old Black residence.

The committee was able to locate then the original Black Ben Davis tree so far as it was known in the neighborhood, but could obtain no positive evidence as to whether or not this tree was a seedling. It was found also that the variety had locally sometimes been called Reagan, in honor of the owner of the farm at the time the variety was being propagated there. The introducers used the name Black Ben Davis, selecting the word Black in honor of the owner of the place where the first tree started in the neighborhood and the name Ben Davis because the apple was of the Ben Davis type and in some respects resembled the latter variety. The committee also saw Black Ben Davis growing on younger trees in the neighborhood of Lincoln, and took specimens of fruit and twigs from various places to compare with Gano.

The history of the Gano apple, so far as it is known, has been secured by the committee through data furnished by W. G. Gano, M. Butterfield, A. L. Zimmerman, Blair, Kauffman and others. From the data obtained from the above gentleman and from personal investiga-

tion of the committee the following summary is made: In the year 1838, Ely Jacks came from Kentucky to Howard county, Missouri. He brought with him seeds and perhaps young trees or scions of apples. These were planted in Howard county. In 1839 he went to what is now Platte county, Missouri, and the following year moved his young apple trees there from Howard county, and planted them in what soon became the largest orchard in that part of the State (ten or twelve acres). About that time a traveling agent sold Mr. Jacks several trees of what he called New York Pippin, which afterward proved to be what is now known as Ben Davis. As the seedling trees brought from Howard county began to bear fruit; all those that produced fruit of fair size and quality were allowed to develop and those that were of no promise were from time to time top-worked with the so-called New York Pippin. These New York Pippin or Ben Davis trees were said to have been the first trees of this variety from which it began to be disseminated in that part of the State.

In the early seventies attention was attracted to one tree in this old Jacks orchard which had before that been regarded as a Ben Davis, but which had fruit of much redder color. The question as to whether or not it was really Ben Davis began to be discussed. About this time fruit from it was exhibited at a meeting of the horticultural society where Dr. Warder's attention was called to it. He pronounced it a distinct variety. Specimens were also sent to Downing and he agreed with Dr. Warder that it was distinct from Ben Davis and suggested that it be given a name. In 1884 it was named Gano, in honor of W. G. Gano. The earliest information which we have of the Gano apple comes from this tree which was started in the old Jacks orchard about 1840, or earlier.

Since Gano has been named and has been disseminated as a distinct variety attention has frequently been called to old trees of this variety, growing here and there in Missouri and adjoining states. In some cases the old Jacks orchard has been definitely traced as the source from which these trees came. In other cases where the source from which the trees came cannot be definitely determined the orchards frequently contain Ben Davis and other varieties which were being disseminated mainly from the old Jacks orchard at about the time these trees must have been planted out. Two trees of Gano have been definitely reported from an old orchard in Kearney, which was planted out about 1840, the two Gano trees being apparently of the original planting. In Mr. Mocks' old nursery, in Lafayette county, several trees of Gano were located. Several trees of Gano have been reported from old orchards in Cook county. An old tree.

planted twelve miles south of Hutchinson, Kas., about 1850, has been identified as Gano. A tree now over thirty years old in the orchard of Mr. E. A. Sylvester, Osborn, Mo., attracted the owner's attention a few years ago. He began propagating it, believing it to be a superior new variety, but since becoming acquainted with the Gano apple he pronounces his tree identical with the latter variety. This tree was one of ten trees bought by Mr. Sylvester for Ben Davis from Mr. Zimmerman of Cameron, who propagated it from stock which originally came from the old Jacks orchard, showing that scions of the Gano in the old Jacks orchard were unknowingly mixed with Ben Davis scions which were frequently cut from that orchard at a time when the Gano tree was regarded as being only a highly colored Ben Davis, or New York Pippin as it was then known.

From the above it will be seen that the committee has not been able to positively determine the primary origin of either Black Ben Davis or Gano. The oldest known Black Ben Davis, which grew on the old Parson Black farm, near Lincoln, Ark., was not proven to be a seedling nor was there any definite proof that it was not. The earliest known Gano, of the old Jacks orchard, is of similarly uncertain origin.

Even if the committee could have established beyond doubt the fact that these trees were of separate seedling origin they would hardly have been justified in passing a positive judgment from this fact alone that they were different varieties, though the chances in such a case would have been very great that such would prove to be true. There are a few cases on record where two different seedlings of the same general type of orchard fruit are so much alike that they cannot be distinguished as separate varieties. For example, the Crawford type of peaches sometimes reproduces itself (or comes true) from seed. The Green Gage plum, one of our oldest and best known varieties of tree fruit, sometimes reproduces itself perfectly from seed. Not all the Green Gage plums now in cultivation are of identical seedling origin. A seedling of Whitney Crab, grown from seed known to have been taken from a Whitney, was introduced in Minnesota and for a time regarded as being superior to its parent, but as the tree got to be older and as other trees were propagated from its scions it was finally pronounced to be indistinguishable from its parent and ceased to be regarded as a separate sort.

On the other hand, even if proof was available that Black Ben Davis and Gano were of identical seedling origin that would hardly be positive proof that they might not be different varieties. It is a fact well known to fruit growers that a variety sometimes produces

sports, or bud varieties, which are different from the variety on which they were produced. For example, the nectarine is a bud sport from the peach. Occasionally a peach tree produces a branch which bears the hairless nectarine and when buds from such a branch are used for propagating they often retain the characters of the nectarine. The difference between the red and yellow Gravenstein apples is only a case of bud variation from the same original seedling and the same thing may be said to be true of the red or striped strain of the Red Astrachan and other varieties in which bud variation has occurred. A bud variation which reproduces distinct varietal characters is as distinctly a variety as is a seedling variety.

For this reason the committee secured fruit from the Black Ben Davis trees in the Bain orchard and also from other younger trees of the same variety growing in the vicinity of Lincoln. Fruit was selected from old and young trees in different orchards in order to fairly represent the variety as grown under different conditions. Fruit was also secured from the Gano trees to compare with the former variety. In order to fairly test the keeping qualities of Black Ben Davis fruit from Ben Davis trees was secured from the Bain orchard where they were growing under conditions comparable with those of Black Ben Davis. It is generally admitted by fruit growers that the Ben Davis and Gano are much alike as to keeping qualities. Twigs were also secured from the same trees so a study of their characters might be made. Each member of the committee took portions of these specimens and kept a part of them in cold storage and a part of each in ordinary cellars, so as to observe them at different times during the winter.

Some of the points of difference which different fruit growers have from time to time stated to exist between Black Ben Davis and Gano are that the former possessed a more yellow flesh, was firmer and a better keeper and possessed a more sprightly flavor, especially toward spring than did Gano. Some have also suggested that there was a slight difference in the shape and that the former might be of higher color. After a careful comparison of the apples once each month during winter and spring the committee are unable to find any difference between Gano and Black Ben Davis. Black Ben Davis differed no more from Gano than did the individual specimens of each sort differ among themselves. Both Ben Davis and Gano kept as well as did Black Ben Davis. So far as the committee could see Black Ben Davis and Gano were of the same color of flesh, of the same flavor and of identical varietal character throughout. In each variety certain specimens kept better than others and the firmer

specimens of each sort were more crisp and of better flavor when cut from time to time than were the riper specimens of the same variety.

Some authorities have suggested that there was a difference between the twig and leaf characters. The two-year-old wood of Black Ben Davis has been pronounced more hairy than that of Gano and the venation of the leaves has been said to differ. This committee has not been able to distinguish any difference between the trees, twigs or leaves that did not exist to an equally marked degree between different specimens of the same variety.

The phenology of Black Ben Davis and of Gano has been recorded for trees of similar age in the same orchard, where they were given similar treatment. There was no difference in the time of starting into growth in spring, in the time of blossoming, in the color or other characters of the flowers or in the time of shedding of the leaves in autumn.

Specimens of Black Ben Davis and Gano were taken to Washington by two members of the committee and submitted to test by the pomologist and his staff on March 3d, 1903. This staff of officials comprised Col. Brackett, Pomologist; Wm. A. Taylor, Pomologist in charge of field investigations; G. Harrold Powell, H. P. Gould and W. P. Corsa, assistant pomologists, and Allen Dodge of the clerical force.

The fruit was examined and tested by each of the above men separately. Neither the identity of the two lots of apples nor the opinions expressed by others concerning them were known to the examiners; though the conditions surrounding the growth and subsequent conditions of storage were explained to them.

It was the opinion of the staff, with one exception, that the two lots were one and the same variety. Mr. Dodge of the clerical force expressed the opinion that the lot marked (Gano) contained specimens of slightly firmer texture and of slightly greater acidity, which might be due to the varietal difference. In other respects he also pronounced them to be the same.

The committee secured this opinion from what should no doubt be considered the highest source of opinion in such matters in the country, not to any way bias the opinion of the committee, but in order to present the strongest possible evidence that could be secured from a test of the fruit alone.

After finding no differences, either in the fruit or in the trees by which they can be separated, your committee is forced to conclude

that Black Ben Davis and Gano are one and the same variety; and that their having been regarded locally as being different sorts is only another case where isolated trees of variety, having been brought to notice in somewhat widely separated neighborhoods, have each for a time been given different names and each been honestly regarded as being of distinct seedling origin. The original notes, correspondence and other data upon which this report is based are herewith delivered into the possession of the society.

J. C. WHITTEN,

J. C. EVANS,

W. T. FLOURNOY,

Committee.

N. F. Murray moved that the report of the committee be received and adopted and that the committee be discharged.

The motion was seconded and carried unanimously.

SOME OF THE TROUBLES IN GATHERING APPLES FOR THE WORLD'S FAIR.

(G. A. Atwood, Springfield, Mo.)

The greatest trouble in gathering apples for the World's Fair to be held in St. Louis in 1904 was to find bearing orchards.

Many orchards are located alongside the railroads. This is specially true of the thousand-acre orchards, of which there are now seven, and more in contemplation in South Missouri. But the frost of April 30 seems to have been attracted by the steel rails, as the bearing orchards were away off—out of sight of the columns of smoke sent up by the iron horse—yes, beyond the sound of the whistle of the engine.

It was a fact, though, that there were next to no apples along the main tracks of the South Missouri railroads, while some of the orchards on the spurs of the main Ozark range, six to fifteen miles from a shipping station, had full crops.

Elevation and other conditions were the same on the spurs as on the backbone. Some one may surmise that the difference in yield may have been caused by the difference in cultivation. Hardly! for, as a rule, there was not cultivation enough in either case to count.

It was quite a trouble to drive through one or two counties to find an orchard containing any apples that would measure up to Superintendent Goodman's specifications. However, this was a case where trouble was not to be considered. Our State was in a contest—honor

was at stake, so long drives were made through Pulaski, Camden, Miller and other counties for sound fruit.

It is ever thus—in times of need we go to the country for help!

Another trouble—peculiar to 1903—was the large per cent. of apples that were damaged by insect enemies. There were as many codling moths this year as ever, and as the crop of apples was small there were but a few more than enough to go around, and these few were found and barreled. Jonathans, choice ones; Missouri Pippins, some as good as ever grown; York Imperials, fine ones; Ben Davis and some others. The old stand-by—Ben Davis—was not so much in evidence this year as usual. The few that escaped the frost were mostly pre-empted by the codling moth, and but few of this great basket-filler were wrapped. Still, there will be enough big Bens to show the world that the Ozark product is the only Ben Davis that can compete with the other great favorites in the home and foreign markets.

Again, the scarcity of apples discouraged the coopers from opening their shops, so barrels had to be shipped from the larger cities.

When the regulation wrapping paper was exhausted the packers had to use old newspapers. Now, there are plenty of printing offices in all these counties, and school houses, too, for present needs, but where neighbors live four miles apart big bundles of old papers must be obtained from a distance.

The severest trouble was to get the barrels of packed apples to the railroad station, fifteen miles away; particularly so on the nerves and conscience of the collector who valued his reputation against the time when the barrels will be opened May 1st or thereafter in St. Louis.

Where the road was recklessly rocky, as close by Tavern creek, for instance, we feared that the seeds would be shaken loose from their fastenings and forced through the apples. If there are any seedless apples at St. Louis, Mr. Superintendent, you will know the reason why!

I assure you, ladies and gentlemen, it was of the apples we were thinking at such trying moments, not of our discomfort—we could walk over the rockiest places.

We hasten to state that the roads, for most of the distance, were good. On the heights there were no rocks and driving was a pleasure.

From some of these points, friends, there are views of fifty miles to the south and as many to the north, of wooded hills where sometimes apples and peaches will be grown.

Fortunately the weather was favorable, delightful all through the

packing season. The people were obliging, whole-hearted, proud if their fruit came up to the tests, Missourians clear through, and are hoping that they will have some fine apples for St. Louis in 1904.

We found many orchardists who regretted they could not contribute apples this year who will send their best next year. Everywhere the people are thinking of the great fair. Many are determined to go and take the older children. It will be an education—an inspiration to them of inestimable advantage materially and intellectually.

Permit the suggestion, brethren, that every member of this society should encourage those who live out on the farms, who think they can afford the trip, to spend a few days at the exposition. Better should they borrow the money for such an investment than to forego the opportunity to see the greatest exhibit of all the ages.

It may not be out of place in this paper to suggest that our able World's Fair commissioners should take some action during the fair towards looking after the lodging of her own people, not to offer free entertainment. You know full well that there are among your neighbors those who will prefer to remain at home rather than go to the fair without knowing where or at what cost they can obtain lodging. With such a committee with headquarters at our State building, thousands will see the show and be lifted up by it, who, without it and its guarantee of service, will remain at home. The opportunity of a lifetime, brought about by the expenditure of millions of the people's money, should be enjoyed by the greatest possible number of our citizens.

Take it all together the troubles in gathering World's Fair apples were more than compensated for by the pleasures experienced.

First, the cause was inspiring, next, the people were glad to help, and when we found some choice fruit we rejoiced. And, then, the grandeur of the region, the glorious views, the trees, the vines, the inexhaustible resources in the soil, its special adaptability for fruit growing, the wonderful possibilities of the country, all impressed us, and, looking ahead, we saw this same country divided into farms where prosperous thousands have orchards on the heights, vineyards on the slopes, corn and wheat, timothy and clover in the valleys and sheep and cattle grazing on the uncultivated places or contentedly chewing their cuds in the shade. So will this be in the coming years, the home-iest spot—to coin a word—of the earth.

Again, looking ahead a few months, really but a few days now, from this crest of the Ozarks we see the World's Fair city—the horticultural palace with its seven acres of fruit—and we see a proces-

sion of men, women and children from every state and from over sea, moving in steady line for 210 days, and as they come to Missouri's 10,000 feet of space, they say: Look! this is Missouri! See the berries, the grapes, the peaches, the apples, and all declare, as was said at New Orleans, at Chicago, at Omaha, "Missouri is the richest State, greatest in resources."

A little later from the same crest we see another movement from every state, this time by families, coming to Missouri, and settling on her unoccupied lands, and our State becomes the first in number of farms and they are owned by the families who cultivate them. And here is being worked out successfully, co-operation—the only salvation for commercial fruit growing.

Yes, indeed, as we were apple gathering in those September and October days, and traversed broad areas that have never been touched by spade or plow we saw it as it soon will be, the fairest portion of the greatest orchard section of the globe.

Your secretary, who is also our faithful World's Fair superintendent of horticulture, should have made my topic: "Some of the Pleasures in Gathering Apples for the World's Fair."

EFFECTS OF THE MAY FREEZE.

(A. J. Davis, Jefferson City, Mo.)

Mr. President:

The freeze of the morning of May 1st almost completely ruined the apple crop in our locality. In looking up apples suitable to exhibit at the Louisiana Purchase exposition I examined the fruit in all the orchards, beginning at Jefferson City and extending some ten or twelve miles up the river, and about the same distance to the west and southwest of that place. In all the orchards examined I found but six that contained any apples that would grade No. 1, and only three of the six contained any first class fruit of consequence. One of the best of the orchards was located on the Missouri river bluffs about nine miles above Jefferson City. The trees in this orchard are about 25 years old, and had been given clean culture the past season. The land sloped to the north with timber on the northeast and west sides. Varieties: Ben Davis, Wolf River, Gilpin, Grimes Golden, Huntsman; apples, medium to large with but very little scab or rot, and but few wormy specimens. There was no injury from the freeze apparent in this orchard. Located about 300 yards south on the same ridge and about the same level is another orchard; trees about 16 years old. I would have estimated the apples in this orchard at about 300 bushels. I was

unable to find a single apple in this orchard that would grade a good second. Scab, bitter rot, codling moth and the freeze had completely ruined the crop. Varieties: Ben Davis, Jonathan, Huntsman and Missouri Pippin; orchard not cultivated the past season. The fruit in all the orchards examined along the Missouri river bluffs, with the one exception, was almost completely ruined by the freeze. Commencing about five miles southwest of Jefferson City is a high strip of table land comparatively level. In this locality I found the apples less injured by the freeze than elsewhere; here were located the other two orchards, where the freeze had not injured the apples to any great extent, although there was considerable damage by scab, bitter rot and codling moth. While these orchards were owned by different men, they were practically only one orchard, they being on comparatively the same level and only the country road dividing them. In at least 95 per cent. of the orchards examined, I believe it would have been better for the owners if the freeze had made a clean sweep of all the fruit, as it was almost worthless for anything except breeding grounds for scab, bitter rot and codling moth.

Pears, peaches and plums were nearly all killed before the freeze of May 1st. Cherry trees were loaded with young fruit when the freeze of May 1st came and killed nearly all of them.

Strawberries.—I have about thirty varieties in cultivation. The following varieties were severely injured by the late freeze: Early Sunrise, Michell's Early, Clyde, Star, Bush Cluster, Nick Ohmer, Georgia Prolific, Tennessee Prolific, Brandy-wine and Beder-wood. Johnstone's Early first fruit and bloom all killed, but gave us a fair crop of late berries. Among the varieties that were the least injured were Excelsior, Crescent, Sunnyside, Edith, Warfield, Ridgeway, Parker Earl, Downer's Prolific and Pine Apple.

Black Raspberries.—Four varieties. Of these Laughlin was about three-fourths killed; Kansas about one-half; Centennial one-half, while Mammoth Cluster was uninjured.

Red Raspberries.—Two varieties. Miller slightly injured; Brandy-wine gave us the heaviest crop of fruit we have ever grown.

Blackberries.—Four varieties. Brunton Early, about one-half fruit killed; Snyder slightly injured; Taylor and Kittatinny uninjured by frost, but severely damaged by hot winds and drouth of July.

Grapes.—Two varieties, home use only. Moore's Early and Concord; all new growth killed by freeze of May 1st; about May 3d removed all dead leaves and vines. Moore's Early produced fair crop from dormant buds; bunches under size. Concord produced the finest crop of fruit from dormant buds I have ever succeeded in growing. I

have only ten vines, five Moore's Early and five Concord, trained over an arbor. I give them clean culture and apply about five bushels of hardwood ashes each year and thoroughly dust with dry Bordeaux mixture. Observations of effect of late frost on small fruit. In 1875 I was residing at Chamois, Osage county. I had growing in my garden Concord and Catawba grape, Lawton blackberry, Doolittle blackcap raspberry, Red Dutch currant and Wilson's Albany strawberry. When the grapes, blackberries and currants were in full bloom and strawberries and raspberries had set considerable fruit there came a freeze so severe that it killed all the new growth on blackberries, raspberries, grapes and currants and also bloom and fruit on strawberries. I remarked to my wife the next day, "You'll not be troubled with putting up fruit this year." You can imagine my surprise when in about two or three weeks later all the vines and plants were again in full bloom and we had an abundance of all the small fruits we had in cultivation, with the exception of Catawba grape, which failed to ripen its fruit before freezing weather in the fall.

This year grapes were the only small fruit that had the new growth killed. From these vines we had a splendid crop of grapes, while the same varieties growing near Jefferson City that were only partly killed gave but a light crop of inferior grapes. This suggests to me an experiment which I shall certainly give a trial if I ever have my vines injured by late frost. I shall strip all new growth from the vines, being careful not to injure dormant buds, thus forcing new growth from dormant buds. I shall also experiment with blackberry and raspberry along the same line.

WORK AT THE SHAW SCHOOL OF BOTANY.

(G. D. Schulte, Scholarship Student, St. Louis, Mo.)

By the request of Mr. Goodman I shall endeavor to interest you a while with a report concerning the Missouri Botanical Garden, and the scholarship which I have the privilege of holding through the appointment of the Missouri State Horticultural Society. Many people hear or read of the Missouri Botanical Garden at St. Louis. Many more visit it from year to year and revel in the pretty flowers, well laid walks, the tastefully arranged green houses, and the rare and valuable plants which they contain. Few of these thousands of people know of the course of instruction that is offered to young men desiring to advance themselves in the science of botany and at the same time receive a thorough training in all subjects relating to

gardening. According to the wishes of its honored founder, the garden now supports six scholarships. Upon the graduation or resignation of any of the students from this course, the scholarship is awarded to young men who have a rudimentary knowledge of the English branches, and who are to be given free lodging and wages sufficient to insure a bare sustenance during the time devoted to their studies; when they practice all the operations of the garden, from the most menial to the most responsible, at the same time they are given theoretical instruction in the direct line of their work, and in such subjects as book-keeping, surveying, botany, entomology and other subjects that are considered necessary for a trained, intelligent gardener. The course extends through a period of four years.

In a day like ours when specialization is the lot of most men it becomes very necessary that every young man should equip himself along some special line of work. Because of this fact we have now six students who are receiving a salary and others at the garden who are bearing their own expenses. Very often I have been asked why I took up this line of work. I remember one instance in particular when working in one of the chrysanthemum houses. A bright young man asked me this question and said that botany seemed anything but interesting to him. I gave him my reasons and then when the opportunity presented itself, I told him he might have his choice of any six of the two thousand most delicately colored and perfectly developed blooms (such as were seen at the garden during the month of November). If you could have seen him selecting those six chrysanthemums you would have agreed with me that he made a grave mistake when he said that botany was not interesting to him. For how were these magnificent blooms produced? At one time the chrysanthemum was only an inferior flower measuring less than an inch in diameter. But by the untiring efforts of the gardener, who (through a knowledge of botany), by cultivating, fertilizing and hybridizing, developed the chrysanthemums until today we have flowers 18 and 20 inches in circumference.

So I may say that everyone who is a lover of flowers is interested in botany.

In former years botany stood as a scientific diversion or pastime for men whose serious business in life was of a very different nature; but in a day like ours when labor is divided and sub-divided, or we may say in a day of specialization, we see some men who are able to devote their entire time to scientific research and by a succession of experiments and discoveries gather a vast amount of valuable knowledge, which will sooner or later be used for the benefit of all men.

First of all, let us see how the student has been benefitted by this knowledge. It is a fact that botany like any other science has come to the front as a study well calculated to develop the powers of observation and the reasoning faculties. And with the splendid herbaria, broad reference library and the abundance of material, both living and preserved, which the student may have access to, he may receive such training as will give him a firm foundation from which he may delve into the wealth of discovery which lies just within his reach.

Agriculture and horticulture are so closely related to botany that it is scarcely necessary to mention the dependence of the successful farmer, fruit grower or florist, upon an intelligent understanding of and conformity to the laws of vegetable physiology in the operation of his everyday life. The nurseryman and the florist are perforce botanists. To them a general knowledge of systematic botany and that careful development of the powers of observation, which a close study of the characters of plants gives, go far to assure success when combined with shrewd business tact and a practical familiarity with the manual process of their vocation.

That the Missouri Botanical Garden and School of Botany might be of the greatest utility in gathering and disseminating of this knowledge was the express wish of its founder. Again, the farmer should be well versed in forestry and familiar with the weeds of the farm, and the most successful means of contending with them and repressing their advances. The reckless manner in which the most troublesome weeds are scattered from farm to farm and from State to State with clover and grass seed, necessitates a knowledge of their seeds such as can be obtained only by careful study.

To provide for this we have the splendid Arboretum and grass garden where the student may study the forest trees and our native grasses and also the weeds. Here in the Mississippi valley the horticulturist contends with climatic conditions unknown in the east or in the coast countries of Europe, whence we have received many of the valued varieties which we are trying—often in vain—to cultivate, as well as the methods of treatment by which we struggle for success. The coming fruit grower must rely upon the teachings of botanical geography in the selection of varieties and upon a most exact understanding of the best methods of breeding and selecting new races of hardy percentage if he would advance to that success which is ultimately hoped for in this changeable and severe climate.

This home creating and home beautifying interest is not lost sight of in the course of instruction mapped out for the student of the Missouri Botanical Garden.

Another interesting and comparatively new line of study is that of plant disease which is a botanical study in more senses than one. The most destructive diseases are almost without exception caused by parasitic plants of low organization. The blight of the pear and apple is attributable to the growth of certain bacteria which destroy the trees while feeding upon the starch contained in the young growth made by them. To barely enumerate the rusts, smuts, mildews and rots of our most valuable plants would prove wearisome and would make an appalling list. Nearly all of these are fungi. To lessen their ravages we must understand their nutrition, growth and propagation, and the varied forms in which many of them appear. The grape mildew and rose mildew are no longer the dreaded foes that they were a quarter of a century ago. The educated gardener of today understands their natural history and is able to hold them in check.

The fact that they are superseded by fungus diseases much more deadly should be a stimulus to further study and one which by the aid of the library and able instructors may be profitably pursued by the student.

Another branch of work that I wish to mention is that of the chemical laboratory. It is quite true that the plants which we see in public parks and gardens are valued for their beauty and the gracefulness which they lend to the surroundings, little thought being given to the active principles which they contain.

For instance, the poppy (*papaver longifolium*) though its flowers are beautiful to look upon, we know that in its capsules are certain juices from which opium is derived.

In all of the large botanical gardens of today you will find a chemical laboratory where the active principles of certain plants are distilled and much useful knowledge is obtained, which would be lost were it not for the chemical laboratory. The tobacco plant (*Nicotiana Tobaccum*) is the subject of the tender care of the botanist and chemist. Many of the diseases which attack the plant can be traced to chemical processes in the soil—a lack of something here or an excess of something there.

Before concluding I wish to give a brief description of the garden and point out some parts that are of interest. During the summer months the outside garden is the more attractive; which, with its well-kept walks and beds and ponds, presents a picture not soon to be forgotten.

In the ponds are found the splendid *Nymphæas*, whose leaves grow to be six feet in diameter and will support a weight of several

hundred pounds. The parterre with its beds of brilliant flowers adds much to the beauty of the surroundings. The grove in which the instigator of all this beauty is entombed is always a welcome retreat to the tired visitor. To one side the fig trees show their rich green foliage and their luscious fruit. The magnolia trees with their fragrant blossoms always excite the admiration of the visitor.

Of the houses perhaps the most interesting are the Mexican house containing many rare plants from that country. The East Indian house with its array of anthuriums and other tropical plants.

The Fern dome in which can be seen any fern from the smallest to the Giant Tree fern from the Hawaiian Islands.

The cactus houses which contain one of the finest collections of cacti in the United States; the Agaves (century plants) which bloom only once and then die.

The palm dome where the majestic palms throw out their giant leaves. The houses containing the economic plants, some of the most interesting of which are the coffee tree (*coffea arabica*), the quinine tree, strychnine plant, tea plant, the rubber trees (*Ficus elastica*) and many others.

Such a collection, with the other things that group about it, gives the means of studying not only the systematic botany of a region—of what plants are—but also of studying the ways in which plants grow; contributing thus directly to horticulture through the advancement of a knowledge of vegetable physiology and by the study of the diseases of plants, and of the possible preventatives or remedies for such diseases.

A great deal of work remains to be done in this way and as time goes on the Missouri Botanical Garden is sure to play its part in such work.

THURSDAY, DECEMBER 10, 2 P. M.

INSECT ENEMIES OF THE YEAR.

(Prof. J. M. Stedman.)

I will speak a short time only of some of the most troublesome insects of the year, judging by the letters which come to the office.

The Bark or Pinhole Beetle.—As a rule this insect attacks dead, weak or sickly trees. It makes a hole through the bark and then works down between the bark and wood, depositing its eggs, about eighty in number, which soon hatch and continue the work of eating their way between the bark and the wood. In a short time they undergo their

transformations and produce a crop of mature beetles and the orchard is overrun with them, then they will begin to attack perfectly healthy trees. This little branch I hold up before you had 167 larvae in it. This insect ordinarily does no great amount of damage, but last year it caused immense damage on account of the drouth of the year before. The drouth injured the trees and gave the beetle excellent opportunity to multiply and breed in the orchard. Many trees died from the effects of the bark beetle and people said, "The drouth killed them."

The best thing to do is to go through the orchard in the winter and cut out all the diseased branches of the trees and burn them, thus killing the insects before they have a chance to come out and spread. Shriveled bark indicates their presence. I know of a great many orchards which are absolutely ruined by this insect alone.

The Aphis.—This insect does damage in the spring. You can detect them in your orchard now, clusters of little black eggs about one-third the size of an ordinary pin head. These are winter eggs. They hatch early in the spring when they may be killed by spraying with kerosene emulsion, or the ten per cent. kerosene and water mixture. Plum aphid is found upon the young shoots and leaves. Later it gets upon weeds; and in the late fall gets back upon the trees to lay its eggs. Spray early with kerosene emulsion, and you can add a pound of pyrethrum to the barrel of spray.

Apple Tree Pruner.—This insect comes from the forests and deposits its eggs in the twigs. The larva eats its way into the pith and downward. When full grown they eat out to the bark, greatly weakening the twig and when the wind blows the twig snaps off, and you have your trees severely pruned. You can gather up the twigs on the ground and burn them, but if the forest is near by, burning will be unsatisfactory, since more insects will come in.

Twig Girdler.—The adult beetle of this insect lays several eggs in the twig and then girdles it from the outside, for its larvae must have dead wood. When these girdled twigs snap off, gather them and burn them. If you are near the timber this will be of little use.

The Twig Borer.—Comes from the forest in the adult state and gets into the tree at a bud and eats a hole down to the pith. Its life history is not known. The twigs die, but do not break off. The only thing you can do is to prune off the twigs. You can do this only on small trees.

Imbricated Snout Beetle also comes from the forest, and gets upon the trees in the spring, feeding upon the cambium layer and the tender bark. Its life history is not known, except that it does not develop in the orchard. Spray with arsenical poisons very thoroughly to cover all the

young twigs with poison. This is difficult, as the leaves prevent the spray from covering the twigs.

West India Scale.—This scale is not from the West Indies. It is very conspicuous, making the tree look like it had been white washed. It is almost as bad as the San Jose scale. It will attack almost any plant of a deciduous nature. Nursery stock may be rid of it by fumigating with hydrocyanic acid gas. Some parts of the East are absolutely overrun with this scale.

Canker worm must be taken in hand when it first appears if you would successfully fight it. It feeds rapidly. Spray with arsenical poisons, using one pound of Paris green to one hundred gallons of water with the usual three pounds of fresh lime added. There is no reason to suffer from this pest. It is easy to fight. You can prevent it by bandaging your trees in September or October. Take wire netting four inches wide, lap it around the tree, cutting it some six inches longer than the circumference of the tree with a pair of shears; cut into one edge of this four-inch strip at short intervals. Put it on the tree with the cut edge up, overlapping the sections so that the lower edge of the netting will stand out from the tree; remove all rough bark and fasten the screen close to the body of the tree with tacks. The female of this insect is wingless and gets on the tree by crawling up the trunk. I have never known them to crawl around the edge of the screen put on as described. Be sure and stop up all holes between bark and screen.

The spring canker worm comes out in warm days as early as January and crawls up the trees. The fall canker worms begin to come out the first of October. The same remedies apply to shade trees.

The Leaf Crumpler is an insect you can easily find and pick while the leaves are off the trees. The insect is in a little case in the dead leaves upon the trees. It feeds upon the young leaves in the early spring. From a few small trees it can be easily picked by hand. Spray large trees with arsenical poisons soon as leaves appear.

Tarnished Plant Bug sucks the sap from the buds of trees and plants, and does damage early in the spring. Spray with kerosene emulsion, or the ten per cent. kerosene water mixture, as made by the spray pumps made for making a mechanical mixture of kerosene and water in the proportion desired.

The Buffalo Tree Hopper sometimes badly punctures young trees, and greatly damages them, very rarely old trees. The punctures are made only for the purpose of depositing eggs. When the young hatch they drop to the ground and feed upon weeds. The most successful way to fight them is to fight the weeds. Hogs seem to get rid of them in some way, or at least prevent them from developing.

Insecticides.—I have come to the conclusion that the best insecticide for fighting insects in general is the arsenate of lead. I have given directions for making it, but I do not now recommend making it, since it can now be purchased under the trade name of

Disparene.—Use it instead of Paris green or arsenate of soda. I am conscientious when I advise you to buy it and use it instead of making it, for a first-class arsenate of lead is now on the market. You can rely upon it. It comes in the best form, and very concentrated. It sticks upon the trees beautifully. It will be successful only with biting insects.

The attachment for the mechanical mixture of kerosene and water made by most of the pump makers is a great saver of time. I would no longer make the kerosene emulsion. These combined pumps will make a mixture of any strength desired from five per cent. to fifty per cent. A ten per cent. mixture is about right for general use.

DISCUSSION ON SPRAYS.

Question: Is there a pump which will do the work uniformly?

Prof. Stedman.—I have no trouble with the bulk of the pumps. If you find your pump is working irregularly there is something wrong with the valve. Usually they give very little trouble.

You can then mix kerosene with Bordeaux, and also add Disparene, and thus spray against all kinds of insect and fungus pests at one time. Disparene does not need much agitation to keep it from settling. If Paris green is used in Bordeaux mixture you will need to add a little more lime to prevent burning the foliage.

Question: Can this kerosene attachment be put upon an old pump?

Prof. Stedman.—No, you will have to buy a new pump. I would advise everybody to get one. The ten per cent. kerosene water mixture will kill a great many insects even of the biting class. Last spring I killed a number of insects in this way, among them the canker worm and the rose slug. Disparene remained on the trees more than a month.

J. H. Hale.—Notwithstanding all the elocution that has preceded me, I must say that in all my experience for a period of years there is not a pump throwing part oil and part water that is safe to use. I have used ten or twelve of them and you may set them at ten per cent. kerosene and they will spray anything from five per cent. to fifty per cent. 300,000 trees were killed in Houston county, Georgia, in one year by using these pumps. Don't use them; they are all wrong; they will not stay right. I have never used Disparene myself, but I gave the experiment station in Georgia a block of three thousand trees in my orchard. The result of the experiment was they took more than seventy-

five per cent. of the crop. That is what Dišparene did for me. I throw out a word of caution here. If you are going to use oil pumps, *don't use them at all.*

Prof. Stedman.—I think the trouble with the pumps was with the valve. Of course when they get out of order you must fix them. It is easy to test them by spraying into a glass jar. The kerosene will come to the top and you can see whether the proportion of oil and water is correct.

Mr. Hale.—We fixed them forty-three times a day and still they would not work.

Prof. Stedman.—Then return those pumps.

Mr. Hale.—They send more just like them. None of them are good and safe to use.

Prof. Stedman.—You will note that in all cases of damage to trees by the kerosene or the disparene on Mr. Hale's place that they were peach trees. I have always written and talked so much about not spraying peach trees that I took it for granted that by this time every one here knew my views on this point. I have repeatedly said that you must not spray a peach tree with kerosene or arsenical poison in any form without first testing it on a few trees during the entire season, and that you should not spray them at all unless absolutely necessary. I would not advise any one to spray a peach orchard unless it be during the winter while the trees are dormant. I have injured peach trees during the summer months by spraying when I could not determine the reasons, and I have come to the conclusion that it is an unsafe thing to do, and never advise one to spray a peach tree while in leaf with anything—not even cold water.

Dry Bordeaux.—Dr. Bird, chemist of the station gave an interesting talk with object illustrations on making a dry Bordeaux to use in dust sprayers. He did not recommend either dry or liquid spraying one above the other. That question must be decided by the orchard test. He said that slacking the lime with a copper sulphate solution would not make a dry Bordeaux mixture. The great heat in this process greatly injures the compound. His process was to make the mixture in very much the ordinary way, except more concentrated, and then pour it into a cotton flour sack and squeeze out most of the water. He said that very little was lost in this way, as only the water was strained out. This left the Bordeaux in a damp lumpy mass. This mass was broken up, and dried by mixing it with lime dust. The details of this method are given in a bulletin published by the station.

Prof. Stedman.—That stuff will not kill canker worms.

Dr. Bird.—It will not hurt the canker worm. It is a fungus medicine.

Question: Can disparene be used in a dry powder?

Prof. Stedman.—It is very difficult to dry out Disparene and make a dry powder of it. It comes in paste form. There is no reason why the factory could not make dry powdered Disparene.

Dr. Bird.—The trouble is getting powder fine enough to stick to the tree.

Question: Can we use dry poisons without getting them in our eyes and noses?

Secy. Goodman.—You can dust a thousand acres and not get a bit upon you.

A NEW BORDEAUX POWDER—FOR SPRAYING FRUIT TREES AGAINST FUNGI.

BULLETIN NO. 60.

(R. M. Bird, Acting Chemist, Columbia, Mo.)

The Department of Horticulture asked for a fine dust that might be used in place of the liquid "Bordeaux Mixture" for spraying trees against fungi. A powder which contains copper in the same chemical state that exists in properly made liquid Bordeaux mixture can readily be prepared by following the directions given below:

Materials required to make seventy pounds of a stock powder: Four pounds of copper sulphate (blue stone); four pounds of *good* quick-lime; two and a half gallons of water, in which to dissolve the copper sulphate; two and a half gallons of water, which is to be added to the quick-lime; sixty pounds of air-slacked lime which has been sifted through the fine sieve mentioned below; a box about 3x3x3 feet, into which the material is sifted; a wire sieve should have a cover. The bottom should be of rather stout wire gauze having 25 or 30 meshes to the inch. This sieve fits loosely between the strips on the box and can be shaken back and forth over the opening without allowing much lime dust to escape.

A wooden frame which fits snugly inside the frame of the sifter and is covered with fine, strainer-wire gauze having 100 meshes to the inch. This makes a false bottom to the stoutly made sifter and is used to separate the fine dust of the air-slacked lime and for the final sifting.

A wooden block to rub the material through the coarse sieve; two close-woven, cotton flour-bags—one slipped inside the other—with which the blue material is filtered.

Directions. 1. Break up into small lumps about seventy or eighty pounds of quick-lime and spread it out so that it will become air-slacked.

When slacked and perfectly dry sift it through the fine sieve (100 meshes).

2. Completely dissolve four pounds of copper sulphate in two and a half gallons of water. The easiest way is to suspend the sulphate in a coarse bag just below the surface of the water until it is dissolved.

3. Pour gradually two and a half gallons of water over four pounds of *good* quick-lime in such a manner as to slack it to the finest powder and give a good milk of lime solution; let it cool.

4. Put sixty pounds of the sifted, air-slacked lime into a shallow box—one in which the material can be well worked with a hoe or shovel.

5. Pour the well stirred milk of lime and the copper sulphate solution *at the same time* into a third vessel and stir until the whole is thoroughly mixed. It will have a deep blue color and be thick. This is so finely divided that it will remain in suspension for hours.

6. Pour this immediately into the double flour bag filter and squeeze out most of the water.

7. Empty this wet, blue material at once (*do not let it dry*) into the sixty pounds of air-slacked lime and work it up so that it will be well distributed. If the resulting mixture is too moist add more air-slacked lime.

8. Rub this through the *coarse* sieve *while still somewhat damp*, mix thoroughly and spread out to dry.

9. When perfectly dry sift it through the fine-mesh sieve, crushing all lumps. All of this can be readily made to go through the fine sieve, except the small amount of sand which may be in the four pounds of quick-lime. Mix so that the blue copper compound will be perfectly evenly distributed throughout the whole mass.

Store until needed; it will keep indefinitely.

This powder contains about three and a third times as much copper per gallon as is contained in the liquid Bordeaux mixture. It may be diluted to suit the need with powdered lime or flour, or may be used in this condition. Where large quantities are needed use multiples of the quantities given above.

If one hundred and thirty pounds of slacked lime, or an equal *volume* of flour is added to seventy pounds of the stock powder, the resulting mixture will have practically the same copper strength as the "four-four-fifty" liquid Bordeaux mixture. It makes no difference whether this added lime be partially or completely slacked, as no subsequent reaction takes place in the dry powder. Any other insecticide, as Paris green, for canker worms, may be added in the form of powder in the proper proportions.

The usual method of preparing dust containing copper seems to have been to slack the lime with a strong solution of copper sulphate. When made on a small scale the resulting powder contains more or less of green and blue copper compounds mixed with much of a dark brown compound. The former are probably basic sulphates of copper, or of copper and calcium (lime), and the latter a hydrated copper oxide, formed by the action of the steam in the slacking process. When made on a large scale most of the copper appears at the end in the oxide condition, and a not inconsiderable quantity of the mixture is too coarse grained to stick very well to the non-resisting leaves.

While this oxide condition of the copper undoubtedly has some fungicidal value, the opinion of experimenters seems to be that its value is not at all equal to the value of the copper compound contained in a properly prepared liquid Bordeaux mixture. The dry mixture here proposed is the same that exists on the leaf after the water of the liquid mixture has evaporated, except that there is present more lime relative to the copper and less calcium carbonate. As soon as the powder gets wet, calcium carbonate begins to form, of course.

Whether or not this powder when applied to the leaf wet with dew or rain will prove as effective as the liquid Bordeaux mixture, only experiment will show. It seems to have the requisite properties, chemically speaking, namely, hydroxide condition of the copper and the necessary excess of lime to prevent injury to the leaves, at the same time exposing fungus spores already upon the leaf or which may fall upon it afterwards to the toxic action of the copper. It being so extremely finely divided it seems possible to cover the wet leaf surface as effectually as when water is used as a carrier of the toxic agent. The subsequent solvent action of atmospheric water and substances produced by the leaves and germinating spores are very likely the same with either material.

In a bulletin to be issued by the Horticultural department at the close of this season the results of practical tests with the powder will be presented. If any one tries it, we shall be obliged if he will report the results to us and tell us exactly how he prepared it, the number of pounds of blue-stone, quick-lime and slacked lime he used as well as the appearance of his mixture and how he applied it to the trees.

The following remarks upon powder spraying mixtures were furnished by Professor Whitten of the department of horticulture:

In the past few years a number of fruit growers in Missouri have become interested in using dry sprays instead of the liquid spraying mixtures that have formerly been popular. This interest has been aroused on account of the fact that dry fungicides and in-

secticides are much lighter to handle and can be applied much more rapidly than those which are applied in water.

Many of our fruit growers have hundreds of acres in orchards and some of them have thousands of acres. Some of our best fruit lands are on steep hillsides where an enormous amount of power is necessary to haul the heavy liquid spraying mixtures through the orchards. In other cases spraying is done when the ground is soft in spring and hauling heavy loads through the cultivated orchards becomes very burdensome and also cuts up the ground, leaving it in an undesirable condition. In many cases, on the well drained lands, where surface ponds cannot well be made to hold water, not enough water can be had within reasonable distance to enable the grower to use the liquid spray. It also not infrequently happens that there are not enough teams in the neighborhood to spray these enormous orchards at the proper time if the heavy liquid sprays are used.

In a number of orchards where it is not feasible to use the liquid, the fruit growers have for some years been using the fungicides and insecticides in the form of dust. In some cases fairly satisfactory results have been reported from using air-slacked lime as a fungicide and mixing Paris green with it for an insecticide. In other cases a dry copper mixture has been made by dissolving the copper sulphate in water and then using this solution to partially slack the lime, which was allowed to finish the slacking process in the air and thus become dry after the copper sulphate solution was added.

One serious difficulty has been encountered, however. The lime alone has not enough fungicidal value to fully meet the needs of the grower. In adding the copper sulphate by the methods usually employed by the grower its fungicidal value has been partly destroyed, thus leaving the dust less efficacious than the liquid spray. It must be added, however, that the results obtained have been more satisfactory than was expected at first. Some of the dry Bordeaux mixtures have proven to have considerable fungicidal value and when Paris green has been used with air-slacked lime as an insecticide results have been fairly satisfactory.

There is great need of an efficient dry Bordeaux mixture that may be economically made by the grower himself. The powder recommended in this circular has been designed by the acting chemist with the hope that it will meet the needs of the fruit growers, especially those who cannot use the liquid spray. This dust spray will be tested practically in the orchard of the Experiment Station during the present season and it is hoped that many orchardists will apply it and report results to the station.

If it is desired to use an insecticide for canker worm or codling moth one pound of Paris green may be added to twenty pounds of the dry Bordeaux mixture.

The dust sticks to the trees much better if it is applied when the dew is on the trees or while they are wet just after a rain.

Machines for applying the dust may be had from the following firms: Leggett & Brother, New York city; Kansas City Dust Sprayer Co., Kansas City Mo.; J. J. Kiser, Stanberry, Mo.; Hillis Bros., McFall, Mo.; Ozark Dust Sprayer Co., Springfield, Mo.; Hazeltine Dust Spray, Springfield, Mo.

STRAWBERRIES—PREPARING THE GROUND, VARIETIES, AND CARE FOR HOME USE.

(H. Schnell, Glasgow, Mo.)

In preparing ground for strawberries, it is best to start a year before planting. If your soil is thin, apply a liberal coating of manure and grow a crop of potatoes, cabbage or something that requires cultivation. The following spring plow it deep, the deeper the better, or if only a small spot, spade it, and pulverize the soil well. Do this early in April, but not until the soil is dry enough to crumble well. After the surface has been well pulverized, set your plants either in rows, four feet apart, plants 18 or 20 inches in the row, or in rows two feet apart and 18 inches in the row, the latter plan being for garden culture where horse cultivation is impossible. Then stretch a line to set by. We use a spade to plant with, and have a boy to hold the plants in proper position. First, open a wedge-shaped hole by moving the handle of the spade to and from you. Then, when the plant is in proper place, with the roots spread out in a fan-shape, thrust the spade in four to six inches from the plant and force the soil up to it. Use your foot to firm the earth well, then level up around the plant. If the plant is properly set, the bud is just visible. Too shallow or too deep planting are both fatal. Never set plants dry, always out of a bucket with two or three inches of water in it. No kind of plant, shrub or tree should ever be set with the roots dry. Begin cultivating and hoeing a week after setting, never letting the weeds and grass get a start, and continue throughout the summer, every eight to twelve days up to about September 10th. Keep the runners cut up to July 15th or even later; they will make plenty more after this date. Rather have your rows too thin than matted too quickly. Plants six inches apart will produce more

and larger berries than where there are thirty plants to the square foot. For garden culture, where the rows are two feet apart, train the runners from two rows together, leaving a path between each two rows so treated, thus there will be, first, a strip of berries, then a path, alternately across the bed.

If your soil is flat and level, see to proper drainage, by ditching and raising the bed, but never plant on ridges, always on the level. The above applies to spring planting. Fall planting is often successful, but in very dry autumn often time and labor are wasted. The safest way is to buy potted plants or pot them yourself. This is easily done. Take three-inch flower pots and bury them in the ground near the parent plant and in them set the runners nearly ready to root. Put a stake in the pot so it may be found again. In two or three weeks they will be ready to move. The pots will be root-bound and usually one watering is enough to start them well. Potted plants set in August and September, with favorable weather, will generally make a nice row, as thickly matted as they should be. If you see your rows will be too thick, it is well to remove the surplus runners.

As to varieties, try a few of the standard ones, discarding those that do not do well, but never discard a variety after only one year's trial; one season is not a fair test. We would recommend Excelsior and Beder-wood for extra early; Haverland, Jessie and Bubach for medium, and Aroma and Gandy for late. These are all standard varieties and will succeed most anywhere. There are scores of others, and a test of them may find you one that is peculiarly adapted to your soil and locality.

Wood ashes are recommended by many as an excellent fertilizer for strawberries and in some soils, it is claimed, they give wonderful results. We have abandoned their use at Glasgow, as we cannot get our plants to withstand the dry weather where we have used them. It may be our soil has an abundance of potash.

Try them in a limited way first and watch the results.

Along in the fall, about Thanksgiving, when the ground is frozen, cover with wheat straw, if obtainable, about deep enough to hide the plants, but not too deep. Leaves and cornstalks will also do for a mulch. In the spring, about April 1st, remove all the mulch into the paths between the rows to keep down the weeds, hold moisture and keep the fruit clean.

Take up some plants each spring and set a few new rows so the old ones may be turned under after bearing two or three crops. This is where most people lose out on strawberries; they plant a bed and

expect it to bear for years, and the result is they soon have an old, worn-out bed and no berries, and lose a couple of seasons in starting over again.

Plant some strawberries. Don't say, like some farmer customers tell us, "Oh! I can buy them cheaper than raise them. It does not pay me to fool with them." That may be true in a sense, for when they buy them, they buy a crate or two to preserve and some for the table two or three times a season, while, if they had them growing in their own garden, they could have them fresh-picked on their table daily, and plenty to eat, can, and preserve. By all means, plant strawberries for home use and plant some every year.

THE COMMERCIAL STRAWBERRY FOR NORTH MISSOURI
—MOST PROFITABLE VARIETIES, CULTIVATION
AND CARE FOR WINTER.

(J. E. May, LaPlata, Mo.)

Mr. President, Ladies and Gentlemen:

In preparing a paper on the above subject I realize the fact that what I may say will only apply to a small part of the north part of our great State, as far as the best varieties are concerned, as I find certain varieties in our own county doing well, that in other parts of the county, we have been obliged to discard. I am sure that the same rule holds good as regards the planting of strawberries as for the planting of an orchard for profit. Perhaps the loss might not be as great where a mistake is made in varieties of strawberries as in planting the wrong varieties in an orchard, as the mistake will be sooner discovered in the first case and can be remedied in a couple of years. The rule referred to is, plant only such varieties as are doing well for others in your own section, and if no one near you is growing the strawberry then select only such varieties as succeed over a wide range of territory. If you will take a number of the plant catalogues of leading plant growers you will find several varieties they all agree are profitable and that succeed over a large part of the country, such as Warfield, Crescent, Bubach, etc. While these might not be the very best varieties for your section, they would be almost sure to be profitable, while some other varieties planted would only result in failure. After seven years of experience in growing strawberries for market and having tested some twenty varieties we find Bubach, Ridgeway, Haverland, Lady Thompson and Gandy most profitable and these varieties are enough for the commercial grower. Early Sun-

rise, Bismark, Sharpless, Glen Mary and many others have been discarded, as they failed to produce fine berries enough to be profitable. The Parker Earl is almost an entire failure with us and yet one man only a few miles west of us plants that variety almost exclusively and with good results, and for this reason I say it would be useless for me to name most profitable varieties for North Missouri, as that comprises a large territory. Another thing that must be taken into account in planting for commercial purposes is your market. If a near-by market, some varieties that are termed soft could be used, while if they were to be shipped several hundred miles they would be worthless. We get fine results with Bubach, but our market is near at hand and they carry all right, while if to go to Chicago or St. Paul they would arrive in bad condition and thus be unprofitable. As much or more depends upon the right varieties for the section where grown as cultivation, etc. We are testing a number of the new varieties in a small way and in a year or two our list might not be as today.

As to cultivation, we practice thorough level cultivation, using Iron Age 14-tooth harrow, Hallock weeder and the hoe. Unless thorough cultivation is given and plants restricted so as not to get too thick, or grown in what is termed the hedge or thin matted row, much of what might be profit is lost. We find with the thick matted row we get too many small berries and too many buttons. Care for winter consists in having your beds clean, a good stand of plants, not too thick, and then as soon as ground freezes solid mulch with slough grass or clean straw lightly over the row, hoeing between rows. Without mulching in our part of the State the vines freeze out and what few live produce inferior berries and would be covered with sand, and thus be a failure. With proper varieties and care an acre of strawberries can be made to yield \$200 to \$700 worth of berries and while not all profit there will be a large margin left to pay you for your trouble, besides furnishing yourself and friends one of the best fruits grown.

DISCUSSION ON STRAWBERRIES.

Mr. Meyer.—We have some fine strawberry land in St. Louis county and we hope to have some fine berries to show you at St. Louis next year.

Northern Plants vs. Home Grown.—Mr. A. Chandler: I have been growing strawberries more than fifty years. Then we had the old Hovey's and other kinds, but they are all gone. Later the Sharpless had the market. Now it is seldom seen. Perhaps these old kinds have been "run out" by poor care and cultivation. As to northern or south-

ern-grown plants, I would act upon the same principle as our seedsmen. Most seeds are more vigorous grown in the north than in the south. I certainly do not believe in breeding plants from old, worn-out beds, north or south. I would very much prefer to get plants from the north rather than the south.

NORTHERN GROWN STRAWBERRY PLANTS VERSUS HOME GROWN.

(E. S. Katherman, Warrensburg, Mo.)

To the Members of the Missouri Horticultural Society assembled at Columbia, Greeting:

I have been planting northern grown plants for some years and have always had good results. Have planted 10,000 plants and got a perfect stand, but can not say that much for home grown. My first reason for using northern-grown plants is that when the spring is late and we have showers through April with sufficient rains to keep the ground too wet to plant, which is often the case, home-grown plants have made quite a growth, sometimes blooming before the ground is in good tilth to set plants. Northern-grown plants are much later, and when we have them shipped south to Missouri they arrive in a dormant condition, just right to plant. Then, if the planting is properly done, the result will be a perfect stand of plants which is very important for a profitable bed.

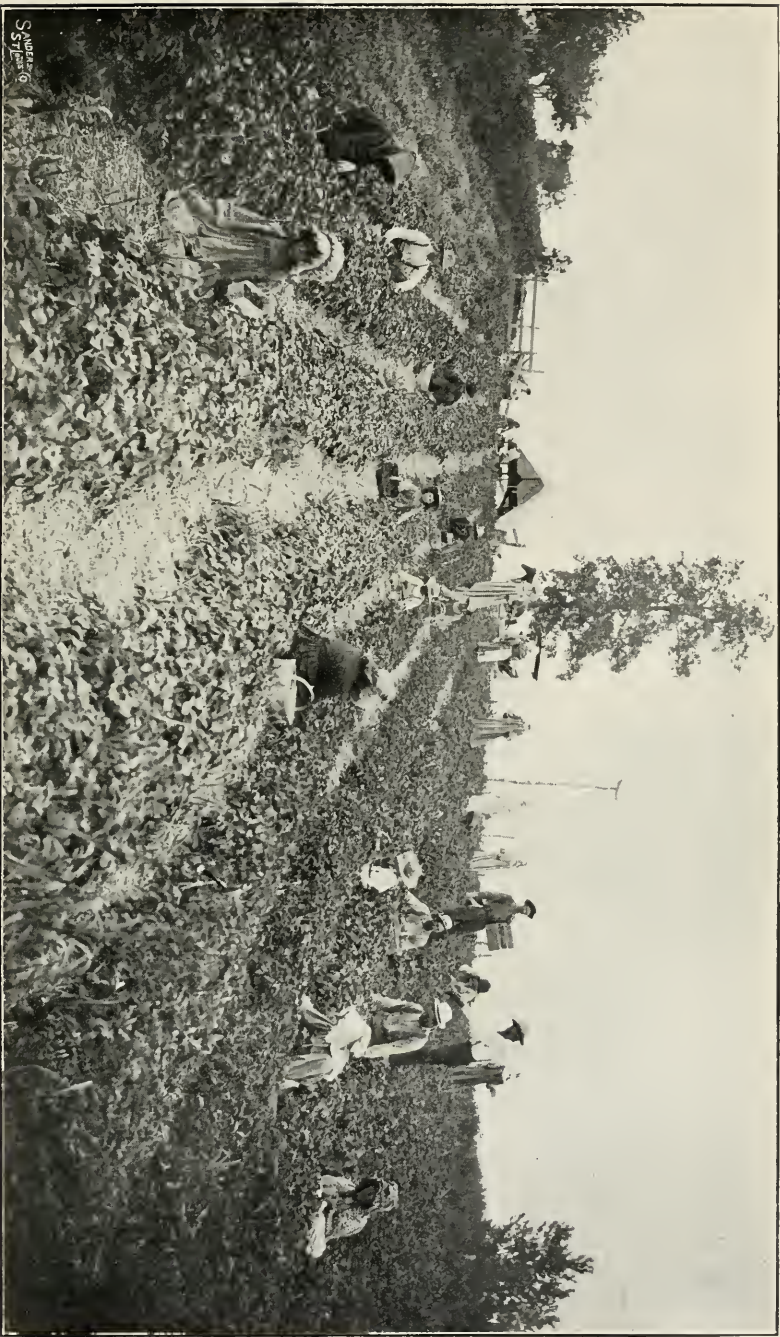
Another advantage in Northern-grown plants is that the same varieties will ripen earlier than home grown. The berry grower that gets berries on the home market first gets the fancy prices. It is the early bird that catches the worm.

When a man doesn't set the right kind of plants and the right varieties, he is wrong as long as he keeps that bed or sets another. For good results plant Northern-grown plants, get them from some reliable grower, plant varieties that do well in your county, suited to your soil, and you will raise fine berries, get a good price and you will be happy.

STRAWBERRIES—COMMERCIAL GROWING AND MARKETING.

(F. H. Speakman, Neosho, Mo.)

In raising strawberries for local market it is of great importance that every detail of the work from the selection of the site for planting, to the placing of the fruit within the consumers' reach, be given



Sanders & Styles ©

Fruit farm of H. R. Wayman, Princeton, Mercer County, Mo. Scene in Strawberry Patch June, 1899.

thought and attention at the proper time, if best results are to be realized.

We are, of course, all seeking these results. How to obtain them is the question. Especially in commercial production when it is necessary to ship in car-load lots and when our markets are from a few hundred to probably a thousand miles removed, is the problem a hard one, and many are the solutions offered and attempted. Probably no one of these will amount to much alone and I think we are apt to lay too much stress on one or another of them.

It is easy, too, to locate the blame when results are not satisfactory. There are so many persons or corporations interested or who have something to do with the deal. A fellow can manage to get very poor results and yet clear himself every time. Then the weather has so much to do with the results. It rarely happens that this is just right.

With the weather against us, with pickers scarce and many of them poor, with freight and express rates high, with refrigeration charges exorbitant and service miserable, and with commission men at the other end of the line ready and waiting to steal everything—really the outlook would seem uninviting to say the least.

But how are we to account for the greatly increased numbers of fruit growers in attendance at the meetings of our associations. Surely there must be another side to this story. Yes, there is. To begin with, our possibilities are wonderful and while never realized fully, we are, of course, optimistic and hope for the best.

Our neighbors hear of our successes and our real estate men do not take pains to tell those locating with us of our losses (and we don't like to say much about them ourselves) and so there is inspiration for all. For the experienced grower there is the satisfaction of knowing that conditions could not be worse than they have been (the past year for instance). And being, as I said, optimistic, we trust that the weather will be just right and we even indulge in the hope sometimes that we will secure lower rates and better service and be able to sell our fruit on track at the loading station at big prices, or at least be fortunate enough to consign only to honest commission merchants who are greatly in need of our fruit.

In strawberry growing, my plan is to select newly cleared timber land that is dry and gravelly; or better still, the same quality of land which has been cleared and cultivated one year; setting but few varieties, and for the past two seasons but one, the Aroma. The fewer varieties the simpler will be the work along the whole line of setting and cultivating the plants and handling their product.

In cultivating, I try to do every thing that will add to the strength and fruiting power of the plant, and while the treatment given is oftentimes a violation of all the rules laid down by authorities, it gives the results sought.

Thinning the plants in the late summer and fall is the best investment made. Who would think of sowing corn broadcast when a large crop of well developed ears is desired. Then why expect a satisfactory crop of large highly colored, well flavored berries on plants that are crowded so thickly in the rows that they root one over another, the late formed ones only being able to root at all in very wet weather, and then only in the air, possibly. I thin four to eight inches apart, according to size of plants and am rewarded for the trouble by having larger, more highly colored and better flavored fruit and more of it than I otherwise would have had.

Then, it ripens earlier and more uniformly and of course is more easily picked and grades higher. We make two grades, "A" and "B." In the early part of the season most all the fruit will grade "A." as a rule, and what does not is brought to the sheds by the pickers who have the faculty of doing things exactly wrong—while at the last of the season probably all the fruit will go as "B's."

In marketing I prefer shipping on consignment to good reliable houses (there are plenty of them) in the markets that I expect to do well during a term of years—to selling on the track, when that can be done, and being compelled to consign when there are no buyers.

It seems to me more business-like and satisfactory to make arrangements sometime before shipping season opens and know as far as possible at least what firms and markets will be used.

Then it is desirable to make the acquaintance of the people you expect to do business with—to study with them their markets and requirements, and our home conditions as well.

And, judging from the acreage to fruit the coming season and the increased plantings in prospect in Southwest Missouri, all advantages to be derived from acquaintance and otherwise will be needed. I intend, in fact, to get just as near to our representatives as possible and by close co-operation I trust to be able to place fruit in the future in our markets in better shape than we have been able to do in the past.

Re-icing the cars must be looked after by ourselves by placing our own people at the re-icing stations to see that this important work is properly done.

In conclusion, I will say that the commercial strawberry grower of Southwest Missouri has much to be thankful for.

The "spice of life" is never lacking, for variety is always in evidence. The differences in the seasons and conditions keep us continually interested and guessing, and I, for one, find much satisfaction in the experiences that fall to my lot as a commercial strawberry grower.

DISCUSSION.

Mr. Geo. Holsinger.—We want to set our strawberries early in the spring, and we can get our own earlier than plants from the north. The plants I have bought are not equal to our own home-grown plants.

Mr. Speakman.—I am glad to find that the strawberry has been given a place at the winter meeting, as strawberry growers can not attend the summer meeting. It comes just when they are busy picking and marketing their fruit.

Mr. McNallie.—I have not prepared a paper upon the subject assigned me by the secretary. You know my views and practices. I am glad we have with us a distinguished strawberry man from Michigan. I call for R. M. Kellogg.

Pres. Robnett.—Mr. Kellogg will address us.

Mr. Kellogg.—I ought to be glad that I am introduced as Mr. Kellogg. Some call me Strawberry Crank Kellogg. I bear the high official honor of being the ambassador of the horticulturists of the State of Michigan, to carry the greeting of the fruit growers of that State to the citizens of the land of the big red apple and of strawberries by the train load. I am a crank and I glory in it. I want to talk to you people on strawberries and rattle your heads together till this floor is covered with ideas which I can take back home with me to my people. There has not been a waking hour in the last twenty years in which I have not been studying, planning and trying to devise some way to grow more and better berries. I am often asked for a method of growing better berries by men who say they have no time to wait or experiment. I tell them to sit down and wait till they are not in a hurry. If you go at it right you can make more money out of a strawberry bed than anything else I know. It has been said that the proper way to train a child is to begin with his great, great, great grand-father. You want to begin three or four generations ahead to grow strawberries. I will tell you that I am now preparing land in which to set strawberries in 1905. I am getting manure from the Chicago stock yards, 137 miles away. I will spread twenty-five tons per acre on eighty acres. This manure is from the stock pens and is pure excrement. In the spring when the ground is dry enough to

work well, we will disk the land with four horses, plow it and thoroughly work and then sow two bushels of Whippoorwill cowpeas to the acre. We will turn down the peas next fall with a sixteen-inch plow, having first rolled them down with a disk harrow. It sometimes bothers the horses to walk through the peas. In the spring of 1905 we will plow it up again, roll it down with a roller made of small wheels after thorough cultivation. I meant to say that in the fall, after plowing down the peas, we sow three and one-half bushels of rye to the acre. The rye prevents the soil from washing and leaching and keeps the winter and spring rains from beating on the soil and puddling it. This roller of which I spoke is the heaviest pull of any implement we use. If you want to hold the moisture in the soil you must make it fine. One advantage of sowing the peas so thickly is they will shade the weeds and smother them out so they will not seed. We don't bother about weeds. I would not reject manure if I know it was full of Canada thistle seeds. Plant early in the spring. We save the plants from starting too early by giving them a heavy covering when the ground is frozen to the greatest depth in January. Just as early in the spring as we can, without working the ground wet, we plow the land as deep as we can without turning up the raw subsoil. It packs and will make a crust and retard the growing of your plants. We wait till the frost has killed the peas before plowing in the fall. We want to get as much ripeness as possible in the peas. You must begin to spray on time. We have a barrel on a cart with three nozzles so adjusted as to spray three rows at a time. We sprayed seventy-four acres last year. When planting we had thirty men, with a man to examine the work after the planters. I sometimes use a cone maker like an auger. The roots are spread over this cone and the soil trampled down upon them. After the work of planting is finished loosen the surface with a cultivator. It has been said that every step makes a compact surface which will loose a quart of water in a day. I use the Planet, jr., twelve-tooth cultivator. For this work I want a man with a small foot, who makes long steps. In passing through the row the first time I require him to walk a little to one side so that the cultivator will cover his tracks when he comes back the other way through the same space. We make our rows thirty inches apart, mostly, and set the plants from twenty-four to thirty-six inches in the row. We place the runners in the row. In this way you can make a hedge row with the plants six, eight or ten inches apart. Allow no other runners to set plants. I cut the runners off with a disk attached to a worn-out garden hoe. Some attach a sharp disk to the cultivator. I prefer the hand tool. Every

plant needs room enough so the sun can shine upon every leaf and furnish the plant with the force which enables it to take its food from the air, which furnishes ninety-five per cent. of the solid substance in the plant. Did you ever think of the wisdom of God when he made only one part carbonic acid in twenty-five thousand parts of the air? The leaf takes this carbonic acid from the air on the under side and combines it with the soil elements to form the tissues of the plant. The leaf is hung upon a long stem so that it is easily kept in continual motion, thus coming in contact with the largest possible amount of air. In Michigan some of us mulch our plants in the winter, but I notice there that nobody mulches along the lake shore.

Question: How do they keep the dirt off them?

Mr. Kellogg.—They don't keep it off. They eat dirt and all. In the wide matted rows you allow one leaf to grow under another and the sun can't shine on it. The plant can not do anything without sunshine. You should have the greatest possible amount of leaf surface exposed to the sun. The top of a narrow hedge row is half round, thus giving fifty per cent. more surface than the same space covered with a flat top like it is in a wide row. In the summer the sun rises in the far northeast and swings around south to the far northwest, shining on every side of trees and plants. If the sun shone only on the south every tree would turn its leaves in that direction. In Michigan some men put a light cover on the plants and leave the ground bare between the rows. They cultivate between the rows in the spring, but never cultivate when in bloom.

We spray the first year. We have found disparene a good thing. In using Paris green put four ounces with the lime for a barrel of spray and pour hot water upon the mixture. This prevents the Paris green from injuring the very sensitive young strawberry leaves. We have no damage from disparene, but Paris green is rank poison and gets in its work quicker. If you should ever come to Michigan come to our house and break bread with us. Let me thank you for your kindness and generous greeting.

THREE BEST VARIETIES OF RASPBERRIES.

(H. S. Wayman, Princeton, Mo.)

A certain tree planter in making up his list of varieties selected one-half the number Ben Davis. After looking over the catalogue of varieties he concluded to plant one-half the remainder Ben Davis. Then after careful deliberation he decided to finish with Ben Davis.

We call this man a "crank," yet I would be tempted to adopt a similar policy with the subject I am to treat, and plant for my Ben Davis raspberry the Kansas. It is justly entitled to its pre-eminence as a market sort, and so well known that I need not occupy your time here with its description.

However, its rather early season of ripening suggests an addition of some later variety; and its lack of highest flavor, a more desirable sort for dessert.

For later market I would plant the Nemaha, a variety similar in fruit to the Mammoth Cluster, and as strong in plant and wood growth as the Cumberland. In our North Missouri latitude the Nemaha usually ripens July 5th to 10th, which is a few days later than the Kansas. Just here I wish to emphasize the importance of planting some of the extreme early and extreme late varieties. Too many of us plant great fields exclusively to Kansas or some other good variety and then fall down at picking time because of insufficient help; we are compelled to fill up the market with over-ripe fruit, which lowers the price and lessens the demand.

Not many years ago our strawberry picking lasted but about two weeks; now by judicious selection of varieties, soil and location, and by proper treatment, the ripening season has been extended to full four weeks. The direct result of this has more than doubled the demand and enabled the grower to put his berries on the market in a better condition and at less expense.

In my opinion the same condition can and should exist in raspberry growing. But who has given any thought or attention to this feature of the business? What do we find in the horticultural papers and reports along this line? I think there is not much of anything. In this discussion let us hear about some of the extremely early and late varieties and begin this feature of improvement.

As a variety for best table use I will name the Evans, and in so doing pay a just tribute to its originator, our time-honored member, Col. Evans, for giving to the world this excellent fruit.

Although with us it is only average in size and appearance and a little too tender for extensive planting, its superior flavor in comparison with other varieties is very noticeable and recommends it to every garden and commercial assortment.

It was in testing this variety that I was impressed with the possibility of improving the quality of the raspberry as well as the quantity, size, color and such other attributes as generally occupy our exclusive time and attention.

I submit this list as being the best only as the result of my own

very limited experience, and if I can elicit a discussion that will bring out more valuable sorts, I will have accomplished at least one object of this paper and will gladly revise my list of "best varieties."

DISCUSSION ON RASPBERRIES.

Mr. C. Holsinger.—I would plant Kansas and Cumberland. The latter is later than the Kansas and far larger, and sells for from twenty-five to seventy-five cents per crate more than the Kansas. We have some Greggs for late.

Mr. Green.—I would plant Hopkins, Cumberland and Centennial.

Mr. Baxter.—Kansas, Cumberland and Miller's Red. There is most money in the Miller's Red. We have sold them in Minneapolis as high as \$3.50 per crate of twenty-four pints.

Mr. Holsinger.—I put Cumberland at the head of the list. I find no Anthracnose on it.

A. Chandler.—I plant 1, Cumberland; 2, Cumberland, and 3, Cumberland.

N. F. Murray.—I plowed out the reds because they did not pay. I find the Kansas hardy and grow it. My ground seems too rich to grow the reds. I get wood, but little fruit. I tried various ways. They were not productive, were more trouble to pick and I could get no more for them than for the black. On thin land in the same vicinity they pay well.

J. H. Hale.—I am surprised to hear you speak of raspberries as if blackcaps were the only kind. Palmer is very profitable in the east. It is earlier than the Kansas. Pinching back in the summer develops too much bearing wood. The old successful growers used stakes, which was too expensive. They seem to have almost revolutionized raspberry growing in Oregon. They ship them to Minneapolis, Chicago and New York successfully. They grow them five, six, seven, even eight feet high on a trellis of two wires. Long canes are bent over the top wire and brought down and tied to the lower wire.

Mr. Murray.—The wood does not winter kill on the Pacific coast. I have tried some of the Oregon varieties here with no success.

A. Chandler.—I have made more money per acre from the red Thwack than any other.

J. C. Evans.—I would plant no red raspberry except Thwack. The Evans for black.

Mr. Kellogg.—For blacks, Kansas, Cumberland and Gregg; for reds, King and Cuthbert.

E. A. Riehl.—King is the best red. For black Evans and Cumberland.

Mr. Kellogg.—The London seems to be infested with root gall.

Mr. Baxter.—King is a good red, but Miller is earlier. Some say that the reds are too soft to ship. I send them 600 miles.

Mr. Riehl.—I don't want the Miller on my table. It is not fit to eat.

Mr. Baxter.—We want the money they bring.

GRAPES—PROFITABLE VINEYARDING.

(Henry Wallis, Wellston, Mo.)

Mr. President, Ladies and Gentlemen:

To deliver to the horticulturists of Missouri in special and to the grape growers in general, a short sketch on profitable vineyarding is the task assigned to me. Having gathered a little experience in practical vineyarding during the last fifteen years I will try to submit a practical paper on this important subject, as far as I am able to give it. Let me divide this article in six parts, which I believe are essential to profitable vineyarding:

First—The proper man to perform it.

Second—The selection of the proper locality.

Third—The proper soil.

Fourth—The selection of the most profitable varieties.

Fifth—The proper cultivation and general care of the vines.

Sixth—The proper marketing of grapes and wine-making.

First—The practical vineyardist to make his vocation profitable must be a man of energy and capability, must have love and enthusiasm for his calling, must labor incessantly with brains and muscles to achieve the desired result, always try to improve and expand the theoretical and practical knowledge he may have gained, and with an iron-will must overcome all obstacles thrown in his path by men as well as by nature's uncontrollable forces—otherwise, he better turn his efforts to something else; if these necessary qualifications are not present, unprofitable vineyarding, if not financial ruin, will be the final result.

Second—The best locality for profitable vineyarding is in my opinion near a large town or city with a good home market in order to avoid the expenses of transportation by express companies, as well as the charges and profits made by the commission men, both curtailing his well-earned profits to that extent that often all "cream is gone and lost and only blue skimmed milk" is left for the poor vineyardist. He must be able to offer and sell his choicest grapes direct to the con-

sumer for a fair price or to a dealer who is a cash buyer, and turn the culls into a wholesome, pure wine, which will in time double his income from a well-managed vineyard.

Third—The proper soil must be specially adapted to the grapevine in general, good rich clay, perhaps with some sand, rocks or slate in it, soil with a porous underground, a reddish clay preferable, but no hard-pan underneath, either the rolling top of hills, or the gentle sloping eastern or southeastern sides, the vineyard not extending too far to the lowland and ravines between them, thus avoiding the dangerous spring forsts. While I admit that some varieties of grapes may be grown on low and level lands in certain localities, I believe that hill-sides are preferable, and will produce the finest grapes.

Fourth—In selecting the most profitable varieties for the vineyard we must study the demand of the public as well as the climatic and soil conditions. People in different localities have different tastes; in general, black grapes are in greater demand everywhere; therefore, black or dark purple grapes are the most profitable for market purposes, while the finest red or white grapes can be sold for fancy prices only in limited quantities; also being located in northern, central or southern regions of the land has to guide us in the selection of varieties in regard to hardiness and productiveness of the grape in that latitude. While the number of varieties known runs into the thousands, the number of real profitable varieties for any certain locality are less than a dozen. Having grown from 50 to 60 varieties myself in East Missouri, allow me to mention those which I believe are the most profitable for Missouri. First, the old reliable Concord, the grape for the millions, though I have less than fifty vines of it growing in my six-acre vineyard, and I grow them only as specimens of comparison alongside the still better, hardier, more productive and more reliable, Hicks, the new Concord of the twentieth century—and the only grape known today destined and able to take the place of the old Concord wherever that grape is grown today. This is my honest and truthful opinion, is the result of twelve years of practical testing and most scrutinous observation, and I hope to demonstrate the veracity of my statement at the World's Fair of 1904 in St. Louis, the Hick's grape in competition with all other varieties rivaling for first place. Second, Moore's Early, Campbell's Early, Worden, Wilder, Telegraph and Norton's Virginia; third, Niagara, Goethe and Stark Star, the latter two the latest of the season. Though a few more varieties may be profitable in some localities and under different conditions, I will not

mention them, as my selection is made according to the hardiness, productiveness, quality and quantity of variety.

Fifth—About the cultivation of the vineyard I will only say: Keep the vineyard clean from grass and weeds by using such tools in proper time as are most suitable to your soil and locality, as grass and weeds curtail the crop, reduce the vigor and health of the vines, also foster insect pests and fungi diseases. To combat the latter, proper sprayings should be made in proper time, and lately the dust spraying process seems to be easier, cheaper, surer in results and therefore more profitable than the old method of using pumps and water as the carrier of the remedies. Numerous bulletins issued by many states and by the Agricultural Department at Washington, D. C., will give all vineyardists the required information, receipts and formulas, and they can be obtained by asking for them. Another principal point in the proper care for the vineyard consists in the proper method of pruning of the different varieties in due time. About pruning alone a volume might be written, therefore I can only touch the underlying principles of pruning the grapevine. The annual winter pruning should begin as early in fall as possible, after the first sharp frost has defoliated the vines, but not when the vines are frozen. This pruning should be finished very early in spring, the latest during March, before the sap will flow abundantly by pruning—the vine would lose its blood of life, and I most earnestly contradict all who say: Oh, that bleeding does not harm the vine—surely it does always and everywhere. If anyone doubts let him bleed himself severely and often, and if it does no harm to him, then I believe it will not hurt the grapevine either. The practical vineyardist must know what and how to do it; he must not only understand the difference in the pruning of the different varieties; he must see and judge the individuality in the different vines of the same variety; must know how to prune for fruit or for new wood; must know how to correct the mischief done, either by frost or drought, or overbearing, and practical experience herein will be our best reliable guide—through many errors we come to a better understanding of nature's unchangeable laws, and a more proper application of man's teaching and rules. For instance, the pruning of my vineyard this year will and must be different from that of former years, on account of the severe May frost. Good bearing vines near the ground are scarce; the upper buds escaping the frost produced fine wood, but are too high for next year's fruiting; the vine must be annually rejuvenated with the tendency to bring the bearing vines as low as possible, therefore I am compelled to use those at the proper height for tying them to the vines wherever

I find them regardless of the form after pruning, which should be fan-like as much as possible. Allow me another remark about pruning the grapevine. Whatever method or system or style you may give individual preference matters not; in profitable vineyarding on a moderate or extensive scale I have found that from the many methods advocated the so-called fan-shape renewing process and form is the simplest and best—vines tied to a trellis of posts with three wires not finer than No. 10 or No. 8. For summer pruning I pinch the top of the young bearing shoots before blooming, one leaf-bud above the last grape bunch when the shoots are about one foot long, using the fingers only, and not a knife or shears, which are injurious to the vine. After blooming I pinch the secondary shoots to about two or three leaf-buds, but do not break them out altogether, as many vineyardists do, and I believe to their loss. The juice of this second growth is needed to bring the fruit to perfection; also the grape will ripen properly only in the shade of its leaves; therefore, too much pinching is more harmful than beneficial; experience will teach us to walk the middle of the road in pruning the grapevine.

Sixth and Last—In marketing grapes profitably we should avoid all commission men and express companies, except we are willing to throw just one-half or more of our so hard earned profits away. I beg you, if you are not able to dispose of your grapes by yourselves direct to the consumer, or to the dealer who is a cash buyer, or by freight in car-load lots, then quit growing grapes to fatten express companies and commission men, and helping to spoil and diminish the profits of those vineyardists who avoid them. I know what I am saying and only the manifold bitter experiences compel me to make this expression without being able to go into detail and to go beyond the limit of courtesy towards fellowmen. Always sell the best grapes only, pack them well and attractively, then ask a fair price and hold on to it, be polite, but firm, and your grape growing will be profitable; of course, in some years more than in others, but the final result will be a bank account in your favor. What I have done many others are doing or can do; the grapevine always rewarded my care and labors, while other fruits were sometimes a total failure; profitable vineyarding has carried me over many difficulties; the grape was, is and will be my choicest fruit to grow as long as I am able to work. From the culls and latest remnants of the grape crop make a pure, healthy, unadulterated wine, or a sweet grape juice if you choose, either for home use or for your friends, and as soon as the public knows that you have the pure, clear and healthy product of the grape, it is glad to buy it from you, and willing to pay a good price for it. But wine-

making is a different topic, which also must be learned, to do it well, so there is only one way left for many, to dispose of the culls of grapes to the winemaker for the price he is willing to pay, and also I have come to the end of my sketch about the art of profitable vineyarding. Thanks for your kind attention.

“MY PERSONAL EXPERIENCE WITH PLUMS—MOSTLY
OF THE NATIVE VARIETIES.”

(J. H. Karnes, St. Joseph, Mo.)

Mr. Chairman and Ladies and Gentlemen:

In this brief paper I shall give only my personal experience and observation in the growing of plums. There are so many varieties of all groups that it would be sheer folly (as well as a waste of time and money) for anyone to attempt to grow but a few varieties for profit. I have already tried more than were profitable. But the temptation to test some new variety is one that I seldom try to resist. So for fourteen years I have been testing some varieties of plums—native, European and Japanese. My residence and location is a few miles northeast of St. Joseph in the northern part of Buchanan county, Missouri. My soil is mostly a sandy loam and rolling enough to drain well. I have planted on lowland near a ravine and on the high ridge land, but the trees on the high land have usually borne the best crops and more frequently than those on the lowland. Therefore, I have concluded that it is more profitable to plant on high ground than on the lowland near the ravines. I have always cultivated my plum orchard, especially until it comes into fruiting and then at least every other year; and always keep the weeds and grasses mown down so as to give a good circulation of air. Such varieties as Wildgoose, Forest Rose, Bradshaw and some others must be headed back almost every year until they come into bearing; Wildgoose more than any other variety unless it be Burbank. The Burbank is such a rampant grower and of such a spreading habit that I find I can make a much better tree and one that bears better fruit by cutting back severely almost every year. Now a few words about varieties and then I will close. There is a well authenticated theory that plum trees of different varieties must be planted together in order to insure perfect cross pollination. So in my orchard I have a number of varieties all mixed up together and have had but few failures of crops in that orchard. However, Wildgoose is the variety which is the surest cropper of anything I have, never

having failed but one year. That year every variety failed from a peculiar cause. The weather had just been warm enough for several days to bring the buds on all varieties just to the opening point. Then came a very warm day with a very high wind. All blooms were opened in a day and all blew off of the trees. There was no pollinization, neither were there any plums of any variety that year. I have Wildgoose, Wolf, Miner, Pottawattamie, Blue Damson, Golden Mammoth, Shipper's Pride, Abundance, Burbank, Golden Beauty and Marianna all growing mixed up together in rows 12x14 feet apart. Now, I do not know which is the best pollinizer. A well known authority on this subject says: "The Wildgoose, though capable of fertilizing almost any other variety which it reaches, is absolutely useless in fecundating its own blossoms. What is true of Wildgoose is true of almost all other plums derived from native species and of many others." And that probably solves the whole question of "fertilization." One variety may not fecundate its own blossoms, but is perfectly potent to fecundate other blossoms. In another orchard I have Forest Rose, Spaulding, Bradshaw and Hawkeye. I get good results from Forest Rose and Spaulding, but little from Bradshaw. Hawkeye is a very slow grower and has borne but little fruit. The following would be my choice of varieties to plant for market and home use in this locality: Wildgoose, Charles Downing, Forest Rose, Wolf, a few Pottawattamie, Newman, a few Burbank and Abundance and a large per cent. of damsons, both Blue Damson and Shropshire Damson. I am trying some varieties, but am not ready to make a report concerning them. I would not plant Marianna and but few Japanese of any kind. Now, Mr. Chairman, if this little article will provoke a discussion on the subject of plums or create any enthusiasm for growing plums its mission will have been accomplished. And the only regret I have is that I cannot be present to take part in any discussions during your meeting.

PROFITABLE JAPANESE PLUMS.

(E. L. Mason, Trenton, Mo.)

In the vicinity of Grundy county only a few varieties of Japanese plums have been generally planted and of that number the Abundance and Burbank have attracted the most attention and are the most widely introduced. In looking up the history of these varieties I find as follows: "The Abundance was imported from Japan by Luther Burbank in 1884, and first sent out as Botan, re-named Abun-

dance and generally distributed by J. T. Lovett in 1888." Thus making fifteen years that the plum has been on trial in this country. While the good qualities of the Abundance may fall somewhat short of the unstinted praise given it by the introducer, it has at least maintained a very satisfactory reputation for hardiness, strong growth, early and abundant bearing and for fruit of good size and excellent quality. Of the well-known sorts this is undoubtedly one of the most profitable Japanese plums on the list. "The Burbank was imported from Japan in 1885 by Luther Burbank; introduced to the trade generally in 1889," one year later than the Abundance, consequently it has been tested fourteen years. As a profitable plum it is doubtful that any of the imported Japanese plums combine more good qualities than the Burbank. Its hardiness and vigorous growth, early and prolific bearing, of large attractive fruit, of good quality, has brought it rapidly into notice and caused it to become a general favorite. The Red June has not been so generally planted, but seems to show some promise. Specimens of the fruit exhibited at the last Grundy county fair were large and fine. Of the hybrid class of plums the America, originated by Luther Burbank, deserves special mention as a vigorous growing tree and an extra early and prolific bearer. The fruit is not equal to the Abundance or Burbank in quality, but is good size and when fully colored is very attractive. It certainly gives great promise as a market variety. The Wickson, another of Mr. Burbank's hybrids, is a fine plum, but has not shown the hardiness of the Abundance or Burbank. Trees planted previous to the severe winter of 1899, were mostly killed outright or badly damaged. Trees planted since that time have made good growth, but have not shown early fruiting qualities. Some of the hybrid class of plums more recently introduced may prove to have greater value, but from what I know of Japanese plums at the present time I would choose the Abundance and Burbank for profit.

EXPERIENCE IN GROWING PEARS.

(J. L. Erwin, Steedman, Mo.)

My experience in growing pears for market is limited to the past eight or ten years and then to but few varieties.

Observation teaches me that the pear, like the oak and hickory in natural growth, finds only a few favored spots where soil and exposure are favorable to its best development. Like almost all others

in planting I selected the best and richest soil that was dry and rolling for making my first plantings of pears. I note that when there is rapid growth there is quick decay. Two Bartletts, for instance, not more than fifty feet apart, one in a loamy moist soil, the other on a high, dry bank, both planted at the same time; the first two years ago with a full crop of fruit totally destroyed by blight, the latter making slow growth, but remaining perfectly healthy.

The Garber and Kieffer have been fairly healthy with me. The Garber rather inclined to overbear. Seven years ago my son, A. T. Erwin, Prof. of Hort. Iowa Agricultural College, made a small planting of pears near Steedman, Mo., on a piece of very rough stony land when we had hard work to find soil enough to cover the roots. The natural growth was black hawthorn apple and brushes of similar wood growth, one very much resembling pear in foliage and wood growth. These trees have made a very fine growth, fruiting about one bushel to the tree in 1901 of most beautiful pears. I have watched their growth from year to year, as they have had very little care, and notice the clean, glossy foliage and healthfulness of the trees. I am led to believe that if we would make pear growing successful and profitable we must look for a soil and exposure suitable to its growth, that it is very provincial in its character and that places which seemingly very uninviting for cultivation are best suited to its growth. Thinning and careful handling pays. If we could have a crate similar to the egg shipping case for handling and shipping or hauling over rough roads to market that would be a very great improvement. The crates could be returned and used again and again.

THURSDAY, DECEMBER 10--8 P. M.

The closing session of the forty-sixth annual meeting was held in the University auditorium and presided over by First Vice-President G. T. Tippin.

THE AGRICULTURAL COLLEGE.

(Dr. J. C. Whitten, Columbia, Mo.)

I want to talk to you for awhile not only of what the Agricultural College has done for the farmer and fruit grower, but also of what we hope to do in the near future. No institution ever reaches the limit of what it is possible for it to do. The work of the Agricultural

College in the interest of the farmer is generally reckoned of two kinds: first, in teaching and instruction; and, second, investigating work at the experiment stations. The teaching lays before the student what is known in regard to the various branches of agriculture, and the experimenters are trying to discover new ideas and methods.

In our college there are several courses offered to students of agriculture and horticulture. The work thus done benefits mainly the students themselves, but the good does not stop with them. The man who comes here and studies is better fitted for the work of farming or fruit growing, and he exercises a great influence among his friends and neighbors. I would not detract from the successful practical fruit grower who has never seen the inside of an agricultural college, but I feel confident that the same man might have won a great deal more success if he had taken such a course as we offer our students. The ability to succeed in any calling depends upon a man's ability to think and see things, and not alone upon his knowledge of horticulture; but also on his general college training which he will get in connection with his practical studies. He will think brighter and better, and more to the purpose. A man who has no training and yet succeeds is entitled to great credit. The well-trained successful man is better qualified to influence others. We all like to look to the most successful man in our business or profession for encouragement and inspiration to better things.

Aside from the regular collegiate courses, we give here in this institution short winter courses for those who can not take a college course, but can come here for a short time in the winter when farm work is not so urgent for a short practical course. A great many who have taken these short courses have gone back to their work with new energy and interest from increased knowledge.

The benefit of the college work does not stop with the students who come here. There is extension work in several ways. Instruction is given through bulletins and other ways to men in their own homes and in their own town. Another phase of our work which has done considerable good is the summer courses for the teachers in our State. Numbers of teachers have been here from every part of our State. It has been said that the best way to teach the children is to teach the teachers how to teach. Eighty teachers came here in the summer to take this course.

In the investigation work, publications go out to the people every year in increasing numbers. Nearly all of these publications have been of practical use to some in whose hands they have come. The applications for these publications shows there is a growing interest on the

part of fruit growers in receiving instruction. The work of the experiment station will result in great good to the State, in the methods of spraying to control insects and fungous diseases which it is working out. While the work of spraying has finally to be practically developed in the hands of the fruit grower, it starts from the station. Some times a bulletin may not, at first view, seem, to have a practical bearing upon fruit growing, but it may fall into the hands of a man and cause him to think and perhaps argue against it, and thus awaken him to new life and energy. He discusses and questions whether it is true and in the long run it may do him more good by causing him to think and try to discover a better method.

Another method of instruction is by correspondence. When I first came I received 150 letters in a year asking for information in regard to horticulture, entomology, and kindred subjects. Last year the Horticultural Department alone received 3,500 such letters; and I presume there were as many in the Department of Entomology.

The past proves that the institution can do something for the fruit-grower and that he is availing himself of the help we can give him. Correspondence is the most important source from which the man in the station gets information and inspiration for the work.

In the growth of the work year by year we believe that a large number of additional features can be added, and that the influence of the University on agriculture is only just beginning.

J. C. Evans.—I have been asked, can a student take a course in horticulture and receive a degree in this institution?

J. C. Whitten.—The student who takes a college course with a certain amount of literary work and general culture can make his work largely horticultural and take a degree.

BITTER ROT.

(Dr. T. J. Burrill, Urbana, Ill.)

I have lived long in your neighboring state of Illinois, but it has never been my pleasure before to meet with the State Horticultural Society of Missouri. I take off my hat and every thing else between my head and the sky to the fruit-growers of the State that grows more apple trees than any other state and keeps in office such an able secretary as you have.

My subject is not very attractive, especially when it is too plentiful on your apples. Bitter rot is no new thing. It was as abundant fifty

years ago as now, in proportion to the quantity of fruit grown. In the past it took the fruit as badly as it does now. I do not think it causes as much damage as the apple scab fungus, a thing we often pass by without paying any attention to it. The scab does a great deal of damage to the tree. The reason we notice the damage by the bitter rot more than that by the scab is that a tree may be loaded with fine fruit until August or September, and we begin to count the apples before they are picked, and in a few days they may all be gone. Even up to picking time they may be all right and then be almost a total loss. I know a man who expected to pick 1,800 barrels. He got only seventeen—not 1,700, just seventeen barrels. I know of another man who had a fine crop on twelve acres. He was delighted and said, "Now I see how I can send my boy to college." The bitter rot struck his orchard and he did not get enough apples for his own use. In 1901 the loss in one county in Illinois was more than \$1,500,000 from this one disease. It occurs over the entire lower part of the apple growing country, with us mostly south of latitude thirty-nine degrees. It is the southern part of the state which suffers, not the northern part. It is due to a fungous disease and not to anything wrong inside the tree. It grows and dies like other plants. It does not affect the leaves and has nothing to do with the foliage. Its circle of life can be followed just as certainly as the life of bigger things, but the eye needs to be aided by the microscope. It does not affect the foliage. In this respect it is very different from the apple scab. It was not known till last year that it affected any other part of the tree than the fruit. Sometimes it is called ripe rot; but incorrectly. It may spread considerably upon winter apples as early as July. In September with warm, damp weather it may go ahead with great rapidity.

In July, 1902, it was found upon some other parts of the tree than the fruit. It was noticed that the apples first attacked on the tree had a cone-like form with the point at the top. You can not notice this later in the season. Mr. Simpson noticed dead spots upon the limbs at the point of the cone. Examination proved this to be very frequent. It was called canker upon the limbs. Perhaps it would be a preventive to cut out these cankers. I have here some branches with cankers on them. In some cases old apples may carry the infection over to the next year; but every reason goes to show that the "mummy" apples are very rarely the origin of the outbreak. The outbreak is caused by the cankers. It would do little good to clean up the old apples on the ground. What can be done in the way of cutting out these cankers? For the most part they are only annual. In some instances they may extend the next year, but this is rarely the case. It is practically impossible to look

over the trees and cut them all out. I believe it would be desirable to pick the fruit of those trees which are known to be infected, and thus to some extent prevent its spread. If we can find some wash to put on the tree in the winter to kill these cankers we should be able nearly to control it. There are very few apples in Illinois this year, and we will not be likely to have much early outbreak of this bitter rot next year. I think it pretty certain that the cankers upon the limbs are produced by the bruises made upon the tree at picking time. They are usually formed upon some injured portion of the tree. Any little bruise is likely to admit the spores, which make the canker. If we want to keep down canker as much as possible we must see that the trees are not carelessly handled. I think one of the worst things is to let the apple buyer go into the orchard and pick the apples. He is apt to club the trees, which puts them into fine condition to admit the canker spores which make the bitter rot. It is thought that the spores may be carried by the little pomace flies, and they may be blown by the wind. This makes it more important to stop its first outbreak.

Can it be controlled by spraying? Experiments show that if the fruit is actually covered with Bordeaux no bitter rot spore can get to it; but it is very difficult to keep the apples sufficiently coated. It does no good to put on the coat after the spore gets into the apple. There is no stopping it then. Early spraying for the scab and the codling moth does not seem to have much effect against the bitter rot. The spray must be put on before the spore gets on the apple; but just as little before as possible. It is hard to meet all the conditions required. Whether we can make spraying absolutely successful is very doubtful. I hope it may be done. I think we will have to get up early in the morning if we succeed. If we succeed we will have accomplished something worth while in Illinois and Missouri.

J. L. Erwin.—Has any effort been made to destroy the spores in these cankers?

Prof. Burrill.—That has not been successfully done, to my knowledge.

Mr. Chandler.—Will early picking and destroying infested apples avail anything?

Prof. Burrill.—That is exceedingly desirable to keep out the very first infection. Where there are not a great many of the cankers in the limbs their removal has proved to be a great advantage in practical work.

Mr. Erwin.—I observed in 1882 that trees to the windward of a tree affected by the bitter rot were affected by the same disease. I grubbed up and burned the affected tree. I think it may be propagated upon wild crabs in the woods.

Prof. Burrill.—That is correct. It may grow upon wild crabs and hawthorns. It is sometimes found upon the peach.

BOTANY.

(Prof. B. M. Duggar, Columbia, Mo.)

I think I was put upon the program that I might have an opportunity to meet you. Your secretary knew I had not been here long enough to say anything of much importance to you; but I am certainly glad to have this opportunity of meeting you at this time. I do not feel like taking up your time. I will therefore be extremely brief. I have listened with much interest to all I have heard, and especially to the statistics given by Mr. Craig in regard to your products, the number of your trees, etc. You know all the orchards in the State are not what they should be. I want to make the orchards laboratories and hospitals. At the Agricultural College should be the principal laboratory of the State. The college can work out certain problems, and you can work out certain problems. We should make of our own orchard a supplementary laboratory and a supplementary hospital, to study ways of dealing with bitter rot, apple scab, aphid, crown gall, canker, fruit spot and all the other insects and diseases you have to contend with. The great number of these things reminds me of a remark made by a salesman of Marshall Field & Co.: "We have every thing you can think of; and what you cannot think of we will send out and get." We have more diseases than in the early times because more apples are grown. Then the diseases were more scattered, but they were there, somewhere. The diseases have travelled by all sorts of methods and they form one continuous pall over the whole country. If they are not here they are on the way here, and we will have to fight them sooner or later. There are two ways of fighting them, by spraying and by finding parasites to feed upon them. I have spent days in Western New York, but with few exceptions, I have not seen spraying as well done as it might be. There is no better time to begin than early in the spring just as the buds are opening. This one spraying will not suffice for all diseases. It will take a great many, all the season.

We must also seek to discover and to develop resistant varieties. I hope to gather up all the information on this subject and make it available.

THE APPLE IN COLD STORAGE.

(By G. Harold Powell, Pomologist in Charge of Fruit Storage Investigations, U. S. Department of Agriculture.)

[The following is an outline of an illustrated talk by Mr. Powell on the above subject.]

There has been a remarkable development in commercial apple growing in the United States within the last 30 years following the opening of the interior of the country by the transcontinental railway, and by more recently completed lines. Apple culture at the present time is no longer an infant industry, but it ranks as a highly specialized form of American agriculture. In 1900 there were more than 200,000,000 apple trees in the United States which yield from 40,000,000 to 60,000,000 barrels of fruit in a normal season. In the decade from 1890 to 1900 about 30,000,000 apple trees came into bearing or an average annual increase of nearly 7 per cent. during that period.

Nature does not produce her crops uniformly throughout the year, and unless there is some means of equalizing its distribution throughout the season temporary gluts are bound to follow in the markets. Not long ago the apple crop had to be sold quickly after harvesting near the centers of production to prevent excessive waste from decay. The quantities received were often so great that the large markets were congested at the height of the season when enormous amounts of fruit were sacrificed for less than the cost of freight. At the same time the supply in many of the larger distant cities and most of the smaller interior towns, was unequal to the demand, while all of the markets were practically barren of apples during a greater part of the year. The danger from gluts in the fruit market, as in every other industry, is reduced as we master the art of handling the temporary oversupply by storing it and distributing it at home and abroad in time of greater need.

The cold storage business has developed largely within the last 15 years, and in its broadest economic relation, is destined to equalize the distribution of fruits, and to increase the demand for them both in domestic and foreign markets. It holds the same relation to the fruit industry that the great warehouses bear to the older industries, such as grain, cotton and tobacco. Accurate statistics concerning the magnitude of the cold storage warehousing business are difficult to obtain, but it is probable that there are not less than 1,000 houses distributed throughout the country that are devoted to a greater or less degree to fruit storage.

The following figures represent the number of barrels of apples held in the United States in cold storage about December 1st of each year since 1898, and give a conception of the magnitude and growth of the apple storage business as a whole:

APPLES IN STORAGE ABOUT DECEMBER 1, 1898-1902.

Date.	Barrels in cold storage.	Barrels in common storage.
1898.....	800,000	400,000
1899.....	1,518,750	654,500
1900.....	1,226,900	794,000
1901.....	1,771,200	138,000
1902.....	2,978,050	1,236,750

There are many practical difficulties in the cold storage of apples and these difficulties arise through lack of information concerning the principles which govern the production of the fruit in the orchard and the effect of various conditions of growth and of the different commercial methods of handling the crop in the orchard and in transit, on its vital processes. This condition leads to frequent misunderstandings between the warehousemen, the fruit grower, and fruit handler which might be avoided and the condition of the fruit storage business improved if there was a clear understanding of the principles of fruit growing in their relation to the ultimate keeping quality of the fruit itself.

The United States Department of Agriculture has been investigating many of these problems during the last two years, and I desire to present a few of the practical results that have been emphasized by our investigations.

INFLUENCE OF TEMPERATURE ON THE KEEPING QUALITY OF THE FRUIT.

A fruit is a living organism in which the life processes go forward more slowly in low temperatures. When the fruit naturally reaches the end of its life, it dies from old age. It may be killed prematurely by rots which lodge on the fruit before it is picked or sometime afterward. A cold temperature is designed to arrest the ripening processes and thereby to prolong its life history. It is designed also to check the development of the diseases with which the fruit is afflicted, but it cannot prevent the ripening of the fruit nor the slow growth of some of the diseases. The lower the temperature in which the fruit may be safely stored, the more nearly are the ripening processes stopped. In the investigations of the department, apples have been stored in temperatures ranging from 31 to 36 degrees, and it has been found that a temperature of 31 to 32 degrees is more efficient in checking ripening than a higher temperature, and that the quality of the fruit and its other characteristics

are in no way injured by the lower temperature in comparison with the higher one. The low temperature also retards the development of scald, and the fruit on leaving the storage house stands up for a longer time on account of its being in a less mature condition.

INFLUENCE OF DEGREE OF MATURITY OF THE FRUIT.

In recent years there has been a tendency to pick the apple crop relatively earlier in the season than formerly. It is quite generally supposed that the longest keeping apples are not fully developed in size or maturity, and that the most highly colored fruit is less liable to endure the abuses that arise in picking, packing and shipping. There are many economic factors which have influenced the harvesting time of the apple crop. A large proportion of the crop is purchased in the orchard by comparatively few apple dealers, and with the growing scarcity of farm hands and other labor, it is often necessary to begin picking relatively earlier in the autumn to secure the crop before the fall storms or winter months set in. The great increase in freight traffic has overtaxed the carrying capacity of the railroads and has influenced the apple dealers to extend the shipping season over the longest possible time in order to avoid congestion and the delays in shipping the fruit. In localities where the entire crop is sometimes ruined by the bitter rot after the fruit is half grown, the picking is often begun early in the season in order to secure the largest amount of perfect fruit.

The investigations indicate, however, that the immature and partly colored fruit has not always the best keeping quality. On the other hand an apple that is not over green and which has attained full size and high color, but is still hard and firm when picked, equals the less mature fruit and often surpasses it. The more mature fruit is superior in flavor and texture, and is often more attractive to the purchaser and therefore of greater money value. It retains its plumpness longer and is less subject to apple scald. If, however, the fruit is not picked until over ripe it is already near the end of its life history and will deteriorate rapidly unless stored soon after picking.

The experiments indicate that so far as maturity is concerned, the ideal keeping apple is one that is fully grown, highly colored, but still hard and firm when picked. Apples that are to be stored in a local cold storage house to be distributed to the markets in cooler weather may be picked much later than fruit requiring 10 days or more in transit, but the use of the refrigerator car makes later picking possible when the fruit must be in transit for considerable time in warm weather in reaching a distant storage house.

It has been found that there is a close relation between the degree of maturity of the fruit when picked and its subsequent susceptibility to scald. Apple scald is one of the most serious difficulties with which the fruit storer has to contend. The nature of the trouble is not well understood, but it is supposed to be caused by a ferment called an enzyme. It is not a contagious disease and is in no way connected with the action of parasitic organisms, such as mould or bacteria. It appears to be closely connected with the changes that occur in ripening after the fruit is picked, and is most injurious in its effects as the fruit approaches the end of its life.

The scald always appears first on the green or less mature side of an apple. The portions grown in the shade, and under-colored are therefore most seriously affected. When the apple crop is picked before it is mature the fruit is more susceptible to scald than it would have been later in the season. The relative susceptibility of immature and more mature apples is brought out in the following table:

SCALD ON MATURE AND IMMATURE APPLES.

Variety and locality grown.	Mature, well colored.	Immature, partly colored.
	Per cent.	Per cent
Baldwin, New York.....	3.1	29.2
Ben Davis, Illinois.....	2.6	15.8
Ben Davis, Virginia.....	13.1	41.6
Rhode Island Greening, New York.....	25.4	43.4
Winesap, Illinois.....	2	31.8
Yellow Newtown, Virginia.....	2.3	9.4
York Imperial, Virginia.....	2.0	18.2
Average.....	6.9	27.0

In the practical handling of orchards the fundamental corrective of scald lies in practicing those cultural and harvesting methods that develop maturity and a highly colored fruit. The picking of the fruit when too green, dense-headed trees that shut out the sunlight, heavy soil, a location or season that causes the fruit to mature later than usual and makes it still green at picking time—these are among the conditions that make it particularly susceptible to the development of the scald.

INFLUENCE OF DELAYING THE STORAGE OF THE FRUIT.

The removal of an apple from the tree hastens its ripening. After picking the fruit matures more rapidly than it does when growing on the tree and maturing at the same time. The rapidity of ripening increases as the temperature rises, and the more mature the fruit when picked the less rapidly the maturing processes seem to progress. Fruit that is

grown abnormally large seems to ripen relatively faster than medium sized fruit, and different varieties vary widely in the rapidity with which they pass through their normal life history. Therefore, from the theoretical standpoint, any condition in the management of the fruit that causes it to ripen after it is picked shortens its life in the storage house, for it is already so much nearer the end of its life history when stored.

It is probable that a large proportion of all the difficulties with apples in cold storage is due to delaying the storage of the fruit after it is picked. This is especially true in hot weather, and in fruit that comes from sections where the autumn months are usually hot. If the fruit is delayed in piles in the orchard, or in piles or in packages in closed buildings where the ventilation is poor, if transportation is delayed, or the fruit is detained at the terminal point, the ripening progresses rapidly and the fruit may already be near the point of deterioration or may even have commenced to deteriorate from scald or mellowness or decay when the storage house is reached. On the contrary, if the picking season is cool, a delay during a similar period of time might cause no serious injury to the keeping quality.

Delaying the storage of the fruit in warm weather increases its susceptibility to scald. The following table brings out the injury that may be caused by delaying the storage of fruit in hot weather. In this particular case the mean average temperature between September 15-30, 1902, was about 62 degrees Fahrenheit. Fruit picked from the same trees in October and stored 2 weeks later when the temperature was about 53 degrees Fahrenheit was not injured by the delay:

SCALD ON IMMEDIATE AND DELAYED STORED APPLES IN FEBRUARY, 1903.

Variety.	Picked Sept. 12; stored Sept. 15.	Picked Sept. 15; stored Sept. 30.	Picked Oct. 4; stored Oct. 9.	Picked Oct. 5; stored Oct. 19.
	Per cent.	Per cent.	Per cent.	Per cent.
Rhode Island Greening.....	0	38	(No record.)	(No record.)
Sutton.....	0	33	0	0
Tompkins King.....	0	15	0	0

From the standpoint of the orchardist or apple dealer who cannot secure quick transportation to a distant warehouse, or who cannot obtain refrigerator cars, or who is geographically situated where the weather is usually warm in apple picking time, the local storage plant in which the fruit can be stored at once and distributed in cool weather, has important advantages.

INFLUENCE OF CULTURAL CONDITIONS.

There seems to be a wide difference in the keeping quality of the same variety when grown under different conditions. It has been observed that the Tompkins King, Hubbardston and Sutton apples from rapid growing young trees ripen faster than smaller fruit from older, slower growing trees, and therefore reach the end of their life history sooner. From older trees these varieties have kept well until the middle of April, while from young trees the commercial storage limit is sometimes three months shorter.

It has been observed that Rhode Island Greening, Mann and Baldwin apples grown on sandy land ripen more rapidly than similar fruit from clay land where all the other conditions of growth were similar.

In the Southwest in the younger apple growing sections where the orchards have been planted on new land, the trees grow rapidly and produce an abundance of fruit, but under these conditions the keeping quality of the fruit does not appear to equal that of the same variety from older, slower growing trees.

It does not follow, however, that the longest keeping type of the same variety is the most valuable. An apple that is large and highly colored, brilliant in color, and with commanding style may be worth 50 per cent. more—though it will not keep longer than early winter—than the same variety grown under other conditions that causes it to be small and poorly colored, but giving it a keeping quality until the spring.

INFLUENCE OF THE TYPE OF PACKAGE.

There has been a good deal of discussion concerning the relative value of closed and ventilated barrels for apple storage. The investigations indicate that the chief advantage of the ventilated package lies in the greater rapidity with which its contents cool off. Apples in a ventilated package, if the ventilation is considerable, are checked in their ripening processes sooner than those in a closed package, and the influence of the package in this respect is most marked with varieties that ripen quickly and in hot weather.

Apples in ventilated packages, however, are likely to shrivel if the fruit is stored for any length of time, and it is, therefore, not practicable under the present commercial methods of storage to store fruit in packages in which there is much exposure of the fruit to the air.

The smaller the package the quicker the fruit cools off, and therefore the sooner the ripening processes are checked. It has been observed that apples keep longer in bushel boxes than in barrels on this account,

and that the fruit can be held much later in the spring in the smaller package as the weight of the fruit itself may cause it to bruise in the barrel after it begins to mellow.

INFLUENCE OF WRAPPER ON KEEPING QUALITY.

It has been found that a fruit wrapper may influence the keeping quality in several ways. It appears to retard the normal ripening of the fruit and thereby extends its life history. The wrappers are usually useful in extending the season of early winter sorts, or in making the long keeping varieties available beyond the usual period of storage.

The greatest value in the wrapper appears to follow the protection that it gives the apple against bruising and the discoloration that may result from improper packing or rough handling, but especially in preventing the transfer of rot of one apple to another. If the fungus is capable of growing in the storage temperature, it is not likely that the wrapper retards its growth, but it confines the spores, when they develop, within their wrapper, and their dissemination is difficult or impossible.

The importance of a wrapper in protecting the fruit from decay is brought out by the following table:

AMOUNT OF DECAYED FRUIT APRIL 29, 1903, IN BUSHEL PACKAGES.

Variety.	Newspaper wrapped.	Unwrapped.
	Per cent.	Per cent.
Baker.....	3.7	27.2
Dickenson.....	6.4	43.0
McIntosh.....	7.7	15.0
McIntosh (second lot).....	19.7	32.0
Northern Spy.....	5.6	52.0
Wagener.....	38.0	63.0
Wealthy.....	42.0	60.0

The double wrapper is more efficient in retarding ripening than a single wrapper. A good combination consists of porous newspaper next to the fruit with an impervious wax or paraffin wrapper on the outside.

From the commercial standpoint it would not be profitable to wrap the common grades of fruit, but for the finest grades, and for the tender varieties like McIntosh, Wealthy, Northern Spy, Bellefleur, Jonathan and Grimes, it is probable that no operation connected with the packing of the fruit would bring greater returns.

BEHAVIOR OF THE FRUIT WHEN REMOVED FROM STORAGE.

There is a general impression that cold storage apples deteriorate quickly after removal from the warehouse. As a matter of fact, however, storage apples do not deteriorate more quickly than other apples

that are equally ripe and are held in the same outside temperature. The rapidity with which the fruit deteriorates on removal from storage depends, first, upon the degree of maturity when removed, and second, on the temperature into which it is taken. Late in the spring the fruit is far advanced in its life and the weather is becoming warmer and therefore the apples break down more quickly at that time than early in winter. In commercial practice a large proportion of the fruit is held in storage late in the season for an advance in price, and the owner removes it not because the price has advanced, but a longer storage would result in serious deterioration from rots and over ripeness. When a considerable amount of stock is decayed on removal from the warehouse, the evidence is conclusive the apples should have been sold earlier in the season.

The following table shows the amount of decay on Baldwin apples removed from the same barrel to different temperatures:

AMOUNT OF DECAY AFTER REMOVAL FROM STORAGE TO DIFFERENT TEMPERATURES.

Variety.	Date removed from storage 1903.	Date inspected.	Per cent rot.			
			44° F.	48° F.	61° F.	67° F.
Baldwin.....	Jan. 29.....	Jan. 29.....	0	0	0	0
		Feb. 10.....	0	0	3	10
		Feb. 13.....	0	0	12	14
		Feb. 16.....	0	0	21	24
		Feb. 20.....	0	4	23	28
		Mar. 3.....	5	10	.....	.....
		Mar. 7.....	5	15	.....	.....
		Mar. 24.....	20	.....	.....	.....
		Apr. 6.....	36	.....	.....	.....

THE IMPORTANCE OF GOOD FRUIT.

Apples do not improve in grade in cold storage. In handling a crop too much care can not be given to grading the fruit properly before it enters the storage house. The contents of many packages are injured by the spread of disease from a few imperfect apples. Rots enter the fruit most easily wherever the skin is bruised or broken, and in the early stages of the rot development it is common to see the diseases manifesting themselves around worm holes or bruises occasioned by rough handling, from nails that protrude through the barrels, or from other causes.

When the crop is light it may pay to store apples that are not of the first grade, but such fruit should be rigidly eliminated from the best stock and stored where it can be removed earlier in the season than the better qualities.

The attractiveness and the value of the best fruit is often injured by careless handling. A bruised spot dies and discolors. Finger marks made by pickers, graders, and packers, and injuries from the shifting of the fruit in transit or from rough handling, become more apparent as the season advances. In fact, all of the investigations of the Department of Agriculture emphasize the fundamental importance of well-grown, carefully handled fruit in successful storage operations.

FINAL RESOLUTIONS.

At this closing session of the Missouri State Horticultural Society we desire to thank those who have contributed to make this session such a success. To the railroads for their courtesies in granting reduced rates we extend our thanks, and still look forward to the time when the horticultural society shall have a regular rate of one fare for the round trip for its meetings.

We desire to thank the president and faculty of the University of Missouri for their kindness and their help, not only at this meeting, but throughout the years.

We are especially grateful to those who have come from other states to help make this session profitable. The present session has been favored with the attendance of more visitors from outside Missouri than perhaps any the society has ever held.

To the different institutions of Columbia, the press, hotels, and the colleges which offered their services in the way of furnishing musical numbers we extend our thanks, even though the latter offer was not accepted.

At this time the society wishes to thank the Legislature and executive officers of Missouri for their liberality in having provided the splendid building which was dedicated during this session. We scarcely hoped five years ago, when we met in this city and passed a resolution asking for an appropriation of \$50,000 for a building devoted to horticulture and the allied sciences that in so short a time we should have such a building erected and dedicated to this work. We ask that the Legislatures of the future will continue to encourage a work which means so much to the prosperity of the great State of Missouri.

When we compare the attendance at our meetings of a decade ago, we feel that the society is to be congratulated at this time upon the great number of young men who now attend our meetings to reinforce the efforts of those who have stood by the society in the past. The present

meeting has had every section of the State represented, by old men and young men, and the results cannot fail to be of much value.

The society wishes to express at this time its appreciation of the honor bestowed upon it by the Missouri World's Fair Commission in allowing our society to name the man who shall have charge of the fruit exhibit to be made at St. Louis. We shall show our appreciation of this trust by trying to gather an exhibit of fruit of which the State shall be proud.

Finally, we thank our outgoing officers, and also those fruit-growers from all over the State who have helped to begin our work of making the fruit display at St. Louis, and to solicit a continuance of this interest until, a year from this date, the world shall know more of the resources of Missouri and the products of her soil.

All of which is respectfully submitted.

JAMES M. IRVINE,
N. F. MURRAY,
H. S. WAYMAN,

Committee.

ADDITIONAL PAPERS.

ADDITIONAL PAPERS.

PRUNING, ITS NECESSITY AND VALUE.

(H. N. Wild, Sarcoxie, Mo.)

The question of pruning is one upon which much interest is manifested with each recurring season, and finds many orchardists and fruit growers who would inquire: is pruning, as commonly practiced, a help or a hindrance to the fruitfulness of the trees, and whether high or low headed trees are preferable?

To all such inquiries there can be no fixed rule of answer, as location, altitude, or surroundings, may have a marked influence upon the method of pruning to be practiced. Then, there is a difference in the varieties of trees to be pruned. Therefore, we venture to say, "in a nut shell," pruning is the well balancing of the tree, keeping a fairly open tree by the removal of the feeble and inside branches, that would otherwise tend to injure or interfere with the rest of the branches of the tree, or be a means of brushing off the fruit as it began to form or before maturing the crop.

Low headed trees are best formed by commencing at the earliest period after setting the trees. It is not necessary to head back each year. Only the most vigorous branches should be cut back, always keeping in view the well rounded or well balanced tree you wish to form. Nothing larger than a pair of pruning shears or knife should be used. The cutting side of the shears used should be placed next to the body where the branch is to be removed, so that the bruised parts are removed with the branches that are cut off; covering the wounded places with a preparation of one part resin and three parts linseed oil. This forms a good covering, easily applied, and not so conspicuous or unsightly as painting with oil and white lead, as is often done. The pruning should be disposed of by burning or used to stop washed places in the ground, where they will serve a good purpose.

The heaviest pruning should be done on the north side of the tree first, because our trade winds tend to incline the tree to the northeast;

and second, the fruit that is grown on the north side is less colored and not so well grown as on any of the other sides. Again, there is less danger of sun scalded trunks where the tree is well shaded on the south. Another thing that might be worth mentioning is that the fruit of most varieties of fruit trees is formed from the central portion of the main branches of a tree and toward the outer sides, not so much toward the trunk of the tree, so that close heading back would diminish the amount of well colored fruit; remembering the best colored fruit is found where it receives sufficient sunlight and air; and would therefore be a hindrance to its productiveness, as well as diminish the value of the crop. It is well known that nurserymen who have no scion orchards prune the outward and upward branches of his orchard trees, in order to obtain grafting wood; it is, therefore, apparent that such heading back is done in order to secure a more vigorous growth of wood, at the expense of part, if not all, of the crop of fruit the tree would bear.

High headed trees are not much in evidence in our commercial orchards, as the trees are more subject to sun scalded trunks, making a lodgment for tree borers, and generally causing the tree to lean in any direction that the storms of summer incline them, besides making an unsightly orchard, and no more accessible (by reason of leaning trees) than if they were low headed trees instead. Following the above suggestions we have, first, a well formed tree that will withstand the storm, sufficiently open to mature well colored fruit, the fruit will remain on the tree longer, accessibility for spraying, and finally ease in gathering the crop, which means less cost in handling, etc.

Some varieties of apples, as Missouri Pippin, Winesap (and its type), Romanite and Jonathan, require an occasional heading back, which should be done when the tree is in its off year of fruiting. This will also give the tree a chance to restore its root system, for which the above varieties require an occasional rest, as often as once in four or five years.

Peach trees should be headed back in a year when the crop of fruit is killed. The tree should be allowed to grow in a natural way until fall, when the fruit buds will be more numerous, after which all spindling branches should be cut out, leaving the larger limbs sufficient room.

Pear trees require but little pruning other than heading back. Cherry trees, least of all fruits, as the fruit is borne almost entirely on the outward branches.

Apple trees form the first growth of leaves at the terminals or ends of the branches before the bloom is developed, and the blooming period might be retarded somewhat by pruning the terminals of branches before time of blooming in order that a new leaf start would ensue. Peach trees bloom and start their leaves at or about the same time.

November and December are the best months in which to prune. February and March should be avoided, as the cut places are apt to bleed at this time of the year in this latitude. Should you be so unfortunate as to have done this at this time of the year, the application of soap wash is beneficial, also in preventing the unsightly after-appearance of the bleeding place on the tree, repeating the operation until new growth is formed, which will show beneficial results from this kind of treatment; and later will appear as if a new covering of bark had been formed.

Pruning in June and early part of July is generally practiced in order to retard the excessive growth and to cause the tree to form a larger per cent. of fruiting buds; but this is only necessary while the tree is in its first bearing years, rarely afterward.

The value of an orchard is largely measured by the appearance of the trees, and they are the silent messengers who bear the information as to whether or not the owner has pruned with that end in view, as well as to his own satisfaction and profit.

This paper is shortened in order to cover what the writer considers the material points, as it is believed that papers of unusual length often tend to prevent discussion, and much practical experience or observation is not brought out, or lost sight of that would otherwise be beneficial.

WHEN TO GATHER FRUITS.

(Chas. Teubner, Lexington, Mo.)

Go into any town or city, look at the various kinds of fruits and note how small a proportion is found which has been carefully handled, graded and gathered at the right time, neither too ripe nor too unripe. Years ago when, as a barefooted boy, I took a sack of Maiden Blush apples to a fruit buyer in my home town (the money from the sale to be mine) the buyer gave me a thorough scolding for carrying apples in a sack. It was a lesson I never forgot. Ever since then I have noticed the careless handling and unripe and overripe condition in which fruits of all kinds are sent to market.

All fruit should have full size, high color and be ripe, juicy, crisp and fresh in order to command the highest price. Fruit may have size and color, and yet lack the most desirable quality—flavor. Most fruits will either lack or lose flavor by being gathered before or after the right time. Early apples, such as Early Harvest, Red June, Yellow Transparent, Astrachan, Duchess, etc., are often gathered (sometimes shaken off) a week or two before they have attained their full size, color and flavor, and are rushed off to market simply because the grower is afraid the

other fellow will get ahead of him and secure a higher price. All summer apples, especially those of white or yellow color, should be handled very carefully, because every bruise will show and detract from their appearance and quality, and thus lower the price. I have seen Benoni sold for 50 cents per bushel which, if allowed to hang three weeks longer to attain full size, color and flavor, would easily have brought \$1.00 per bushel. This grower had about 12 bushels, for which he received \$6.00. Had he gathered them three weeks later, the yield would have increased to 15 bushels and sold for \$15.00, or one hundred and fifty per cent. more. Early apples must be closely watched, for after they attain their ripeness they rapidly deteriorate in quality. The time to gather them is after the prematurely ripened (wormy) fruit has dropped, when the fruit is full size and the green ground color has turned to a straw or cream color, and when the fruit parts rather easily at the stem from the branch. The stem should invariably be left on the fruit.

It is best to make two or more gatherings, taking only the largest and best colored fruit at first. This gives the remainder a chance to grow and ripen quicker, as well as to improve in quality. Fall apples, such as Rambo, Bellflower and Grimes Golden, should be gathered as soon as they show signs of ripening, for they soon turn mealy if left too long on the tree or loss is incurred by dropping. With winter apples it is somewhat different. Jonathan, Gano, Ben Davis and Rome Beauty should not hang too long, while Huntsman, Winesap, Willowtwig and York Imperial may be gathered later. Of the Huntsman, especially, several gatherings should be made, as they color and mature rather unevenly. The Jeneton can be left to hang until there is danger from frost or cracking, the latter being due to cold and wet weather. They should be closely watched, because a few days of rainy weather and cool days and nights late in fall causes the skin to crack and often much loss results before the grower is aware of it. Small Romanite and Lansingburg can be left to the last, but it is best not to delay gathering too long, because during a late warm fall they will mature on the trees beyond the proper period and a sharp frost detracts from their keeping quality and flavor, although the fruit may not show it at gathering time.

All fruit sent to distant markets, and especially those intended for cold storage, should be packed in a cool building or in the shade of a tree and shipped as quickly as possible; for fruit ripens more rapidly off than on the trees. Apples for cold storage should be fully colored and ripened or else there will be loss from "scalding" in storage. For home cellaring, however, I prefer to gather Ben Davis and Gano as soon as fairly colored, say from the middle to end of September. I know from experience that they will then remain juicy a long time, and not turn

"dry as sawdust" within a few weeks after gathering. Jonathan should not be allowed to hang until their crimson color turns dark, because they then have lost much of their beauty and are more subject to bitter rot.

Pears should never be allowed to ripen on the tree. Some varieties (like the Seckel) taste good when ripened on the tree and may be allowed to hang longer than others, but some, like the Flemish Beauty and Clapp's Favorite, are apt to turn mushy if left to ripen on the tree. Others, like the Kieffer and Garber, get hard and gritty around the core. I have gathered Kieffer at different times from the same trees and found that they develop a better flavor and texture when gathered about the 10th to 20th of September than when allowed to hang two to four weeks longer. The Sheldon, too, must not hang too long or it will lose its juiciness.

Peaches, as a rule, are not allowed to hang long enough. They should be well matured and well colored, but still firm, if to be shipped any distance. Wait until all the green color has turned to a creamy white. I have seen early peaches brought into market here and sold for 50 cents per bushel (fit only for cooking), which if left a few weeks longer on the trees would have sold for \$1.25 per bushel. Damson plums are often gathered weeks in advance of the right time. Here at Lexington many gather them during the month of August when they should be left until the end of September. Damsons color up two months before they are ripe, and this fools many into the belief that they are ripe long before they are so in fact.

Quinces should be left on the trees until they turn yellow and then they should be allowed to ripen in a cool room or cellar a week or two before being turned into preserves. There is no fruit preserve as fragrant and fine in flavor as a well ripened quince, and when dried, a few slices mixed with dried apples greatly improves the flavor of the latter. If preserved in their green state, as so many do, they are tough, like so many partly flavored leather chips. Cherries, especially the sour sorts, are also much improved, both in size and flavor, by being allowed to hang a week or two longer than customary.

Blackberries and strawberries gain much in flavor by leaving them on the vines until very ripe, but for shipping the patches should be picked over every day.

Some of the blackberries (like the Kittatinny), having a hard core, should, for home use, be left to hang three to four days after turning black, when the hard, bitter core will have turned into tender lusciousness. Raspberries lose flavor if allowed to hang too long. Gooseberries should hang longest of small fruits. I know a number of persons growing them.

who were surprised when told that gooseberries are sweet when fully ripened.

Grapes.—Some varieties, like the Delaware, Catawba, Hartford and Ives Seedling, improve in flavor if left to hang long; others, like Concord, Niagara, Martha and some of Rogers Hybrids, are best when just ripe, but if left to hang beyond that stage develop too strong a flavor. For making into wine, however, grapes should be allowed to become "dead ripe."

Handsome, well ripened and attractively packed fruit always commands high prices, as I have often experienced, and as the following examples (of which many similar ones could be given), show: My first shipment of apples (1869, forty barrels Bellflower) went to St. Louis where the highest market quotation was \$2.75 per barrel. These apples being large and highly colored, carefully handled, graded and packed, and having written my commission firm that the contents of any one barrel were equal to any of the others, I confidently expected them to sell for \$3.00 per barrel. Imagine my surprise when I learned they sold for \$4.00 per barrel, and that more were wanted. This was another eye-opener for me. In 1901 I sold peaches here and in Kansas City for \$1.25 and \$1.50 per bushel net, when other growers found slow sale at 60 and 75 cents per bushel for similar varieties.

How many dwellers in town and city ever tasted a really ripe, luscious strawberry or blackberry, peach, pear or summer apple? A strawberry, when its blushes, have gradually deepened to a crimson hue, when its seeds—turned to a golden tint—have sunk deep into velvety recesses, and its body easily parts from the parent stem, and when, finally one's tongue with gentle pressure extracts its nectar and ambrosia, what a contrast when compared with a "shipped-in" berry, with its faded complexion, white nose, prominent seeds and the trade-marks left by the pickers' fingers. Or a blackberry; after hiding its ebony face three or four days under a bower of leaves, until its body is rounded and swelled to fullest proportions, its eyes glistening like black diamonds or polished jet, its body tender and ready to drop at the slightest jar—ah me—no hard bitter core, no acid, nor tannin there.

And that queen of fruits, the peach, away up or out on a limb, where sunshine floods it all day, its white or yellow cheeks gradually overspread with carmine, its down disappearing as its body expands, when the wasp begins to lacerate its softening tissue, when it at last drops, at gentlest touch, into the carefully extended hand—then, ah, then—my mouth begins to water in anticipation of the feast celestial.

And, my friends, did not some of you gather some overgrown brownies from a young, vigorous Seckel tree, lay them away in a cool,

dark cellar to await a coming county fair, and when that time arrived you found their russet exterior turned to a golden yellow: you gave one of them a gentle squeeze, only to find its tender body giving way, leaving its tears on your finger tips. Then you lifted it carefully by the stem, elevated your chin and allowed your store teeth to cut out an ample slice. You didn't mind the honeyed juice meandering from both angles of your mouth and trickling down on your vest. You took another and still another bite; you found no hard core, so you chewed the seeds and the stem, too, now didn't you? And you felt then that there was still left you a remnant of the Garden of Eden.

NEW VARIETIES—A LETTER.

Oak Ridge, Mo., Feb. 12, 1904.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir—We have received the report of the Missouri Horticultural Society, and thank you kindly for same. If you have any good reports or anything good to read on horticulture at any time it will be appreciated, as we are fond of reading on fruits. In looking over the report on cherries we notice that you don't grow the Trilby and the Pocahontas cherries. We propagate both. The Pocahontas belongs to the Duke family, the Trilby belongs to the Heart family. The Trilby favors the White Oxheart, but is a larger berry; it is the largest cherry we have seen; it is sweet, a thrifty grower. The parent tree is as large as a flower barrel, about 35 or 40 feet high, looks like a wild cherry tree from distance; we cut some of the buds from the trees. They claimed it bore eight bushels of cherries two years ago; it is a sure cropper. The Pocahontas is from Perry county, sometimes called the Pope, after the man who owns the tree. This cherry is like May Duke, but more prolific; it is a very strong grower in nursery and orchard. Our soil is limestone and porous sub-soil. If you wish to try a couple of trees of these, they are one year old straight, we will send you two of Trilby and one of Pocahontas as gratis for trial. The parent tree of Trilby stands four miles north of our nursery at the Baldrige farm; it looks as large as one of the small plums. We cannot propagate enough of them; the parties who know them want nothing else. I have crossed Winesap with Beach apple, also Ragen Yellow with Ortley; they are one year old this year. I crossed Winesap and Ben Davis, Kieffer and Edmonds. I love the work, and practice on fruit. I had to give up my trade as tinner, so we went in the nursery business. I think we will have peaches here if they don't get killed in the spring; we had four degrees below zero. My

father brought prune and other scions from Germany in the forties and grafted them, and we ate prunes when we were boys. Please let me know if you wish to try a few of those cherries, what time you want them. Some day I will join the society. Yours respectfully,

HENRY WILLER & SON.

THREE SHORT NATURE LESSONS IN HORTICULTURE.

(By G. B. Lamm, Sedalia, Mo., Chairman of Committee on Horticulture for Missouri State Horticultural Society).

TEACH HORTICULTURE:

By what means? Answer: By graded lessons.

TEACH HORTICULTURE: -

In what manner? Answer: Along the line of Nature Study.

TEACH HORTICULTURE:

At what place? Answer: In the public schools.

APPLES PREPARED FOR USE.

Nature Lessons in Horticulture for Grades 5 and 6.

Dried Apples.—We all like ripe apples in their natural state, but these are ripe apples dried. Some people pare, **quarter** and core apples by hand, and then put them on pans in the oven to dry. Did you ever see an apple parer? Several families may get together and in one evening prepare **bushels** of apples for the dry house, which is a little, cheap, one-room house made of rough lumber and has a stove in it. In this room the **sliced** apples are arranged on slat shelves so the hot air from the stove can pass among them and dry them. But there is also **machinery** for paring, coring and slicing apples. Then such apples are put in a hot air room, dried, bleached and boxed. When apples are dried in large quantities in this way, we say they are evaporated, and such a place is called a fruit **evaporator**. These dried apples are shipped all over the world and sold by the pound to people for food. Whole crops of apples are handled in this way, and it is a safe and **economical** way to prepare apples for use. Twenty-eight pounds of dried apples make a bushel.

Apple Cider and Vinegar.—This **liquid** in the glass was once the sweet **juice** of apples, and it was called cider. The apples were ground in a mill to a pulp. This pulp was put in a sack and the juice pressed out. The mill which ground the apples is called a cider mill, and the press is called a cider press. You will see them at hardware and implement

stores. Usually the small and bruised apples are made into cider. Cider when sweet makes a delicious and wholesome drink. It is used in making mince pies and apple butter. But this in the glass was allowed to stand in a warm place and the sweets in it turned to acids, and we now call it vinegar. Vinegar gives to everything a very sour flavor and is used to make pickles. Great quantities of **vinegar** are used, and it is bought and sold by the gallon or barrel.

Canned Apples.—This glass jar of **canned** apples is a common thing to see, but it is very useful. We will try to learn about it. Almost every home has apples put up in this way for food. It is easy to learn how to can apples. After they are pared and stewed they are sweetened to suit the taste and put in the can while steaming hot. The steam drives the air out of the can, and when the top is securely fastened, no air can get inside and the apples will keep until you are ready to use them. Canned apples are used in every home and also in bakeries and hotels.

A cannery is where they prepare apples for canning by machinery and put them in tin cans. Apples are brought from the orchard to the cannery by the wagon load and sold by the bushel. Grocerymen buy these canned apples by the dozen. This is a can from the cannery and the grocer sold it to us for 10 cents. If it holds one quart, what will one bushel of canned apples cost?

These are some of the important ways of preparing apples for use.

Suggestions: It is advisable that samples of most objects spoken of in this lesson be upon the teacher's table several days before the lesson is recited. Let the pupils handle them. Answer questions and anticipate lines of thought that will likely come to the pupil's mind. Give the pupils opportunity to ask questions and furnish objects for the lesson. Spell words in heavy type. Use them in sentences oral or written. Have the pupils tell in their own language how apple sauce and apple pies are made. The teacher may tell how apple butter is made.

APPLE NURSERY AND ORCHARD.

Nature Lesson in Horticulture for Grades 7 and 8.

The place where apple seeds are planted and the little trees budded or grafted and cared for until they are big enough to **transplant**, is called an apple **nursery**. The man who tends the nursery is the nurseryman. He locates his nursery in that locality where fruit is successfully matured. He grows those varieties of apple and fruit trees that do well in the surrounding country. The local nurseryman knows the early and late, sweet and sour, tender and hardy **varieties** and can answer many questions that

the fruit grower wants to know. Pupils of grades 7 and 8 should visit a nursery and see the little trees and plants growing in rows like corn rows. It is well to learn the names of such apples as grow in the neighborhood where you live. This is an apple tree just one year old. It has been budded or grafted and is small and straight. It remains in the row usually two years longer before it has good roots and a well shaped top. When three years old they are ready to transplant where they can grow large and bear fruit. The nurseryman digs or plows them out in such a way as not to destroy the roots or injure the tops and will sell you trees of any age or variety you desire to plant.

This tree is three years old from the seed. See the little roots or **rootlets**. They must be kept **moist** until set in the ground again. See the well balanced top. The nurseryman allows no **forks** to grow in the trunk, for the weight of the fruit will split the fork, and thus injure the tree.

If you set these trees out in rows so the trees are about twenty-five feet apart, they will grow into large trees with strong roots and tops. A cluster or grove of these trees is called an apple orchard. If you plant the right varieties you can have ripe apples for summer, fall and winter use.

Avoid a south or southwest slope in setting out an apple **orchard**, because the hot sun in the afternoon in Missouri will injure the trees. Any of the other **slopes** are better. The branches should be started low, as shown by this sample tree; and, in this way, the trunk is kept shaded and the apples kept within easy reach.

If you set out a large orchard intending to sell or ship the fruit, it is called a **commercial** orchard. It usually has such varieties as ship and keep well. We live in the apple belt. Apple trees do not do well in extremely cold or hot countries. We must raise apples to sell to the people who raise oranges, pine apples and bananas for us.

A good apple orchard adds value and beauty to the State. It furnishes the best of food and is a source of **profit**. No spot on the farm will be remembered so long or so well as the orchard with its rosy checked apples.

Suggestions: At this recitation have apple trees, one, two and three years old. The little roots and branches should be left on for pupils to examine. Explain "low branches," "varieties," "fork," "balanced top," by examples. In connection with all these lessons read and discuss bits of literature in prose and verse on the orchard, apple blossoms, cider making, bird helpers, insect pests, etc. This literature should be found in the school or teacher's library.

APPLES, GREEN AND RIPE.

Nature Lesson in Horticulture for Grades 3 and 4.

This is an apple. It is red, but some **apples** are yellow and some are brown. Boys like big red apples best of all. All apples have the same color before they are ripe. Can you tell what color they have? Apples grow out of sweet little **blossoms**. Did you ever think when you look at the pretty blossoms on an apple tree that a little green apple is in every bloom? It is hidden away in the **flower** so nicely that you must look very closely to find it.

The cold, frost or hard rain may kill the little apples, but honey bees may step on them, when getting the sweets from the blossoms, but do not harm them. Can you find what is called the blossom end of an apple? Find also the stem end. The stem holds the apple to the twig. The twig holds the stem to the **branch**. The branch holds the twig to the trunk. The trunk holds the branches to the roots, which furnishes the tree food, and the roots hold the trunk to the ground so the wind cannot blow it away.

An apple tree that is full of blossoms is a pretty sight, but all boys and girls are glad to see a tree full of ripe apples. Would you like to **climb** into such a tree and **shake** down the fruit? If you would, you must plant the tree and care for it until it is as old as you are when you begin to go to school.

This red apple is good for food, for it is ripe. It is a sour apple, but some apples are sweet. Boys and girls like sweet apples best of all. Cattle like apples so well that they often **swallow** them without chewing and **choke** on them.

Mother bakes apples for breakfast. She sometimes makes apple pies for dinner, but apple butter and apple sauce are eaten at any meal. We can keep some kinds of apples **all winter**, if we do not let them get too warm or cold. They are then called winter apples. Those apples that ripen in the **summer** are called summer apples. Those apples that ripen in the fall are called fall apples. People raise more winter apples than any other kind. Of all fruits grown in Missouri the apple is king, yet the tree grows from one of these little seeds.

Suggestions: The teacher should have on the table three or more varieties of apples, some apple seeds, and a small apple tree with roots and branches attached. Any tree similar to an apple tree will do. She should then point out to the class the parts of the apple and the tree. The pupils should learn these parts by sight, should spell the words in heavy

type in the lesson, and should use them correctly in sentences, oral or written. The pupils should be asked to bring the tree, seeds and apples. If they cannot, the teacher should furnish them, but by all means have everything ready for the class to see, and handle, and taste, before the lesson begins.

ON THE PLANTING AND CARE OF TREES FOR THE STREET AND LAWN.

(Howard S. Reed, Instructor in Botany in the University of Missouri,
Columbia, Mo.)

A brief inspection of the streets of any of the cities or towns of this state will show many chances for improvement in the matter of ornamentation by shade trees, and many evidences of neglect and injury to those already planted.

The purpose of this bulletin is to give information on the proper method of planting and caring for shade trees on streets and lawns.

The value of shade trees should always be borne in mind by those parties laying out new streets or building lots. Trees not only add much to the attractiveness of the locality, but contribute materially to the health and comfort of the residents.

WHAT TO PLANT.

In selecting shade trees, experience has taught us that it is better to buy well-grown trees from a reliable nursery than to go to the woods and dig up natural seedlings. The nursery tree has been transplanted several times and has compact roots which are not injured by moving. The seedling from the forest, however, is often much injured by transplanting and by the time it has recovered, the nursery tree will be far ahead of it in size and vigor.

The tall, erect varieties of trees should be used for street planting, but the lower, spreading trees may be planted on lawns. Observation will show that certain kinds of trees succeed best in one part of the state and others in another locality. Some general recommendations, however, may be made as to the best trees to plant.

The oaks are rather slow growers and require plenty of light, but are exceedingly hardy. If transplanted when young from the nursery, the oaks make much more rapid and thrifty growth than when brought from the forest.

The Bur-Oak (Mossy-cup oak, Over-cup oak) (*Quercus macrocarpa*, Michx.) is well adapted for a shade tree on the street or lawn. Mature specimens are frequently one hundred feet high and have a diameter at the base of three and a half feet. It thrives best in rich loam and is especially valuable for prairie planting.

The Chestnut Oak (Yellow Oak) (*Quercus acuminata* Michx.; Sarg.) grows well in dry soil, especially along limestone ridges.

The Red Oak (*Quercus rubra*, L.) is the most rapid grower of all the oaks. It thrives on all soils except an undrained one.

Of the Hickories, most persons will prefer the Shagbark or Shellbark (*Hicoria ozuta* Mill.; Britton). It comes into bearing when quite young and produces excellent, large nuts. The tree does not succeed well on poor, dry, or wet soils.

Elms, although natives of the swamp, grow well and remain perfectly thrifty in a great variety of soils. The White Elm (*Ulmus Americana*, L.) is one of the most valuable trees for street planting.

The Silver Maple (White Maple) (*Acer saccharinum*, L.) is extensively planted throughout the state as a shade tree. It grows rapidly, and, if properly pruned, makes a handsome tree; but it is often so seriously damaged by severe winds and hail-storms that it has little value as a shade tree. The trees should be pruned to form numerous small branches instead of a few large ones, as the latter are easily broken by severe winds. In many respects the Sugar or Rock Maple (*Acer saccharum*, Marsh.) is more satisfactory than the white maple. It grows to a height of seventy-five feet and forms a very compact top. It is a fairly rapid and persistent grower, and endures a moderate amount of shade. Storms and high winds do not damage this tree as they do the White Maple.

In localities where the soil is not too compact, one may plant the Locusts. They grow rapidly when young, but need plenty of light. The Yellow (or Black) Locust (*Robinia pseudacacia*, L.) is more desirable for streets and lawns than the Honey Locust (*Gleditsia triacanthos*, L.) It is, however, subject to the attacks of a wood-destroying fungus (*Polyporus rimosus*)¹, which is more frequent on the older trees and detracts considerably from the value of the Locust as a shade tree.

The Catalpa (*Catalpa speciosa*, Warder) is a rapid growing tree which is widely planted in the west. The tree grows well in a great variety of soils, but does best on loamy clay. On the whole it cannot be recommended for an ornamental tree because the older trees become very unsymmetrical unless given a great deal of light on all sides. Attention

¹ Von Schrenk, H.: A disease of the Black Locust (*Robinia pseudacacia*). 12 Rep. Missouri Bot. Garden, 1901.

may here be called to the economic value of the Catalpa; several railroad corporations are cultivating it to obtain timber for ties and poles.

White Ash (*Fraxinus Americana*, L.) Cottonwood (*Populus deltoides*, Marsh), Basswood (*Tilia americana*, L.) and Black Walnut (*Juglans nigra*, L.) are trees which are suited to almost all parts of the State, and will give good results.

The evergreen coniferous trees are valuable for lawns, parks, drives, etc., and add much to the attractiveness of the home surroundings. The best effects are obtained by planting the large evergreens at the rear and sides of the grounds. Their dark green foliage forms a desirable background for the lighter colors of the deciduous trees.

The White Pine (*Pinus strobus*, L.) is a rapid grower and succeeds well on a variety of soils. The tree does not attain rapid growth until after the fifth or sixth year; from that time until the twentieth year it grows from one to two and one-half feet per year. A number of fine specimens of White Pine stand in the lawn of the Rollins homestead at Columbia. These trees were planted in 1855 by Col. J. H. Rollins. In 1897 the largest was twenty-nine inches in diameter, breast high, and sixty-four feet nine inches in height.

The Norway Spruce (*Picea excelsa*, Link.) is adapted to a loamy soil, but should not be planted on extremely dry soils, for it is badly injured by drouth. It grows at first rather slowly, but about the tenth or twelfth year its height-growth becomes rapid, and it develops into a symmetrical, conical tree. This tree is well suited for hedges and wind-breaks. For the latter purpose, plant two or three rows, eight feet apart, the trees in one row alternating with those in the next.

The Austrian (Black) Pine (*Pinus Laricio*, Poir. var. *anstriaca*) is frost-hardy and not sensitive to drought. It likes a moderately deep, porous and fairly moist soil, which need not be fertile. The tree develops a straight stem with a dome-shaped crown; as a rule, the height does not exceed seventy-five feet.

Of the smaller evergreens, a few deserve mention.

The Red Juniper (*Juniperus virginiana*, L.) is an important evergreen for prairie regions; it endures drought well. The branches are horizontal, close together, and feathered to the ground. In some regions it forms a tree forty or fifty feet high, but in this state it is frequently seen only in the form of a shrub.

The Irish Juniper (*Juniperus communis Hibernica*, Loddiges) forms a graceful, compact and slender pyramid attaining a height of six to fifteen feet.

The Arbor Vitae (White Cedar) (*Thuja occidentalis*, L.) is a rapid

grower and is easily transplanted. It succeeds well in any soil not too stiff.

THE TIME TO PLANT.

Trees should be planted when they are in a dormant state or just as they start into growth in the spring. Very hardy deciduous trees, such as the Elm, Cottonwood and Ash, can often be successfully moved in the fall, if the ground is moist at the time of removal, but great care must be taken to work the soil in compactly about the roots so that there will be no large air-spaces between them. If the trees are large they should be tied to a strong stake to prevent their being blown about by the wind.

Large trees are sometimes successfully moved in the winter because a large ball of frozen earth may be taken up with the tree. Before the ground freezes in November, dig a trench about the tree deep enough to cut most of the roots. Fill the trench with straw and, when the ground is frozen, move the tree with the large ball of earth to the hole previously dug to receive it.

Evergreens should be transplanted early in the spring when the ground is moist.

HOW TO PLANT.

Distance Apart.—On rich, loamy soils the large trees used for street planting should be placed forty feet apart. In dry, stony, or sandy soil, twenty-five or thirty feet is far enough. The smaller trees may be planted closer.

Digging the Holes.—The hole should be dug large enough to take the roots of the tree without crowding, and deep enough to allow the tree to set a little deeper than it was before. Loosen up the sub-soil in the bottom of the hole and put in some fine, rich top soil before putting in the tree.

Planting.—Great precaution should be taken to prevent the roots of the tree from becoming dry while planting. If they are received sometime in advance of planting, unpack them and "heel" them in, i. e., bury the roots in earth until ready to plant. When the cells in the roots of the tree have once become dry, it is very difficult for them to absorb water from the soil and start the current upward which supplies the leaves and growing shoots.

Cut off all the injured and broken parts of roots with a sharp knife. If a smooth cut is made, a callus forms readily, and above it are produced the fine, fibrous feeding roots.

One person may hold the tree in an upright position while another

fills in rich top soil around the roots, being careful to work the soil well in among them and under the butt of the tree. The soil should be moist, but not wet, and free from large stones. Tread the earth or firm it with a rammer as soon as there is two or three inches of soil over the roots, so that there will be no air spaces about them; if there are air spaces the roots will dry out and the tree will die. Never put stable manure into the holes, as it causes drying out. If the soil is very dry, water may be put into the hole after the roots are covered, and allowed to soak away before the rest of the soil is put in.

After the hole is filled, the ground about the tree should be covered with a mulch of straw or coarse stable manure. This will prevent the soil from baking or drying out.

Pruning.—After planting the tree, its top should be trimmed back in order that it may develop symmetrically and to counterbalance the loss suffered by the roots. It is better to cut back the side-branches than to cut off the entire top of the tree. The pruning should be done with pruning shears or a sharp knife, which will leave a smooth surface and not injure the bark.

HOW THE TREE GROWS.

* When once well planted in a favorable location, the tree is generally able to supply itself with the necessary food and to maintain itself by growth. Some of the more important phases of growth may be mentioned.

Absorption of Water.—The greater part of the supply of water is obtained through the roots from the soil. It is not the large, woody roots which absorb the water, but the fine, fibrous roots. The fine young roots are covered with root hairs which readily absorb water through their thin walls and pass it upward to the tree through the larger roots. The precautions against drying while transplanting are necessitated by the delicate structure of these small roots, because they readily lose water through their thin walls when exposed to dry air.

A good mulch of straw or coarse stable manure is usually sufficient to keep the ground moist during the summer. In extremely dry weather, however, the tree should be watered and the ground under the mulch kept loose by stirring it from time to time with a hoe. If there is a heavy sod about the base of the tree, it should be cut away, and some lengths of drain tile be put vertically into the ground several feet from the tree. The water may be advantageously supplied through these tiles; merely watering the turf does not usually help the tree.

Transpiration, or the Giving up of Water Through the Leaves.—The water which is taken up by the roots rises through the trunk and

passes to the leaves and young growing branches. Most of it passes off in the form of vapor from the leaves, but a part of it is used in building up the substance of the tree.

The ascending current of water rises through the *wood* of the trunk. (Fig. 1.) The causes of the upward flow are not fully understood, but in a general way it may be said to be accelerated by rapid evaporation from the leaves. Therefore, more water will be given off on a dry, windy day than in moist, still weather. The water vapor passes out through small pores in the epidermis of the leaves. Large trees undoubtedly give off as much as thirty to fifty gallons of water a day in dry weather.

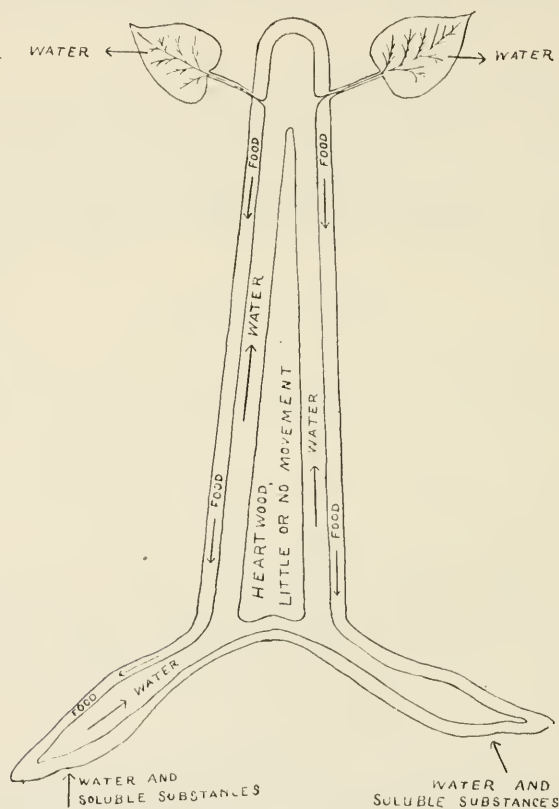


Fig. 1. Diagram of the structure of a tree, showing the path of the ascending and descending currents.

The advantage of this stream which enters the roots and passes out through the leaves lies in the fact that it brings in dissolved minerals from the soil and gives the plant a chance to use them in the manufacture of new materials.

Assimilation.—When wood is burned we see that a large part of it is composed of carbon. The tree obtained this carbon from the carbon-

dioxide of the atmosphere. The most active agents in the transformation of carbon are in the cells of the green leaves. Air containing carbon-dioxide enters through the same pores from which water vapor escapes and, under the influence of light, the green coloring matter of the leaf takes it up and forms more complex carbon compounds from it, such as starch, sugars, gums, etc.

These considerations show us two important requirements for the growth of the tree, viz., leaves and light. Without the former the tree would be unable to obtain sufficient carbon-dioxide or to keep a stream of water passing upward through the body of the tree. Without the latter the process of food-formation in the leaves could not go on.

What practical bearing have these facts? They teach us that the leaf-destroying fungi and insects should be kept in check; that trees should be planted far enough apart to allow the access of light; and that by proper pruning light and air should be admitted to the interior of the tree top.

These newly formed food substances do not remain in the leaf, but are transferred to the regions where growth is going on, or to special organs for storage. The paths through which this food material is transported lie in that part of the trunk known as the bast, or "inside bark." (Fig. 1.)

When a tree trunk is girdled the downward flow is stopped at the place where the soft "inside bark" is removed. The tree does not immediately die, but in time, as a result of depriving the roots of their food, it does die.

Growth.—The growth of the tree does not occur alike in all parts, but is limited to certain tissues, viz., the so-called meristematic tissues.

The growing tissue of the trunk is confined to a few layers of delicate cells, between the bast and the wood, known to botanists as the cambiums. The increase in diameter is due to the division and growth of the cells in this layer. The food they need is in part furnished by the dissolved minerals absorbed by the roots and in part by organic substances manufactured in the green parts of the tree. These substances are absorbed by the cells of the cambium layer and used in the formation of new cells and cell products. When first formed, the cambium cells have thin walls, but as they grow older they become thickened by the addition of successive layers of cellulose. Later the walls undergo chemical changes and become infiltrated with various minerals and gums. They are no longer cambium cells, but are *wood* cells.

The character of the wood depends to a large extent upon the amount and kind of substances with which the walls are infiltrated. All the tissue

arising from the inner side of the cambium ring goes to form *wood*, while that produced on the outside is the *bast*. The amount of wood produced is many times greater than the bast.

Owing to climatic variations, the cambium tissue of woody plants exhibits a periodical activity which results in the formation of annual rings of growth. In the spring, during the period of rapid growth, larger cells are produced than in the latter part of the season. For this reason, a difference is perceptible between the *early wood*, which is com-



Fig. 2. A Silver Maple tree ruined by ignorant pruning. Notice the splitting of the stubs and the exposed wood. Photographed in December.

posed of large cells especially active in the conveyance of water, and the *late wood*, consisting of narrow cells which impart strength to the stem.

Throughout the greater part of the temperate zone, the formation of wood ceases in the latter part of August, until the following spring, when the larger elements of the early wood are again developed. The consequent contrast in the structure of the early and late wood marks off the

growth into annual rings, which serve as a means of computing the age of a tree. Serious injury to the tree often follows the death of the cambium cells, which may be caused in a number of ways, e. g., by heavy objects striking the tree, by driving nails into the tree, the action of wood-destroying fungi, etc.

The Leaf-fall and the Winter Rest.—During the months of autumn, the leaves of our broad-leaved trees fall off, and during the winter months the trees are in a dormant condition. The leaves of the Evergreens assume a darker color and suspend activity, although they still remain on the tree.

What causes the fall of the leaf? Frost plays some part, but it is not the only cause. Early in the autumn a layer of cork cells containing

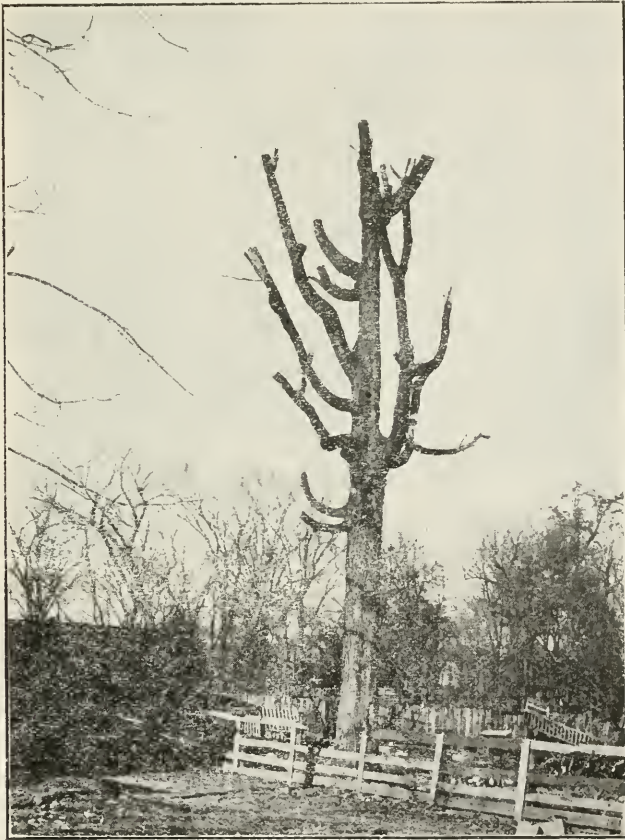


Fig. 3. An Oak showing the results of ignorant pruning. This tree will be inevitably attacked by a host of fungi and insect enemies. Photographed in December.

water is formed at the base of each leaf-stalk. When the water in these cells freezes, it tears apart the cell walls and allows the leaf to fall. If

it is not frozen, the cells separate, as the protoplasm in them dies and the leaf dries out. The corky layer left protects the stem from injury by drying out, or by the entrance of rain and sleet during the winter. In this way the tree is covered naturally with a water-proof, corky layer during the dormant season, which allows but little loss of water.

Wounds which expose large surfaces to the air at the time the tree is dormant make severe drains upon the water content of the tree. It is unable to make up the loss of water by new supplies from the roots and consequently suffers damage.

The trees shown in figures 2 and 3 are in the worst possible shape for enduring the winter. Not only are the beauty and symmetry of the trees completely ruined, but the large exposed surfaces will allow serious loss of water while the tree is in a condition least able to withstand it. In cases where it is necessary to make large cuts (which are rare) it should be done in the spring, and then the wound should be painted over.

CARE OF TREES.

Assuming that the tree has been properly planted, we may now consider what should be done from year to year to keep it in growing condition.

Protection Against Injuries.—All trees, but especially street shade trees, are exposed to injuries of various kinds. With the development of our cities and towns, the adverse conditions multiply from year to year.

Excavations for buildings, sewers, etc., destroy portions of the root system, thereby cutting off the food supply. The street pavements and sidewalks are well-nigh impervious to water and hence diminish the supply of moisture in the soil on which they lie.

Unless proper precautions are taken, street trees suffer badly from having the bark gnawed off by horses. As has been shown, this destroys some of the most important tissues in the tree. The trees may be protected by a wrapping of burlap, tied on with tarred rope, but a substantial iron or wooden frame (Figs. 4 and 5) is better, because the burlap makes a breeding place for injurious insects.

The mulch should be removed from the base of the tree at the approach of winter, because it is likely to become inhabited by mice, which girdle the trees when food is scarce in winter. If other rodents become troublesome, the bases of the trees should be enclosed with a guard of wire screen eighteen inches high, or the trunks may be painted with a lime wash made rather thick and containing one tablespoonful of Paris green

to a pailful of the wash. If the wash is made up with skimmed milk instead of water it adheres better.

The most serious injury from insects and their larvae is done to the foliage. With trees on the street or lawn, the easiest method is to clip off

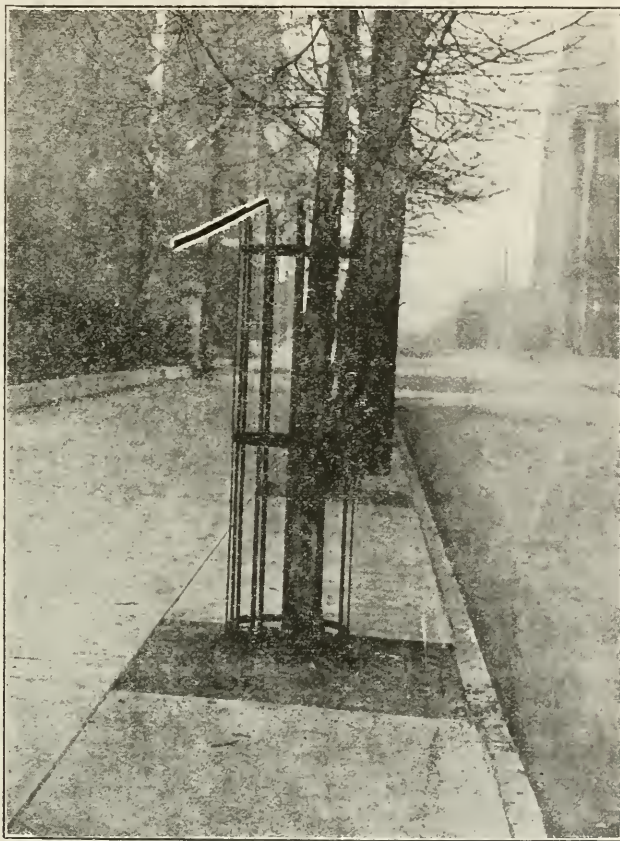


Fig. 4. Protection for street trees.

and burn the twigs on which the insects appear. Where large plantations are involved, the foliage may be sprayed with Paris green, applied by means of a force pump and spraying nozzle.

Larvae which crawl up the trunks of trees may be trapped by the following means: Wind a strip of thick cotton batting six or eight inches wide around the trunk just below the lowest branches, tie it with a strong cord at the lower edge of the strip. Now turn the strip down over the cord, forming an umbrella-like obstruction to any crawling organism. If desired, the inside of the obstruction may be smeared with coal tar.

There are numerous diseases which injure shade trees, but, except

in severe cases, preventive measures are the easiest and most effectual. Remove and burn all dead branches and diseased or dead trees. In this way the infectious sources of both fungi and insects are destroyed.

Sunscalds are quite frequent among street shade trees, because they are not close enough to shade their trunks. In order to prevent it, the trees may be wrapped with burlap or with rye straw. When trees are injured by sunscalds the loose bark should be cut away down to the live growth and the exposed wood painted over.

Sleet storms and winds frequently break down trees which have not been properly trimmed. The Silver Maple suffers damage from this source. If no large crotches are allowed to form in the trees they will

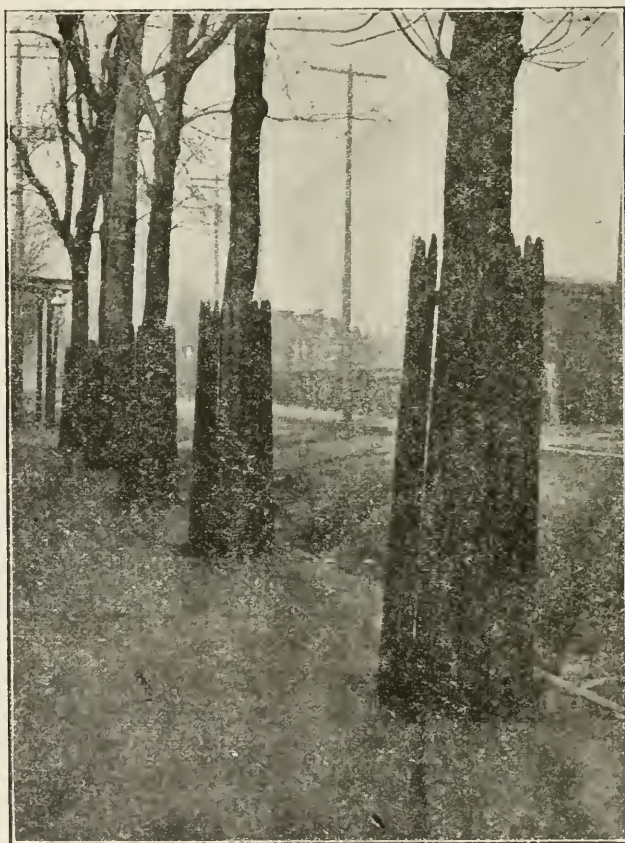


Fig. 5. Protection for street trees.

not be liable to injury. The method of pruning, shown in Figures 2 and 3, cannot be recommended. Such trees had best be cut down, they are only valuable for cord-wood.

A moment's consideration of the structure of a tree, as briefly out-

lined above, will show how severely it may be injured by having nails and staples driven into it. Not only are many of the delicate cells destroyed, but the holes formed admit sunlight, frost, and rain, each of which do their destructive work by killing the cambium cells in the vicinity of the wound. Figure 6 shows a tree which has been injured by a barbed wire.

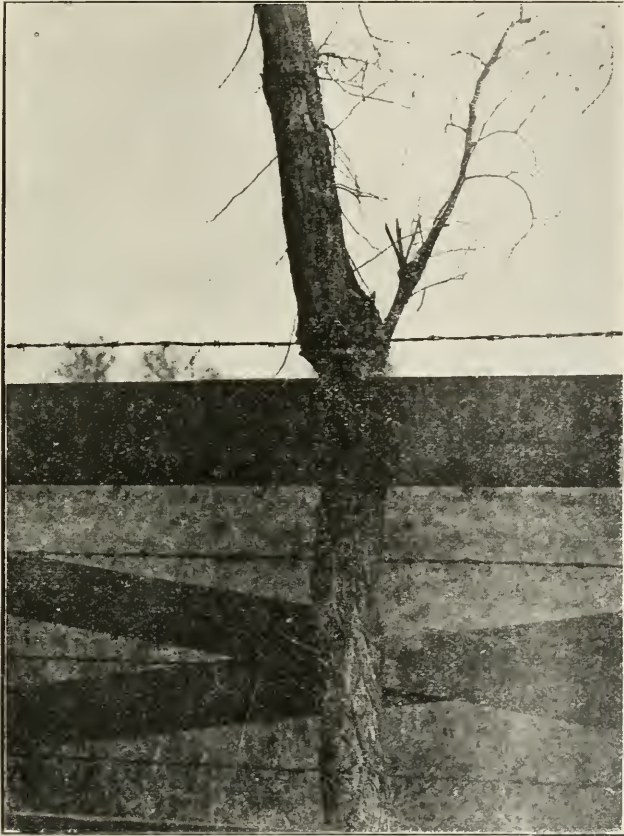


Fig. 6. Young Elm injured by barbed wire.

The increased number of telephone and electric wires in proximity to the branches of street trees is a serious menace to their welfare. Many of the wires conducting currents for trolley lines and electric lights carry such heavy charges of electricity that they burn notches wherever they touch the trees. The damage is done in wet weather when the trees are covered with a film of water.²

In almost every town there are numbers of trees which have been in-

² For an admirable study of this subject, see Bull. 91, Mass. Exp. Sta.

jured or killed outright by electric wires, and the number increases annually. The time will come when either the trees or the wires must give way. The best solution of the difficulty is to bury the wires in conduits, as is now done in many cities; if this cannot be done they should be located in alleys, in the rear of buildings instead of the streets.

Trees are frequently mutilated to an outrageous extent by linesmen when erecting poles and wires. Figure 7 shows a sample of their



Fig. 7. Telephone poles vs. Shade trees. The destructive work of linesmen in erecting telephone wires.

destructive work. In this case the entire tops of the trees were destroyed, instead of merely a few branches, as is usually done. When we remember that it is the tall, erect trees which are most valuable as street trees, we see how futile it is to plant trees under a mass of wires. Both cannot occupy the same territory, we must choose the one we will have.

This is a matter which should not be neglected by town and city councils in granting franchises. Companies which have the privilege of erecting poles and wires should be strictly enjoined against injuring

the shade trees by direct contact with high potential wires or by chopping off the branches.

When trees have become split at the crotches by storms, they may often be saved if the separated members be bolted together. The bolt is run through a hole bored through the separated branches and drawn up with a nut. Both the nut and the head of the bolt should be large, so that they will not draw into the wood.

Pruning.—At the time shade trees are set out, they should be carefully pruned, with a view of helping them to develop into symmetrical trees; after that a little pruning from year to year is all that is required. In the case of elms and trees which have been brought from the woods it is a good plan to cut them off about ten feet above ground and trim the side branches back to stubs. If the trees have well formed heads, they may be simply shortened in when transplanted.

The Silver Maple, like other soft wood trees, needs particular attention at this time. Preferably, it should be pruned to form a main central axis with numerous smaller secondary branches arising along the main axis. In cases where this cannot be done, the tree should be trained to form a symmetrical head, in which no large crotches are allowed to form. After the first few years street trees will need but little pruning; they should be examined each spring, however, to see what is necessary. Trees may be pruned about the time the buds start in the spring and from that time until they are in full leaf. During this time the growth is active and the wounds heal rapidly.

Some general principles of pruning for all trees may be suggested. If the tops of the trees are to be shortened in, it should be done gradually. No branch more than one inch in diameter should be cut off, but the heading in should be repeated from year to year, until the tree is of the desired shape. The practice of cutting off the larger limbs squarely at the top is very injurious, for reasons already noted. It should never be permitted.

When removing a branch, cut it close down at the shoulder with a sharp saw, so as to leave no stump. The adjoining cambium cells will then be able to grow over the wound and close it. In case the limb is over two or three inches in diameter, it should be cut off a foot or more from the base, to prevent it from splitting or peeling back the bark; then the stump should be cut off close up to the main trunk, leaving a smooth surface.

As soon as dry enough, all large cuts should be painted as directed below.

No street trees should be allowed to develop branches within eight feet of the ground, for the safety and convenience of pedestrians.

Remove all dead branches and old stubs as close to the trunk as possible and paint the exposed wood.

Examine cracks and patches of dead bark to see whether the bark and wood have separated. If they have, cut away all the dead bark and paint the exposed wood.

If there are cavities in which the wood is badly decayed it should be dug out and a plug of sound wood fitted in and painted over.

Trees which are dead, or nearly so, should be removed, because they furnish breeding places for insects and harmful fungi. They no longer possess any beauty, but are a menace to all other trees in the neighborhood.

COATING FOR WOUNDS.

The most satisfactory coating for tree wounds is thick lead paint well rubbed into the wood.

Coal tar which has been burned until it is hard when cold is also good. It should be burned in a large kettle and applied when warm, but not hot, with a brush.

THE EASTER BONNET.

(Laura Coates Reed, Kansas City, Mo., President Women of the Humane Society.)

(A toast read before the Second District, Federation of Women's Clubs.)

Some one has likened the satisfaction of being well dressed to the consolation of religion. This comparison was no doubt made by a woman who had succeeded in buying a becoming bonnet. Chesterfield pronounced a woman well dressed because he could not remember what she had on. He saw her in evening toilet. Had he met her on the street, his verdict might have been altogether different. He would have remembered her bonnet! A bonnet, the generic term for woman's headgear, is the most important factor in the art of dressing. Dress, like our surroundings, is invested with our personality, so that we are often told that our houses, our gowns and our bonnets look just like us. "A day may sink or save a realm," says the poet, but it does not always buy a pretty bonnet. With many, as with various religious sects, a bonnet stands for a conviction. With every woman it embodies in some degree her idea of the beautiful. Fashion, "wearing out more garments than man," and decidedly more hats and bonnets than the woman, is a sort of roulette ball, determining by its revolutions around the season's circle the size and shape of clothes in a manner so pronounced as to al-

most label every garment with the date of purchase, and yet with bonnets there is standard of beauty that fashion cannot change. "Among the ancients," says Lessing in his scholarly analysis of the Laocoon, "beauty was the supreme law of the imitative art. The Greek artist represented nothing that was not beautiful. Pain in its disfiguring extreme was not compatible with beauty. Keeness of sympathy," the great writer adds, "the dreadful thought of our own annihilation, makes a dead body in nature an object of aversion." If millinery is an art, and it certainly is, is a dead bird a legitimate means of garniture? Is that which suggests suffering and death, an "object of beauty or of aversion?" Is the flagrant violation of a long established standard of beauty the fault of merchant or of buyer? Supply is always indicative of demand. Many milliners denounce the custom of wearing birds as barbarous and one that should be abolished. As long as there is a demand for this so-called decoration, sentiment will be ignored, economics disregarded, the sensibilities of others wounded, and the balance of nature disturbed. Women can no longer afford to encourage this wrong.

* What does it cost, this garniture of death?
 It costs the life which God alone can give;
 It costs dull silence where was music's breath;
 It costs dead joy that foolish pride may live.
 Ah, life, and joy, and song, depend upon it,
 Are costly trimmings for a woman's bonnet?

From no standpoint can woman afford to perpetuate this fashion. The mother, her child a fledgling in the nest, cannot challenge the criticism of being at least thoughtless, if not indifferent. The wife of the farmer can ill afford to indulge in that which if preserved will increase her husband's income; for millions of dollars are lost to agriculture every year through harmful insects that birds destroy. The devotee to beauty can hardly wish to show disregard, if not ignorance, of an imperative and fundamental law of beauty. The maiden teaching her Sabbath class of love and mercy has no desire to weaken precept by example.

Many women are ignorant of the cruelty that fashion sometimes institute. They do not always know that the delicate, airy little tuft or plume they so much admire, and call the aigrette, is obtained at a great and cruel sacrifice of life.

Mr. Earl Dodge Scott, curator of the Department of Ornithology in Princeton University, says in his interesting book: "The Story of a Bird Lover's Life," concerning the aigrette that "the time, when the several kinds of herons, known as egrets, wear their decorative plumes is coincident with the nuptial season. Then nature adds to their charm and beauty these superb decorations. They are worn only for a brief period, perhaps six weeks or two months, and during all this interval

the birds are busied in mating, and in rearing and feeding their young. It is a comparatively easy thing to disturb birds and to drive them away at the period of nest building. When the helpless young are in the nest, nothing short of catastrophe will induce their desertion. This is the time chosen by the plume hunter for his harvest. Now he realizes that the cries of the hungry birds will surely bring the parents back at short intervals, no matter how frequently disturbed and frightened away. The almost noiseless Flobert rifle, with its tiny charge to speed the fatal ball, the gun, whose report is scarcely louder than the snapping of a twig, is his weapon. Stationed within ten or twelve feet of a nest both parents are secured in a very few moments. Continuous work of this kind from daylight to dark results in two things, a vast pile of carcasses of the dead parents, stripped of their beautiful plumes, and thousands of young birds left to starve to death in misery in their nests." Can any woman ever wear an aigrette again after knowing this? Her first impulse will be to dispose of everyone in her possession; to cast them into the fire, not give them to others that the wrong may still be indorsed, but to burn them up, one by one, rejoicing as she does so, that her action may sometime enable two snow-white parent birds to rear their young in peace and safety.

One is often confronted by the argument that many of the breasts used for millinery purposes are manufactured from chicken feathers. This is probably true. But we are also assured that plumage is torn from the live bird in order that it may retain its brilliancy of coloring. As long as women will wear this unnatural trimming, bird life will be sacrificed to a fashion that does not discriminate.

Few women are indifferent to cruelty. They do not always know what cruelty is. In many instances a particular sense of mercy, like the seed in mother earth, lies dormant to await the quickening that comes from an impulse to reach the light. Although but entering upon the Lenten season, the time for spring bonnets will soon be here. Easter, that great feast of the resurrection, should have a higher significance than ever before. Easter speaks alone of life. Its message is that life is the law of God. May every Easter bonnet testify to a quickened sense that will not permit needless sacrifice of life. Cover the Easter hats with flowers. Help the church to herald *Life* instead of death. Show that a bonnet can be an artistic creation without destroying a necessary and beautiful part of creation. If you cannot buy a new bonnet, remove an aigrette or a wing from an old one. For although

"The voice of the curate be gentle:

No sparrow shall fall to the ground."

If you wear a poor broken wing on your bonnet,

'twill but mock the merciful sound.

The "something new," supposed to bring "good luck" if worn on Easter day, will be the new resolve that you have made. Should the birds happen to tell old Sol about it, I am very sure he will, as the superstition says, "dance for joy on resurrection morn!" If you are so fortunate as to be able to get a new bonnet, let it stand for a conviction. A "love of a bonnet" should bear evidence of love. If it does, the *Te Deum* will resound with greater force and meaning. Easter flowers will assume higher symbols, and if perchance a robin's note is heard through an open casement, you will know that it means a thank you for your pledge. Should the beatitudes be read, "Blessed are the merciful" will mean you.

COMMERCIAL FRUIT GROWING.

(J. H. Hale, Pres. Am. Pomological Society, South Glastonbury, Conn.)

The commercial side of the fruit question was one in which the average grower fell down, yet it was fully as important to be able to sell as to grow. In fact, there was little object in raising fruit unless it could be sold, and that at a profit. The commercial fruit grower should make it his business to find out what the market wanted, how it wanted it, and then he should do his best to produce the article wanted. The fruit grower can do a little missionary work in educating public taste, but life is short and it will not do to spend a great deal of time along such lines. It would pay the fruit grower to visit his markets and observe for himself. He himself had just returned from a four-thousand mile trip, undertaken just to see the people who used his fruit, and to learn what he could of the way other growers did. Our greatest competitors are producers three thousand miles away, and the way they get the market is by attention to minute details and giving a nearly perfect article in attractive and suitable packages. We have a great advantage over these far-away rival growers in the fact that we are only a few hours from the points of consumption. We not only have great advantage in the short haul, but we can see for ourselves the fruit being sold, and talk with the middlemen.

In his long trip Mr. Hale was surprised at every stop by the quantity being produced and consumed. The growth of the fruit industry is like a fairy tale, almost too incredible to be believed. Fifteen years ago there was no commercial peach orchards of any size in Georgia. Ten years ago there were only a million trees; now there are 19 millions, with three or four millions being planted this winter and spring. In States of about the same latitude there are from 15 to 20 million trees, and more are being planted. In November a rather small convention of apple growers met in St. Louis, yet this gathering owned over one

million trees. Orchards of two or three hundred acres are not uncommon in the west. A few years ago the production of canteloupe melons was restricted to scattering local patches of an acre or a little more; now there are whole counties almost given over to melon production, and some of the greatest sources of supply are 2,000 miles or more from the people who consume them. This last season between 5,000 and 6,000 carloads of melons were produced east of the Rocky Mountains. There seems to be a constantly increasing demand for fruit and flowers. Why, in one country town in Missouri they ship 50 carloads of strawberries a day for two weeks. The increase in consumption of fruit is out of all proportions with the increase of population. The fruit sales multiply ten-fold, while the population increases less than one. Towns that half a dozen years ago used \$1,000 worth now get away with \$10,000 worth. In his trip he was asked repeatedly why eastern people did not supply their own markets, instead of permitting growers thousands of miles away to ship to them. He believed the reason was because the eastern people were not as wide-awake and enterprising. These westerners are looking up this matter, and some of them are moving to the east and buying up abandoned farms, and are going to be competitors right at home and put western energy and skill to bear on New England soil. He would advise small growers to combine, to unite in shipping and marketing. What the fruit growers of Central New York, and in fact all over the country need is not brains, but the use of them. He thought co-operation and even corporate organization might be just as good in fruit growing as in making tin or glass, or selling hardware. One man excelled in growing, another in packing, and a third in selling. A partnership of the three would make a complete firm capable of coping with difficulties all along the line, from the planter to the consumer. Better business methods must be adopted. There is much of crudeness in the producing, and especially in the packing and selling of fruit.

There are factors besides nearness of market to favor the eastern grower. In the middle west, trees are short-lived. Fifteen to twenty years is considered the limit in Kansas of an apple-tree's usefulness. Here they produce abundantly for three or four times as long. We need not produce more bushels than we do now to double or treble our receipts. Put more care and brains into the growing and selling. Apples from the Pacific coast are selling in New York at 25 cents each, \$1.50 per dozen, and at 7 cents each per one-bushel box. They spray all summer, and each apple is sprayed and kept covered with Bordeaux, and when the fruit is ripe each apple is carefully wiped. It looks like a good deal of drudgery to wipe every apple, but the difference between 25 cents apiece and 25 cents per bushel will pay for a whole lot of wiping. The

eastern grower of red raspberries thinks he does wonderfully well if he can ship them 200 miles and have them get there without bruising, but the growers on the Pacific coast ship as far east as St. Paul, and some have even touched Detroit and Buffalo, 2,500 miles from where grown. The raspberries are planted eight feet apart, with hills three feet apart, wires are stretched, and four canes to each hill are allowed to grow and are tied fan-shaped to the wire. They yield enormously of extra large berries, each cane having abundance of light and air, and plenty of room for its roots.

There are two very great evils in ordinary marketing of apples in the eastern states. They are not allowed to reach full maturity, and are not graded sufficiently carefully. Mr. Hale picks peaches in Georgia during a period covering two weeks for each tree, only mature fruit being gathered at once. He believes the same method should be used in gathering apples. Pick the south side and the top boughs first, and the interior of the tree a week or more later. Of course, it is some trouble, but people who get to the top in this undertaking take pains. Cantaloupe patches are picked four times a day. Four separate strips are made at as many different periods in gathering the famous Rocky Fords. We sometimes hear sarcastic allusions to something being fifteen minutes earlier than its rivals, but melon growers have got down to a point where it is a question of only three hours as to the best time to pick a melon. When eastern growers of fruits and vegetables get to a point where they are willing to take the infinite pains and go into the minute details that characterize the westerner, then they will be in a condition to have their home markets to themselves.

Uniformity of character and condition in each package, and the most complete maturity consistent with marketing, are two prime essentials in satisfying both retailer and consumer. He knew of one high-grade grower and packer whose product was sold in advance of shipment and at an increase in price of from 25 to 75 per cent. above the ordinary market price. The careful and high grading of a product actually eliminated the factor of making a market. The operation resulted in making the selling automatic. It sold itself. There is no reason why the methods of the manufacturer should not be put in practice by the fruit grower. If a maker ships a dozen corsets or rubber boots or mowing machines to fill an order for No. 1 goods, he does not work in one or two or more seconds. The shipment is as near uniform as possible, and every factory has inspectors who watch every process of manufacture. If by chance a second-rate machine or garment gets into a first-class consignment, the consignee ships it back by first train and gets what he ordered and pays for it. Fruit growers are more or less in the prac-

tice of trying to get as much of second-class goods into first-class grades as they think the traffic will bear. They have as a class always done this. It would be suicidal in a manufacturer, and should be abandoned by the fruit grower. The consumer pays for everything—the growing, the packing, the freight and the selling. He is the final referee. If he is suited, that is all that is necessary, and experience has settled the fact that when the consumer is pleased, he willingly foots the bill. Of course, there is a class for every grade, but the class that demands an extra No. 1 article is increasing faster than the supply.

Mr. Hale thinks the family package will be the one that is to be in demand. The apple barrel is too large, and not more than 10 per cent. of apples consumed are sold to the user in whole barrels. Just what size will prove best, he was not prepared to say, but the bushel-box would get into many more families unbroken than would the barrel. It would pay to give the matter close attention. The breakfast-food problem has been largely worked out along the line of small fancy packages. Even the cracker trade has drifted into packages, and thousands of people carry home neat packages of crackers who would never buy them in bulk and carry them home in bags. The matter of reaching the consumer direct is worth considering, not only by the small grower, but by the large one as well. It looks like a large proposition to place ten thousand barrels of apples among consumers, but it need not be impossible. There are department stores doing a million dollars a year, nearly all of whose customers they reach by mail, express and freight. If you can eliminate the jobber and the retailer in selling your stuff, you can reach the consumer with a smaller price and at the same time get more. The consumer gets the retailer's profit and you get the jobber's. Mr. Hale devoted a few minutes to describing his methods of advertising and selling. He puts his name only on extra and first-class peaches. Seconds go without his label, taking their chances on the general market. His culls in Connecticut are sold to Jew hucksters, who come to the farm for them. In Georgia the overripe and culls go to the canning houses.

L. B. P.

—Report of N. Y. Fruit Growers' Meeting in Country Gentleman.

FROM "THE FIRST DANDELION."

(By Walt Whitman.)

O, the farmer's joys!

* * *

To rise at peep of day and pass nimbly forth to work,

To plough land in the fall for winter-sown crops,

To plough land in the spring for maize,

To train orchards, to graft the trees, to gather apples in the fall.

MISCELLANEOUS.

FALL WORK IN THE ORCHARD.

(By Prof. J. C. Whitten, Horticulturist, Agricultural Experiment Station, Missouri State University.)

(Written Expressly for The American Truck Farmer.)

Attention to the orchard should not cease just because the season's fruit crop has been gathered. Fruit trees of all kinds will bear watching. They need good management to enable them to do their best, and this care should be given on time—before the trees begin to show signs of suffering from lack of the requisite attention. It is easier and cheaper to keep trees in good condition than it is to restore them once they have gotten in bad condition from lack of good management. The young orchard, particularly, is subject to certain dangers that should be guarded against. It is usually easy to prevent injury from these dangers; it is usually difficult to cure the injuries once they have occurred.

Rabbits.—With the first snowfall of early winter, rabbits are liable to begin gnawing the bark from the fruit trees. As soon as the snow covers the normal food supply of the rabbit he falls upon the tender bark of young trees as the most available diet. It is no unusual thing for a young orchard to be entirely ruined in a night or two by rabbits that begin girdling the trees as soon as the ground is covered by the first snowfall. Young trees especially should be protected now, to prevent the possibility of such injury. There are many methods employed:

Killing the rabbits is one way of getting rid of their depredations. Scores of them may be caught in traps and they may be destroyed by other means. As long as a healthy rabbit is left in the vicinity of the orchard, however, the trees are in danger. For this reason, in addition to killing the rabbits it is advisable to protect the trees.

Wrappers of various sorts are often put around the trees with good results. The best kind of wrapper to be employed depends upon local conditions, the number of trees to be protected, the price and availability of labor, the amount of available cash that may be expended on the trees and the habit of the orchardist. Perhaps fine screen wire is the best wrapper if expense is disregarded. The screen wire may be purchased in 30-inch strips and the wrapper cut 18 inches high and long enough to reach around the trunk of the tree and lap well, so as to give room for expansion as the tree grows. Plenty of space should be left between the trunk of the tree and the wrapper and the lower end of the wrapper

should extend slightly into the ground at the base of the tree. These wrappers have the advantage of admitting light to the bark of the trunk and of enabling the orchardist to see through the wrapper so he can detect any injury that may be going on under the wrapper. It is not necessary to remove the wrapper to see whether or not borers, woolly aphids, mice or other depredators have found a possible entrance.

A spiral wire rabbit guard is sometimes used. This effectually keeps out rabbits.

The trunks of the trees may be wrapped with corn stalks, or coarse grass, if these are available and they have the advantage of costing nothing but the labor of applying them.

Cheap bandages of cheese cloth, or other cheap cotton fabric are employed. The cloth is torn in strips a few inches wide and applied just as a bandage is wrapped around an injured limb, carrying it high enough up the trunk to exclude depredators. The last end of the cloth bandage may be split, so the two ends may be tied around the trunk to hold the wrapper in place.

Wooden veneer wrappers, which are made by box and basket companies, are perhaps the cheapest and best wrappers for large commercial orchards. They are simply a thin slice of wood, like that employed in the manufacture of berry boxes, made 15 to 18 inches high and one foot wide, so they will enclose a young tree. If the tree is too large for one wrapper to reach ground, two of them may be employed for a single tree. They are held in place by two small wires wrapped around near the top and bottom. If these wrappers are employed they should not be more than one-twelfth of an inch thick. Some growers contend that these wooden wrappers injure the trees. We have used them for years at the Experiment Station, however, and have observed no injurious results. They are also used in some of the largest commercial orchards in the State and usually give good satisfaction. They are cheap, may be quickly applied and will last about three years. They should be removed once a year to see that the tree is given room to enlarge and that no other injury is going on under them.

With us newly transplanted trees make better growth the first year, where their trunks are shaded from the intense heat of the sun by means of these wrappers. In the case of young trees being set in the fall their trunks often remain fresh and green under these wrappers during winter, when unprotected trees show drying and shriveling of the tender bark, particularly if the winter is cold and dry.

Mice.—Mice frequently girdle young trees just at the surface of the ground. They do not work on the trees, however, unless dead grass or other litter is abundant enough around the base of the tree for them to

make a nest. Cleaning away the trash and litter around the base of each tree will prevent injury by mice. The same wrapper applied to keep rabbits away is also effectual against mice. If wrappers are employed they should extend slightly into the ground at the base of the tree.

Sanitary Methods.—Diseases of trees and the fruit itself, such as bitter rot, brown rot, scab, canker, etc., are partially preventable by cleaning up decaying fruit, cutting out diseased limbs and other sources of infection. All decaying and mummified fruit on the trees or under them should be removed and destroyed. Fruit rots are largely distributed through the orchard in spring by means of spores that develop in the decaying fruit that is left in the orchard during winter. An apple affected with bitter rot may contain enough spores of this disease to seriously endanger the crop of fruit that begins its development the following spring. Other fruit diseases are largely spread in this way. A single mummified fruit, which is allowed to hang on the tree over winter may be the source from which spores of some disease may largely destroy the crop next year. The decaying fruit which is removed from the orchard should be so taken care of that spores of disease that may develop in it cannot find their way to the fruit trees in spring. It may be burned, buried in some ravine or composted in the manure heap and used to fertilize the garden.

Diseased limbs should be removed whenever they appear. It is now known that the Bitter Rot of the apple may be disseminated from winter spores that develop in cankered spots in the limbs of the trees, as well as from the spores that develop in the decaying fruit itself. In orchards where this disease is prevalent the trees should be examined for these cankered spots and all of the latter should be pruned out and burned. These cankered spots are dark colored, shrunken areas where the bark has been killed and where the wound does not appear to heal in the normal manner, but where the wound looks dark, shrunken and diseased. It is not easy to distinguish between them and the trunk and limb canker that injures tree. For that reason it is well to prune away any such injured spots as appear to be diseased from any cause and where the healing process is not going on normally. Blighted twigs should all be cut out.

Washes and Gullies.—Along the hillsides and ravines in the orchard washes may occur from the rains in summer and autumn. In some cases the roots of the trees may have been laid bare and thus exposed to winter injury. Such washes should be filled to prevent further damage and any exposed roots should be well covered to protect them from winter injury. If the ground has not been given level culture depressions may occur

under some of the trees so that the water from rains and melting snows may stand under the trees and injure their roots. Such a condition as this is a serious menace to the health of the tree and care should be taken that standing water under all trees should be drained off.

Borers.—If borers have found an entrance to any of the trees they should be removed. Their presence may be detected by the castings which they throw out in boring their way into the wood. These castings look like fine sawdust and may be seen just at the surface of the ground, next to the trunk of the tree. In the case of peach trees there is also likely to be a gummy exudation just at the line where the trunk of the tree enters the ground. The living borers, which work in the growing layer of the tree just below ground, may be cut out by means of a sharp slender knife, or they may usually be reached with a piece of wire, thrust into the borer cavity in the wood.

GROWING APPLE TREES FOR NURSERY.

(J. B. Sinnock, Missouri.)

Apple seed is planted, the young trees cultivated one summer, then dug up late in the fall and placed in the cellar. This same summer's new branch growth is cut from the scion orchard, tied in bundles, labeled and packed in sawdust in the cellar. Next comes the grafting, which is pleasant work for nurserymen during cold weather. The scions and pieces of root are fitted to each other and packed away to callus, and by spring are knit together and buds swollen ready to push out.

Land for setting the grafted stock should be prepared as for corn, plowed deep in late fall and rebroken in the spring as soon as it will do to work. Pulverize fine and it is ready for the grafts. Mark the rows off three feet and eight inches apart, plant eight inches apart in row, using steel dibbles, setting each plant firmly in the ground. Carefully label each variety.

It is now time for cultivation, which is the most important part of nursery business. The surface soil should be stirred with a cultivator every few days and no weeds allowed to start. As soon as the rows show a few weeds we throw the dirt away with a small diamond plow, very shallow, leaving a three or four-inch strip to be worked out by hand, being careful not to loosen the young plants. In a short time the cultivator must go over again and level the ground. Keep the cultivator going, and whenever the rows need working use the small diamond plow and hand work or hoe. Cultivate until the latter part of August, then hill them up with the disk cultivator for the winter.

The first season little pruning is done until late in fall or early in spring. Train each tree to a straight whip, cutting back the very small ones to the ground, and let them take another start. When the young sprouts and leaves get about an inch long, put on leather gloves and rub each tree about two feet high. If at any time you find anything to come off the body break or rub it off while young and tender.

Those dug at one year old should always be dug with a spade. When two-year-old trees are to be dug for early fall orders, you must first strip off all the leaves, but after the leaves have frozen they may be left on. The tree plow is the proper thing to dig with if you are going to clean the ground, but if only part of them are ready to dig you will find it best to use a spade, as those which are to be left until spring of the third season will not do so well if disturbed. Handle carefully after digging, haul to the packing ground, heel well and do not let them be exposed to the sun, dry or cold wind.—Orange Judd Farmer.

THE CARE OF THE APPLE ORCHARD.

(Written for the Star by the practical pioneer orchardist, Col. C. Aul, Smithville, Mo.)

In selecting varieties to plant an orchard, as said before, much depends on the soil, surroundings, uses apples are to be put to and many other things. One thing to be borne in mind is, to not run after the high-priced new kinds, that are always for sale by agents and tree dealers. See what your neighbors raise successfully, consider the soil, situation and location of your orchard, compared with others around you, then see what use you can put the varieties to that they successfully raise: and consider their hardiness, bearing qualities, and the value of the fruit after you get it. Think also what you will be likely to want to do with it after you have it. There are some new varieties that have merit, but I have not felt it best to plant those varieties that were not well tried. I have found for winter apples that the earliest apple to grow was the Ben Davis. I do not regard them as the best apple, but where there are hundreds of thousands of children that so much want fruit, and when it is such healthful food for them, I would by all means advise planting them in preference to none. They come into bearing young, and bear nice apples—not of the best quality, but are still a fair apple. Another of the old tried kinds that is really a good apple, a good keeper, a good bearer and hardy, adapting itself to different kinds of soil and long-lived, is the Winesap. I regard the Jeneton as one of the best apples we have,

except for its liability to cracking of the skin, just before picking time. I have seen a whole crop ruined in one day; a wet day, cold with considerable wind, will crack them and that ruins them for keeping. The cracking of the skin appear to be of the same nature as by wetting the hands and exposing them to the wind, and keeping them wet for a few hours, is liable to chap them, if the air is cold. The Jeneton is one of our hardiest apples, as well as one of our best for eating, cooking and keeping, as also for cider. The Winesap is also a fine cider apple. The Jonathan is one of our very best in quality, also a hardy tree, adapting itself to the different kinds of soil and location. It is usually not so liable to overbear as other varieties named above, but it is not a long keeper. From September to January is as late as it will keep well. Should be in every orchard, but not too many in a family orchard. The Gano is also a good family apple. In quality, size, and in nearly every way, is the same as the Ben Davis, but it is better colored, and I think the trees live longer. Another apple that is one of the best for family use, that has been almost discarded, is the Milam. The size is too small for commercial purposes. The Willowtwig is also a good apple, a good late keeper and a good bearer. It does best on natural rich land, if dry. The trouble with it is, many faulty apples. It will not bear manuring. The Red Romanite is another good vigorous, good growing, hardy variety. It keeps well and if not allowed to overbear, is a good apple. If not thinned, they are liable to overbear and the apples will be small. Like the Willowtwigs, will do well on rich land, dry and not manured. There are other varieties that are being set, but these are tried kinds. For summer and fall, Duchess of Oldenburg, Red June, Lowell, Maiden Blush and Snow will bring you to Jonathan, so you can have apples from June until June again. I once filled out a barrel of old apples with the new crop. I would plant about two of a kind for summer and fall, about five Jonathan, balance in the other varieties, for a family orchard of fifty trees.

FRUIT—THE PHYSICIAN.

Fruit is a valuable article of the diet when ripe and fresh. Taken on an empty stomach in the early morning it is refreshing and serves as a stimulus to digestion. What better family physician should one wish than a well selected full-bearing orchard?—Ark. Farmer and Fruitman.

WHAT IS A WELL-RIPENED TREE? SHOULD THE LEAVES FALL EARLY?

Oh, dear, here I am up against another snag! I have told you, before, about that block of plum trees which have not had any cultivation for two years, how thrifty they are, etc. Well, I notice they are not ripening up their wood properly. They have most of their summer clothes on yet (Nov. 16), while those immediately next to them of the same variety, which have been cultivated have ripened their wood, thrown off their leaves and behaved themselves properly. I know it is not a good sign when trees hold their leaves very late; however, it may come out all right with my uncultivated trees, but I assure you I do not like their behavior; I watch the result with considerable interest.

W. H. SKILLMAN.

We think that Mr. Skillman is borrowing trouble about those trees. Our observation is that the leaves hang longer where the ground is mulched than when thorough cultivation is given. We are unable to explain why this is so, but with us it seems to be a fact. We like to have leaves hang to the trees as long as possible. The fact that they hang in this way does not prove that the tree is making new wood. It is the surest way for the tree to ripen. Let's see what others say:

WHAT J. H. HALE SAYS.

When I first began raspberry growing years ago, the old chaps used to talk about canes maturing early, so as to be hardy and pull through the winter all right, but I soon discovered, especially among the tender red varieties, that where great damage was done by freezing in the winter it was usually worse on those early-matured canes. The only real live fresh ones I could find in the spring that were sound clear to the tip, were the latest to develop and those that had held their foliage up to freezing time in November. Later observation of trees of all kinds makes me always suspicious of the early dropping of foliage. I like to see trees of all kinds hold their foliage late in the fall. I know it means a more vigorous and healthy wood and abundant strong fruit buds that are less likely to winterkill. Now I do not mean by this that I want to give orchards late fall culture and make new wood very late, for this, of course, means tender wood that is sure to be injured by the winter's freezing. Vigorous growth should cease in this latitude in August or early September, but trees that are vigorous and free from

fungus pests or blight, ought to hold their foliage late in the fall, and the later they hold it the better it is for the tree every time.—Rural New Yorker.

HORTICULTURAL TALK.

(By Edwin H. Riehl, North Alton, Ill.)

Plant Several Varieties.—There are several points in favor of planting more than one variety of the different fruits, but one important advantage of having several varieties planted together is that of being sure of having good pollination. In nearly all of the fruits we cultivate there are some varieties that are more or less self-sterile. Take it with strawberries, for instance; I have found in my experience, even, those varieties that are strongly staminate, give better results when several are planted in a field or bed together than when one is planted by itself; which shows that the mingling of pollen is strengthening, and insures a better setting of fruit. I find, by the way, as a rule, that pistillate varieties of strawberries, when well pollenized yield more than staminate varieties, which is, of course, due to the fact that plants of the former are not taxed by the production of pollen. I therefore can not side with those who rate pistillate varieties as second choice. For example, here is a list of some of my favorites: Sample, Marie, Humm, Haverland, Bubach, Winchell's Beauty, Kittie Rice and Warfield, all pistillate. Plums always do better when several varieties are planted together, and to be on the safe side, I think we should do a little mixing of all the different fruits with this point of perfect pollination in view. It is also especially important in grapes. By planting several well-selected varieties we also have the advantage of a succession in ripening.

Manure for Fruit.—In no other branch of farm industry is manure more valuable than in fruit growing, and best results, I find, are obtained when manure goes direct from the stable to the orchard or fruit garden. As suggested in previous issues, I find it a very good practice to put a liberal quantity around young trees. It gives them a boost, making them vigorous and healthy from the start, and before you know it you have trees large enough to bear considerable fruit. For small fruits and vineyards, it is advisable to manure the ground heavily a year or two previous to planting, if possible, but in all cases take the manure from stable to field, and thereby get the good of all there is in it. As a rule, manure should be spread when taken to the field and not thrown off in heaps to be scattered at some future time, as some people do. If, however, the ground should be covered with a heavy coat of snow when

manure is ready to leave the stable, I think it would be preferable to pile it up instead of spreading on top of the snow.

Timely Suggestions.—Now is a good time to overhaul the spraying outfit and see that it is in perfect working order. Don't wait until the day you should start spraying, and then find that the tank leaks badly, and that you must send to the factory for a new nozzle. Get a supply of spraying material on hand, excepting, perhaps, the lime, which cannot be too fresh or too good. The pruning shears and saw should be in use these pleasant, sunny days, cutting out the blighted limbs in the pear orchards, and the objectionable apple limbs. It is a little too early yet to trim the peach trees, excepting where we know that the buds are all killed, as the percentage of live buds has much to do with the manner in which peach trees should be pruned. Gooseberry and currant bushes often need attention of this kind, and this might now be done. The pruning of raspberries, black berries and grape vines should be done before the spring rush comes on. Go through the orchard carefully, and if you notice any trees that have a decided sickly appearance, have them taken out and burned, and put young, vigorous trees in their places. Experience has taught me that it does not pay to fool with a sick tree.

Plant enough cherries that the family will get a goodly supply in spite of the birds. Include some late varieties that ripen when the most troublesome birds are gone. If you intend planting currants and gooseberries this season, you had better order plants at once, as they are scarce and in great demand. The drouth of 1901 cleaned up bearing currant bushes, and this fruit could not be bought since at any price, excepting in very limited quantities. No wonder, then, that plants are in demand.

Why not plant a few grafted chestnut trees the coming spring, just for the sake of learning that they are really profitable, as well as useful and ornamental? They bear the second year after planting and keep it up, whereas the much-talked-about pecan, even when grafted, does not begin bearing until it attains an age of six, eight or ten years. Again, we are not sure of the hardiness of the improved southern pecans, and but little has yet been done in the way of improving and propagating our hardy natives. The seed of several vegetables is scarce this season, and those who use them in considerable quantities should get their orders off at once.—Colman Rural World, Feb. 9, 1904.

CIDER MAKING.

At the meeting of the Illinois Horticultural Society, H. M. Dunlap described his own process of making vinegar as follows: "I run the cider into casks from the press, then store them in the upper story of my cider house. Running them up overhead serves two purposes—it preserves the barrels from the little worms that bore through and let the vinegar run out, as is the case with vinegar stored in sheds on the ground; also the temperature is very warm in the summer time and correspondingly cold in the winter. The cider made in the fall will freeze very nearly solid; I have about six or eight gallons drawn out of each barrel to make up for the expansion. These barrels are laid on racks, and the freezing process separates the water, which goes to the top, from the strong cider stock, which goes to the bottom. The demand for cider vinegar has increased on account of the pure-food laws that were recently enacted by the state legislature."—Country Gentleman.

HISTORY OF THE APPLE.

(John W. Clark, North Hadley, Mass.)

When the apple was first cultivated was, and probably always will be, clouded in mystery. That it was known at a very early date, and is one of the oldest, if not the oldest, of cultivated fruits, is not questioned. Lyell, in his "Antiquity of Man," carries us back 5,000 to 7,000 years into the Age of Stone, and says that "carbonized apples of small size are found in the mud of that period."

We also have records of sliced apples, cut as if for drying, being found beneath the ruins of the Lake Dwellers, where they have lain with the implements and utensils of these ancient people for centuries, and by their presence do their part in telling us of these strange people.

The home of *Pyrus Malus*, the source from which our cultivated apple sprang, according to the best authorities, is Western Asia, and it is a fact worth remembering that Western Asia, the cradle of mankind, is also the birthplace of our apple, and has followed man in his wanderings into nearly every country and clime, and, like him, has reached the highest stage of development in the temperate zone. Of the fruits known to man the apple has the widest range of adaptation, being found cultivated in nearly the whole of Europe, Northern Africa, Western Asia, China, Japan, North and South America and Australia.

The apple was known and cultivated by the ancient Romans. The Ephrastus, we are told, knew of two kinds: Cate, seven; Pliny, the elder, twenty-three, and says that some of the sorts were so sour as to turn the edge of a knife.

Loudon says: "The apple, Whitaker conjectures to have been brought into Britain by the first colonies of natives, and by Haedni of Somersetshire, in particular." Glastonbury was called Avillania, or the apple orchard, before the arrival of the Romans.

Before the third century the apples had spread over the whole island. The Romans, according to Tacitus, on their arrival began to plant apples.

The Druids, Loudon tells us, paid particular reverence to the apple. Northern mythology informs us that the giants used to eat apples to keep them from growing old.

The introduction of the apple into the British North-American colonies, dates back to the earliest period of their settlement. Seeds of apples were brought from England by the order of the Governor and Company of Massachusetts Bay, in 1629, and in 1632, Governor's Island in Boston Harbor, was granted to Governor Wintrop, on condition that he should plant a vineyard or an orchard.

The first apple orchard planted in Rhode Island was at Sturdy Hill, near Pawtucket, in 1636. Connecticut had apples prior to 1645. In 1741, apples were exported from New England to the West Indies in considerable quantities.

The apples of early New England were grown mostly from seed, and were what is known as natural fruit, the largest proportion of which being of little value except for the feeding of stock and making of cider, with occasionally a seedling of superior quality. From among these Massachusetts has given us the Baldwin, Roxbury Russet, Hubbardston, Nonesuch, Sutton Beauty, Porter and Williams' Favorite. Connecticut, the Golden Sweet and Seek-no-further. Rhode Island, the Greening, that bears its name with Peck's Pleasant and Tolman's Sweet. From New York comes the Newton Pippin, Northern Spy, Spitzenburg and Jonathan.

The Yellow Bellflower and Maiden's Blush we have from New Jersey. Pennsylvania gives us the Fallwater, Smith's Cider and York Imperial. Ohio, the Rome Beauty. Kentucky presents us with the Ben Davis, and from Minnesota comes the Wealthy, the introduction of which has extended the profitable cultivation of apples 100 miles further to the north than they could be grown before this variety was known. From the origin of the varieties given, it will be seen that as a rule, a variety of apples does best near the locality where it originated. Taking Great Britain, Central Europe and America, the Gravenstein is the most popu-

lar variety with the German, Briton and Yankee, the Red Astrachan coming next and having the most extended area of cultivation of any known variety of apples.

Schoolcraft, in his report on the Iroquois, states that on the first introduction of the apple in New York, these tribes were captivated by its taste and lost no time to transplant it by sowing seeds about their ancient castles.

The pioneer who first introduced apples into Ohio and Indiana was Jonathan Chapman, more commonly known as Johnnie Appleseed, who, in his wanderings on the frontier of civilization, planted apple seeds in places that he cleared in the forest, from which the larger part of the trees of the first orchards planted in this section came.

The real apple-growing region of this country, it was claimed only a few years ago, was only about 600 miles from north to south and 1,500 from east to west; this fixed the western limit of profitable apple cultivation as middle Kansas. Within the two last decades apple orchards have been made to flourish where it was thought impossible to make them live, and are now cultivated from Florida to Alaska. At Sitka they bloom in June, but seldom perfect their fruit.

Colorado has within her borders 99,000 acres planted to apple orchards.

Orchards are found in Utah, New Mexico, Idaho and Montana; the last named boasts of orchards containing from 60,000 to 100,000 trees. Marcus Daly in his day owned one in that State that contained 60,000 trees.

California and Oregon in 1890, each had over one and one-fourth millions of bearing apple trees, whose fruit competes in the markets of Europe with our eastern grown apples.

According to the census of 1890, the United States had over 120,000,000 of bearing apple trees, and since then has produced in a single season over 69,000,000 barrels of apples, and shipped to England 3,000,000 barrels.

In cold storage we carry each year from 6,000,000 to 10,000,000 barrels of apples. Ships especially fitted for carrying apples weigh anchor from New York and Boston for Europe, laden with this fruit.

The exporting of apples has grown with such rapidity it has become one of our leading exports, and bids fair to rank as the greatest fruit crop of the world.

"The fruitage of the apple tree,
Winds, and our flag of stripes and stars
Shall bear to coasts that lie afar,
Where men shall wonder at the view.

And ask in what fair groves they grew :
 And sojourners beyond the sea
 Shall think of childhood's careless day,
 And long, long hours of summer play
 In the shade of the apple tree."

—Apple Specialist.

SEPTEMBER DAYS.

The goldenrod is yellow,
 The corn is turning brown ;
 The trees in apple orchards
 With fruit are bending down,
 By all these lovely tokens
 September days are here,
 With summer's best of weather,
 And autumn's best of cheer.

—Helen Hunt Jackson.

HOW A TEXAS GROWER PREVENTS ROT IN PEACHES.

Many reports as to the behavior of the Carman peach in different places report it as the very finest, entirely free from rot ; a few say it is rotting quite badly. There is deep-seated cause for wholesale peach rot, but is it generally understood? The original tree of the Carman has, up to this day, shown no rotten peaches, although standing on low and rather wet ground. It stands in a corner of an orchard from which come the prevailing south winds. Surrounding the tree by say 150 feet there is no peach ripening ahead of it, hence no spores of rot are present to infect the fruit. In other parts of orchards where some badly rotting varieties had been replaced by Carmans, in wet weather the Carmans are also subject to rot, though not as bad as many others, ripening either before or with it. The cause of it is this: The brown-rot fungus, once present in an orchard, especially where the rotten peaches are allowed to remain on the ground, or to mummify on the tree, is there to stay for years to come. In damp weather the spores spread on the ground, often covering quite a large space, where rotten peaches laid perhaps two or three years before. This growth on the ground is of a greyish yellow, and luxuriates mostly in the shade. For this reason a closely-planted peach orchard is an especial hotbed for the propagation of rot, in particular where there are no hogs kept to clean up the waste as it comes from the trees.

The best remedy of course is preventive. Giving trees a liberal distance (for my own section of country no less than 24 feet each way ;

in other parts less might do), and keeping shotes in orchard, will prevent rot, or greatly check it, as well as curculio. Hogs have had the run of our main orchards now about 12 years, and the result is that rot and curculio have almost entirely disappeared. Some men loading a wagon with peaches this summer wanted to know if "them hogs didn't harm the trees." I pointed to the peaches in the wagon, saying: "If you can find a single wormy peach in this wagon I will make you a present of all you can haul off." They did not find the wormy peach. That was a variety (Sylphide) that used to be over half wormy years ago. Some of those shotes, 10 months old, are bringing me now over \$16 a piece, the butcher coming after them.

We are all in the business for the money there is in it; now what difference does it make whether the dollar comes through the peaches the hogs eat, or through those that are shipped? I believe in shipping only the best, and let all the hogfeed stay at home where it ought to be. Thus we not only built up a good reputation, but have also usually remunerative prices for our goods. To furnish plenty of cheap hogfeed when there are no peaches, the orchards are sown to Rescue grass, a native annual of our State. The seed lies dormant in soil from May till the first rains in October, when it comes up like a spear of wheat. It grows rapidly, and usually covers the ground before Christmas. All stock is very fond of it, and as the seeds are ripening during the month of April, they are nearly as nourishing as oats. I have no seeds to sell. By middle of May we generally give orchards a good plowing, turning under that Rescue sod, which, as it disintegrates, keeps the soil loose and mellow the biggest part of the season, a few harrowings with the Acme being all the cultivation required after the plowing. As well as furnishing hogfeed this cover crop of grass also prevents the washing of our land, not a small matter with us, where sometimes as much as six inches of rain falls during one night. I have known four inches to come down inside a half hour; then good-bye land that is kept too clean. The Rescue grass grows from one to two feet high; is the hardiest plant in the way of grass we have. No amount of drought or cold will kill it, nor can it be pastured too close to prevent it from going to seed. It is a boon to Texas indeed.—*Rural New Yorker.*

JAPAN PLUMS.

Japan plums all have a tendency to form broad, spreading trees. This can be obviated by pruning soon after the bearing season is over. Wide spreading limbs frequently break under heavy crops. Plums are

stone fruits, and all such are heavy. Kelsey is smaller than Burbank. In flavor it is excellent. It is one of the fruits frequently saved by smudging, as it blooms and sets fruit quite early in the frosty spring. The Japan plums are wonderfully free from black knot and from the attacks of the curculio. The trees are thrifty growers. Burbank leads the class.—Southern Fruit Grower.

PRUNING THE GOOSEBERRY.

(John W. Lloyd, Illinois.)

If the pruning of gooseberries is neglected, the bushes fill up with wood and the berries become small and difficult to pick. The fruit is produced from lateral buds on one-year-old wood, and also on short spurs on wood two or more years old. The same spur may produce fruit for three or four years if the strength of the bush is maintained by proper fertilizing and pruning. The first two crops from a given spur are, however, usually the best.

The new wood which is produced in a gooseberry bush each season appears as new branches arising from buds on the previous year's growth of the canes already present, or as new shoots arising from the crown of the bush. The new branches on the old canes will produce fruit from their lateral buds the year following the one in which they develop. The new shoots from the crown will become fruiting canes when two years old if allowed to grow. The new branches on a comparatively young cane are much stronger than those on an old cane. After a cane has reached the age of about five years, the new growth is likely to be short, weak and unproductive. Since a weak new growth indicates a general weakening of the whole cane, the spurs also, even though young, are likely to produce fruit of inferior size. As soon as a cane shows signs of weakening it should be removed, and a new shoot left to develop into a cane to take its place. In this way the bush may continually be renewed, so that it will remain productive and profitable for many years.

Care should be taken to avoid leaving too many young shoots to develop into canes. If the bush is in normal condition, the number of young shoots left should be just equal to the number of old canes removed; and they should be so distributed as to keep the bush as symmetrical as possible. Low-hanging shoots and canes should always be removed. A symmetrically pruned gooseberry bush will consist of from six to a dozen or so canes of all ages from one to about five years, and there will be approximately an equal number of canes of each age.

In addition to the cutting away of old canes and superfluous young shoots, the pruning of gooseberries consists in thinning out and heading in the young wood on the old canes that are left. The weak and poorly developed branches are removed, as are also some of the stronger ones if they are too numerous. The aim is to have the new bearing wood as evenly distributed as possible. The branches which are left are shortened back to from 8 to 12 inches. A new shoot which is to be left to develop into a cane should be headed back to a height of from 16 to 20 inches.

The excessive amount of wood in the bush before pruning is not due to neglect, but to the natural development of the plant under normal conditions. A gooseberry bush which does not make a large amount of new wood each season is too weak to amount to much in the fruiting line. Yet a large portion of this new wood must be removed in order to insure large size in the fruit and a normal growth of wood for the next year.

The best time to prune gooseberries is very early in spring, before growth starts. For cutting out the old canes, a pair of two-hand pruning shears is the proper tool; and for the other pruning there is nothing equal to a sharp bill-hook pruning knife. In using a pruning knife, the arm should be held straight rather than bent at the elbow. Otherwise the knife is likely to slip and cut further than the operator intended.—Orange Judd Farmer.

A WHITE BLACKBERRY.

When something unusual in the line of modifying plants takes place, the name of Luther Burbank, of Santa Rosa, California, comes involuntarily to mind.

For some time Mr. Burbank has been engaged in cultivating various grades of blackberries, obtaining by cross-breeding a grade which he calls the "Iceberg," and finds the plant is as productive and hardy as the black variety, the berries being as abundant, large, handsome and delicious as the best black ones. The change in the color of the fruit does not affect its flavor. A field of these "Iceberg" berries is a veritable picture to the eye.

The well-known Lawton blackberry is one of the great grand-parents of this white blackberry. The Lawton when ripe is excellent. It is one of the most productive berries on the market. Owing to its fixity of race, it is said to produce itself from seed almost exactly, and its seedlings will not be influenced, when raised from seed pollinated by other varieties but readily imparts its good qualities when employed as the staminate parent.

The first experiment of Burbank with this blackberry resulted in the seedlings, when crossed with crystal white, being all black. The second also was black, though varying much in other respects. But the third produced this wonderful plant, bearing the snowiest white berries ever seen.

Very little attention was paid to the long rows of cross-bred descendants until one day this white berry was discovered among its black relatives, with the canes bending in various directions with its load of delicious snowy berries, which are not only perfectly white, but so transparent that the seeds, which are unusually small, may be seen in the ripe fruit.

Clusters larger than those of Lawton berries, as near as could be judged were earlier, sweeter, and more tender and more melting throughout, though as firm as Lawton is when ripe.—National Fruit Grower.

PICKING APPLES.

Editor Rural World:

At the picking season for each returning year volumes of advice are generally given as to the best methods of picking, handling and preserving the apple. The subject necessarily is very old and the many points connected with that work have been pressed frequently, causing it to seem that the subject in all its bearings had been worn almost thread-bare. Nevertheless, there are some plain, common-sense methods in regard to this work that can never be turned down and should always be distinctly borne in mind.

The most important part in picking apples is to do all that you can to prevent the apples from becoming bruised. While bruises may not be noticed at the time, later, especially when the apples have been placed in cold storage for months, there will be developments leading to serious injury. It has been often noted as to how much mischief one rotten apple in a barrel can accomplish.

With the idea in view of preventing bruises, it should be recommended that the picker should not use too large a basket, one-half bushel basket should be of sufficient size, and this should be padded with old sacks. In commencing the work all apples on lower limbs should be picked first. Many of the apples on the tree can be gathered in this manner without the use of the ladder and can be passed carefully from limb to basket. Soon as the apples are out of reach, then use the ladder, placing it carefully in order to avoid knocking apples from the limbs. Then continue the method, as commenced, of picking from the lower limbs first. Have

a good hook on your basket, and raise it frequently, so that it can receive the apples without their being thrown or tossed.

If the picker is placing his apples in piles when he empties the basket, he should not turn it as though he was rolling out rocks, but should hold both hands in front of the emptying basket, in order to let the apples down easy. Possibly when picking, the packer may be busy in the orchard placing apples in barrels. In this case there should be plenty of baskets, so that the picker will always have an opportunity of leaving a full and taking an empty one. The packer will have an opportunity to sort, throwing out the culls and saving the good, round, even apples as he goes along, for use in facing the barrels. In speaking of facing apples, it is not intended that deception should be practiced by placing the largest on top, but merely to get a size that will fit together closely in order to prevent jarring when the barrel is properly headed.

Every orchardist should have good, careful and trustworthy pickers. It is much more economical to pay careful men decent wages and depend upon their work, rather than to let a lot of cheap boys, who have never learned that careful interest should be taken in all duties assigned to them, do the work. In short, in handling nice, ripe, luscious apples, one should be nearly as careful in the work as he would be in handling eggs.

In picking fall and winter apples it is of course best to make one picking for all the apples on the tree, and this certainly will involve much care in sorting.—James Handly, Quincy, Ill.

ART IN MARKETING.

Many who succeed in raising good crops of garden products, berries, etc., fail in marketing. It is one thing to have and another to sell at a profit. It is possible for one to master the art of production and yet have so little business skill as to make a complete failure in unloading. A certain amount of the trading instinct is necessary.

While the best ways of management can only be learned by long experience there are certain easy principles which the young men on our fruit farms should be trained to notice. They will be helpful by giving them a start in the right direction.

1. Careful grading, quality and cleanliness in the package always count.

2. Your fresh products under the above conditions are worth more than stock shipped long distances. Always maintain this.

3. Plan to sell to consumers. As much as possible eliminate the middle man from your business. You save his profit and it is more satisfactory to the consumer to buy direct of the grower.—The Fruitman.

RULES FOR GRADING FRUIT—WHAT CONSTITUTES NUMBER ONE?

The following questions are submitted by one of our New York State readers: "A sells his crop of apples at a certain price per barrel, the buyer agreeing to give the same price for No. 1 and No. 2 quality. Can the buyer create his own code of rules as to what shall constitute No. 2 quality, or are there certain fixed rules which protect the seller in this case?" What is the custom in your locality?

There should be no creating of code of rules by either the seller or buyer after a sale is made unless both agree to the rules. The rules and specifications should be agreed upon at the time of sale as to what constitutes a No. 1 and a No. 2 apple and be a written contract.

J. B. COLLAMER.

Hilton, N. Y.

I understand that there is a fixed code of rules, stating what shall be No. 1 apples and No. 2. As I understand it, No. 1 are nothing less than $2\frac{1}{2}$ inches in diameter, free from worms and fungus. No. 2 are nothing less than two inches in diameter and not more than one worm hole and fairly free from fungus. The above is what I suppose is the rule of the New York State grower.

B. J. CASE.

Sodus, N. Y.

There is no code of rules for grades of apples that I know of. All perfect apples $2\frac{1}{4}$ inches in diameter go for No. 1 here, unless it is specified that they shall be $2\frac{1}{2}$ inches. No. 2 are all other apples reasonably fair that are two inches or over, but any man makes a mistake to sell in that way, and not have some definite understanding. Fungus on Greenings is a bad condition this year, and we should put ourselves in the place of the buyer, at least part of the time, when we are packing.

T. B. WILSON.

Hall's Corners, N. Y.

If A sells a hundred barrels of apples for \$2 per barrel, what difference does it make if 50, 60 or 90 barrels are graded as No. 1 and the remainder No. 2? If same price is paid for No. 1 and No. 2, the buyer grades to suit himself. If A should sell his No. 1 for \$2 and No. 2 for \$1.50 the parties would agree on size and condition of No. 1, as

well as size and condition of No. 2. Some buyers will accept for No. 1 apples, free from all defects and above $2\frac{1}{2}$ inches in diameter; others will accept down to $2\frac{1}{4}$ inches.

I. N. STEBBINS.

Orleans Co., N. Y.

The custom of selling fruit in two grades at a uniform price per package for both is not uncommon, and one of the objects in making such a sale is that the buyer may grade it or have it graded to suit himself. Certainly there can be no injustice to the grower in such a case in permitting the buyer to do as he pleases. He may after buying put the fruit all in one grade and call that No. 2, or he may make his No. 1 a fancy grade and put the bulk of the fruit in another, and call it No. 2. In either case ought the grower to complain, as he gets the same price per package without regard to the grading. There are no rules that are binding in this matter. The National Apple Shippers' Association has adopted rules of grading, but they can be enforced only by individual contract. The rules suggested by the New York State Fruit Growers' would not cover such a case, because they do not include a second grade, the purpose being to base the reputation of New York State fruit on high grade only. If, however, the inquirer has reference to the line between the No. 2 and culls or rejected fruit he might be greatly injur'd by allowing the buyer to dictate. There should have been a distinct understanding at the time of sale and the contract should have covered the point as specifically as possible. I know of no rules that would govern the case in the absence of such a contract.

W. T. MANN.

Barker, N. Y.

IS FRUIT GROWING OVERDONE?

(By Prof. H. E. Van Deman, Ex-U. S. Pomologist.)

Editor Rural World: Almost every day we hear of some big orchard or other fruit plantation being planted or plans on foot for establishing it. There are already in bearing thousands of orchards of such extent as would have seemed foolish to even contemplate 25 years ago, and others still larger that are not old enough to bear. The same is true of the vineyards, especially those of California, and of the strawberry fields as well. The question comes into the mind, whether it is expressed or not. "What will be done with all the fruit that will be produced?" Yet the product of

these great orchards, vineyards and berry fields is but little when compared with the aggregate produce of the millions of smaller ones that are scattered over the county.

At the recent meeting of the Western New York Horticultural Society, where I was in attendance, this subject came up for discussion. There were many wise and experienced fruit growers there, who were in the most serious mood as business men, and they expressed themselves as in no wise troubled about the outlook. They do not fear that the business of fruit growing is being overdone.

In my opinion, the main reason for the present high prices of fruit that generally rule the markets of America, and that is likely to maintain them in the future, is, that we are getting to be more and more a race of fruit consumers. In the early days of our history, when fruit was grown with far less trouble than now, because of the absence of many of our most troublesome and destructive insects and fungus enemies, there was very little profit in growing it. It is true enough that many of the varieties were not so good as those we have now, but they had a few that were excellent and that remain among our best kinds of today. Good winter apples sold for from 25 cents to 50 cents per bushel and sometimes much less. Peaches brought still less. Grapes had almost no sale at all, and berries the same way. Brandy, cider and wine were the principal products manufactured from fruit, and many orchards of both apples and peaches were planted solely for the making of these drinks. Now we do not hear of any such thing, and all the brandy and cider that is made is out of the scraps. However, there are great vineyards planted especially for making wine. Oranges were almost a curiosity in the markets when our fathers were children, but now they are almost as abundant as good apples in some of our leading markets, in the flush of their season.

How has all this change come about? Aside from the mere fact in the case, of the eating of fruit by our people, instead of drinking its juices in alcoholic form, there are several other reasons. The very cheap and quick means of transportation makes it possible for those to get fruits in the fresh state who could not do so before; and these facilities are getting better every day. The cost of production has been greatly lessened by improved methods of culture and handling. Evaporating and canning have become established branches of the fruit industry. They utilize millions of tons of fruit every year, and much of that which might otherwise go to waste, because of its poor quality or abundance. Another very important factor in the fruit business is our exportations. Great as they are now they are only well started. Our fresh fruits are sent abroad in large quantities, but the canned, preserved and evaporated

fruit products are winning their way into all the markets of the world. American dried prunes are being sold in France, Germany and other countries where we once had to send for these same articles for our own consumption. Even our raisins are getting a foothold there. America is becoming more of a manufacturing country, and all the toilers in the great hives of industry call for something to feed them. They want our fruit and are able to pay for it. One point that might be overlooked is the fact that our fruits are really better in quality than they once were, and are constantly getting better. And the better they are the more will be wanted and the better the price.

No, do not be alarmed about the fruit business being overdone. The world is progressing and we who grow fruit must keep pace with the procession.

HORTICULTURAL EXPORTS.

In the twelve months ending January 1, 1904, there were exported from this country fruits and nuts to the value of \$19,839,107. This will startle many people who have no true idea of the rapid development of the fruit industry in this country. Of this amount apples alone contributed \$7,758,908. Ten years ago the exports of fruits and nuts amounted to only \$3,918,799, while the exported apples were worth only \$1,580,052. This immense increase in the export trade in fruits is only a suggestion as to what the future has in store. It is also a mere mouthful compared with the increase in home consumption which the future is sure to bring. Stand in this city on any crowded corner and stop 100 men at random. Ask them how many apples they have eaten within a week and you will be astonished to find that the great majority hardly know what an apple tastes like! All these people are to be educated in fruit eating. They will learn in time, and each year will bring new recruits to the Apple Consumers' League. Let no man fear for the future of apple culture—if he is willing to conduct it in a business-like way.—Rural New Yorker.

PLANTING OF FRUIT TREES AND VINES.

Editor Rural World: Since the spring of 1897 we have planted fruit trees and vines on our place as follows: Pears, 322 trees; plums, 258 trees; peaches, 266 trees; apples, 56 trees; cherries, 98 trees; total, 1,100 fruit trees; grape vines, 383; strawberry plants, 7,350. The oldest of the

trees have passed their sixth summer; also the grape vines. Now for the income: 141 pear trees, past their sixth summer, have yielded \$76; 32 cherries, same age, have yielded \$2.25; 24 plums, of same age, yielded \$21; 58 apple trees, four years old, have borne one apple; 75 peach trees, four years old, have borne three peaches; thus 330 fruit trees, of bearing age, have yielded in the past six years \$99.25 worth of fruit. (The apple would not be considered of bearing age at four years.)

Now for the vine fruits: Of 383 grape vines, all told, 308 had proper care; 75 were subject to almost total extinction by chickens, so we will estimate 308 vines, all six years old, have yielded in four seasons \$1,126 in fruit. There have been bought and set 7,350 strawberry plants, and the income from them has been \$116.45. They have been grown between the fruit trees. We also grow melons between our young trees, and during the past two years we have sold \$199.37 worth of melons. To sum up, will say: 330 fruit trees, six years old, have yielded \$99.25; 308 grape vines, six years old, have yielded \$1,126; 7,350 strawberry plants yielded in two crops \$116.45; one acre in melons yielded in two seasons \$199.37; total yield from the tree and vine fruits, with berries and melons grown between, in past four years is \$1,541.07. Considering that we are chicken fanciers, and are only playing with fruit, this is not so bad. Fruit used in the family and given away is not taken into account. We hope for a full crop of fruit next year.

Farmington, Mo.

E. W. GEER.

SOIL MOISTURE NECESSARY TO FERTILITY.

(J. J. Edgerton, Iowa Experiment Station.)

In referring to the sale of crops from the farm it is customary to speak of selling so many pounds of plant food that should be returned to the soil, as though this were the only evil resulting from this practice. This evil is, however, very small compared with others that result from the continual production and sale of grain crops. For when we consider that for every pound of mineral matter removed from the soil by a crop of grain, from five to seven pounds are lost through the percolating waters, we can readily see that the return to the soil of all the plant food taken up by the crop would only replace from 15 to 20 per cent. of what had been removed therefrom during that season. You may well ask what supplies this enormous waste. The answer is very simple and to find it we have but to study nature's methods of soil formation.

All of our soils have originated from the rock masses of the earth's surface. One of the chief agents in the decomposition of these rocks was

the growth and decomposition of vegetation. The decomposition of vegetable matter in the soil, with the resulting organic acids, heat, etc., has a very powerful action in decomposing the inert mineral matters of the soil. The mechanical condition given the soil by the partially decomposed vegetable matter also aids very materially the action of the other elements.

In the eastern states where they expend annually some \$35,000,000 for commercial fertilizers, they have discovered that if barnyard manure is mixed with these partly insoluble fertilizers they will be rendered much more soluble. But they seem slow in comprehending that this vegetable matter if applied to the soil will have the same action upon the same kind of insoluble compounds that are already there.

In a recent experiment to determine the extent of this action, two boxes were filled with soil identically the same except that to one was added 20 per cent. of its weight in cow manure. These boxes were treated exactly alike for 12 months, the soil receiving an occasional stirring. At the end of this period an analysis showed an increase of 30 per cent. in the soluble plant food of the soil to which manure was added, after making allowance for what was contained in the manure. While that which received no manure showed a loss in soluble plant food of 4.36 per cent.

Prof. Snyder of Minnesota has done quite extensive work in the way of collecting and analyzing soils that have been cropped in various ways, and he finds that a native prairie soil contains about twice as much vegetable matter and three to five times as much of the more important elements of plant food, in a soluble form, as adjacent soils that have been continuously cropped with grain for 15 or 20 years. While many that had been under cultivation for much longer periods, but which had been allowed to produce an occasional crop of timothy and clover, and had an occasional dressing of manure, were in a condition almost equal to the native soils.

HOW VEGETABLE MATTER AFFECTS MOISTURE.

The effect of vegetable matter upon the moisture content of soils is equally as great and of no less importance. In this connection it has a two-fold effect, that of increasing the power of the soil to hold water by capillary attraction, which is the water used by field crops, and at the same time increases the readiness with which the excess of moisture will percolate away. On soils all finely pulverized, the reduction of the vegetable matter results in the land becoming more solid, more inclined to adhere in clods, and when wet more soggy and more inclined to puddle or bake.

I call to mind a case in point. Some years ago my father purchased a piece of land from a man who was regarded by his neighbors as being

incurably lazy. There was a certain field upon this farm, originally very productive, that had been continuously grain cropped until the vegetable content was very much reduced, and upon which had recently been placed what manure had to be moved in order to allow passage in and out of the stable. In order to avoid any undue exertion, this manure had not been scattered, but each load dumped in a heap by itself. The result was a few spots exceedingly rich in vegetable matter. The contrast was almost equal to that of an oasis in a desert. After heavy rains, the manured portions would be in a fit condition for cultivation, while water would still be standing on the other soil all about them. And when the other would get ready to work it would be heavy and solid, and would not stir up into a nice mulch, while these spots would be as loose and light as an ash heap. The plants on the manured portion would be of a rich dark green color, stocky and vigorous, while those besides them on the unmanured portion would be pale, slender and often sickly in appearance.

The greater length of time taken for the excess of water to percolate away is a loss not only in time, which the farmer should have the use of in his fight with the weeds, but also in its greater injury to the growing crop, as none of our cultivated crops will thrive or even live very long in a saturated soil. A native soil will retain about 20 per cent. more water than one that has been continuously grain cropped for 15 or 20 years. In an experiment where one-half of a sandy knoll was manured and the other not, the manured portion contained nearly 25 per cent. more water during six weeks' drouth than the unmanured portion, and at harvest time the corn on the manured portion was fully two feet taller.

In another experiment to determine the effect upon evaporation, a difference in the rate of evaporation was observed equal to one ton of water per acre per day in favor of the manured portion. Owing to the uncertainty of our rainfall in regard to time, the capacity of a soil to absorb and retain water for the use of crops is very important. A certain amount of moisture is necessary before the sap will move and any growth take place. And the nearer the moisture content becomes reduced to this point, the less rapidly will growth take place. The variation of only a few per cent. in the amount of moisture retained may mean the difference between a good crop and an almost total failure. During the past season, which enjoyed a fairly good distribution of moisture, we were able by the addition to a corn crop when the ears were forming, of four inches of water to the soil, to change the yield of corn from 68 to 91.5 bushels per acre. This amount of water is equivalent to a little over 5 per cent. moisture in the first four feet of soil.

In conclusion it may be said that the term, worn out land, is a delusion. Such land still posses plenty of plant food in an insoluble form.

Lands cease to be productive because their content of plant food in a soluble form has been reduced, and they can readily be reclaimed by the application of a sufficient amount of vegetable matter to decompose the insoluble plant food fast enough for the needs of the crops. And it is certainly far more economical to cultivate and grow fertility than to purchase it, and not only is this kind of fertility more economical, but it is far more lasting in its effects. Very frequently the decline in productive power may be due as much to the lessened capacity of the soil to retain moisture as to a reduction of soluble plant food, without the aid of which the richest soil in the world has no crop producing power.—Orange Judd Farmer.

WHY WE SHOULD STUDY THE SOIL.

In the State of Indiana we have a large variety of soils, which vary in structure all the way from the stiff clays to the black muck soils, and in order to properly understand the structure of these soils we must know something of their origin and make-up. Of course, there are but two primary kinds of soils, viz.: those which are formed in place, that is, from the underlying rocks; and those which have been deposited by the action of water and other agencies. Soils which have been formed in place are most likely to become exhausted first. They may contain a large amount of some single element necessary to plant growth and but a small amount of some other element just as necessary. This difficulty is usually avoided in case of the transported or mixed soils. Some of the tough clays, however, which have been formed in place, are very lasting, due largely to the fact that they are very slow to give up the elements of their composition. The plant food is yielded slowly, thereby preserving in large measure the soil fertility, but yielding smaller returns per acre per year. The soil of Indiana for the most part are what are known as "drift soils," those that have been formed by the action of glaciers. Of course, since that period of formation large deposits of vegetable matter have been made, thus forming our muck soils. In other places we have soils which for the most part are formed from the underlying layers of rock—for example, our limestone soils. Keeping in mind then the facts that we have soils which are made up of gravel, vegetable matter, clay and sand in varying proportions, it is readily noticeable that they cannot all be treated alike and produce results satisfactory to their owners. We should keep in mind the fact that not all soils are affected in the same way by the passage of water through them, and the further fact that not all soils allow water to percolate through them at the same

rate. Other conditions being equal, it is quite desirable that a soil should allow water to pass through it slowly, holding moisture the greatest length of time within the reach of plant roots. There is a wide difference in the power of different types of loose soils to retain moisture. For this reason careful observation should be made when cultivation is done with the object in view of retaining moisture. It would seem then that in order to successfully manage the soils of this or any other State, the operator should have a pretty thorough idea of the physical structure of the soil of his farm. He should have some working idea of how the soil particles are broken down and made available food for plants. The fact should be kept in mind that the soil is not only a storehouse for plant food, but that it is a laboratory in which this food is prepared for the use of plants, and any agency that makes work in that laboratory more effective is an agency for increased returns. The facts seem to indicate then that the more one would know concerning his soil the more he must study its physical aspect, always keeping in mind, however, the chemical side.—F. S. Johnston, Purdue University, Indiana.

THE FARM AS A LABORATORY OF NATURE.

Farming is at once the simplest art and the most complex science. This paradox rests upon the facts that nature is prodigal in her gifts to man, and that she holds the secrets of her methods so closely that with the lapse of centuries they are as yet but dimly disclosed. The savage is content to take the gifts he finds awaiting his hand, and through untold generations his ancestors found them sufficient to their simple needs. As he advanced, his efforts were of the simplest sort—the domestication of animals, the propagation of his food plants, and the repression of their enemies.

The simplest agricultural operations may be performed without tools, the naked hands and feet being sufficient materially to assist in reaching the desired results. But little intelligence is required, beyond a knowledge of the order of nature in the broad lines involved. Even with the advent of simple implements and animal power the art of tillage remained one easily acquired. There is indeed some foundation for the saying, "Anybody can farm." With a propitious season anybody can get something of a crop; he must, in fact, be very successful as a blunderer in order totally to defeat the beneficent operations of sunshine and rain, air and earth, working out the salvation of living things.

But while it is true that anybody can farm, it is true only because

there are so many degrees of success in farming, and so many kinds of people in the world. It is sufficient for some rudely to apply a simple art, or without understanding to follow the methods of one who has successfully thought more deeply upon the reasons for things, and has brought a higher degree of intelligence into action. But the progress of the ages has not been due to such as these, but to those who applied clear thinking to accurately observed facts. By them the art of agriculture has been developed to a high state, in which fullest success is won only by those who have made adequate preparation. Let us consider for a few moments some of the channels through which nature works out her miracles, and which man must intelligently direct if he would farm with the highest success.

All of the natural processes taking place on a farm are referable to one or another of the several sciences. We live in the age of science, that is, of classified knowledge. The multitude of known facts are most advantageously studied when grouped under various headings which are called the sciences, but which are merely parts of the great body of truth. Almost all of these touch agriculture. We can not enter into the refinements of view concerning the ultimate constitution of nature, but for our present purpose we may recognize that matter and energy furnish the basis for all observed phenomena, and that in ordinary observation there is a marked difference between organic and inorganic nature, between the living and the not living.

The most fundamental of the sciences are physics and chemistry, and these two illustrate the interdependence of all. Neither is independent of the other; neither can be studied without at the same time studying the other to a greater or less extent. Chemistry deals with matter, physics with energy or force; yet no chemical changes can take place without accompanying physical changes, and physical changes are recognizable only as changes in the condition of matter. These twin sister sciences are the foundation of agriculture, and in so far as we would understand this art, we must master those sciences. Agriculture illustrates all the degrees of complexity in the manifestations of these sciences, in the transformation of inorganic, non-living matter into organized living things by the interaction of the physical and chemical forces. The soil, the air, the plant, and the animal, are the laboratories of nature in which processes are executed which as yet are far beyond the skill of the scientist to perform except by using the same laboratories.

Consider how water is used. It falls in rain, and settles into the soil, and dissolves the minute percentage of soluble salts that it contains. By the resultant action of gravitation and capillarity this soil water moves up or down or laterally, according to the existing conditions. It thus

comes in contact with the roots of plants, and as they absorb it more flows to them. The solution of substances thus brought to the plant world would seem to be a very simple thing, and perhaps it is the simplest factor in plant nutrition, yet the nature of such solutions engages the study of the most acute physicists and chemists, and can not be said to be understood fully even yet. After the water has entered the root, what causes it upward flow? Why does it flow downward at times in the performance of its mission of transferring nutriment from one point to another? Why does the plant apparently exclude some of the things in solution for which it has no need, and helplessly admit others in injurious quantities? These are questions about a simple process that are yet waiting for a complete answer.

Water acts more than as a mere solvent; it enters into chemical combination. Within the cells of the leaves of plants combinations and decompositions are taking place that have thus far defied the chemist's art. Carbon dioxide from the air enters, and from it and water that wonderful series of compounds called the carbohydrates is built up. We are not sure of even the first step in that process, though several beautiful theories have been advanced and some experimental evidence adduced. We know that in this wonderful laboratory of living cells a highly complex substance, starch, makes its appearance, that, in composition, it is equivalent to water plus carbon, and that oxygen is simultaneously set free. The steps in its formation are but dimly seen. We know, too, that this starch goes into solution, and that starch is deposited in the grain of cereals, the tubers of potatoes, and many other places where we have no reason to suppose that it has been produced from carbon dioxide and water, but rather from some soluble product of the starch formed in the leaves.

Water and carbon dioxide do not spontaneously form starch even within the cells of the plant leaves. It is only under the influence of the radiations from the sun that this synthesis takes place. The sun is the great motive power for earthly processes. The radiant energy which for untold ages he has emitted is to a slight extent intercepted by the earth, and to this can be traced the greater part of all that makes the earth what it is—the winds, the rains, the flowing streams, the growing plants, and hence the animals. The energy that reaches one square inch of leaf surface in full sunlight, if entirely used in constructing starch from water and carbon dioxide, which produces about one ten-thousandth of a grain per second. Small as this amount is, when it is multiplied by the immense leaf surface presented by a cornfield, it accounts for the rapid growth of this plant in favorable weather. The energy of the sun is often referred to as heat or light; strictly speaking it is neither. With the exact nature of radiant energy we need not concern ourselves at

present, but it is complex in its quality, and its effects are various, depending on its own inner differences, and upon the nature of the objects upon which it impinges. Upon the retina of the eye it gives us the sensation of light. Passed through a prism it is partially decomposed, and some of its fractions give use the sensation of the various colors of the rainbow, while others do not affect the optic nerve at all. This radiation as it impinges on matter is partly transformed into heat, and thus raises its temperature. On certain objects it brings about chemical changes, that is, the radiant energy is transformed into chemical energy. It is this that is manifested in photography, and it is this that effects the production of starch in the cells of the leaf. While nearly all parts of this energy coming from the sun can bring about this formation of starch, those rays that appear to the eye as yellow light are the most efficient. The so-called chemical rays are much less effective.

This marvelous sun-force doubtless performs other functions less apparent, but as the source of the heat and chemical energy, without which plant growth would be impossible, it is the pre-eminent factor in agriculture, for plant production is the basis of animal production also.

Wonderful and complex as are the elaborations of nature in plant growth, they are exceeded by those of animal economy. An animal body is a complex mechanism, self-constructive, self-repairing, automatic. It obtains its energy from food and oxygen instead of directly from the sun. This energy is manifested in the manifold activities of the animal organism, such as muscular movements both externally and internally applied, the vital processes of digestion, assimilation, secretion, excretion, etc., and probably in any acts of mentality or consciousness. In digestion the complex constituents of foods are resolved into simpler ones by the action of chemical agents in the digestive fluids, and in assimilation these products of digestion are by still more mysterious chemistry synthesized to the tissues peculiar to the animal. By the vital action of the organism, substances in the tissues and fluids are utilized in providing the energy for the various processes of bodily activity, and are finally changed to water and carbon dioxide in large part, that is, to the very substances with which the plants started to build up their tissues. So the cycle of nature is completed, and through it all, she has been carrying out on the farm, in her animal and vegetable laboratories, physical and chemical transformations that man can imitate but feebly, processes that are of extreme delicacy, and at the same time performed on a gigantic scale.

Such may be said to be the normal state, normal from our point of view, but with the advent of diseases of plants or animals we see introduced by nature additional complications in the processes of her laboratory, complications that the agriculturist must make haste to master and

abate. Man's part in all amelioration of his condition is to bring nature's materials and forces together, or to keep them apart, according to the results he desires, and she does the rest. The farmer's problems involve learning how to bring these forces and materials into the desired relation.—J. T. Willard, in *Farm Life*, Manhattan, Kansas.

IGNORANCE IN HORTICULTURE.

(Alvin Dickson, Benton Co., Ark.)

Gentlemen of the Benton County Horticultural Society:

I have chosen for my subject, "Ignorance in Horticulture," not a very pleasant or popular subject, but one we cannot afford to ignore, as evidence of the fact that it does prevail in our midst to an alarming extent. Look at the small attendance at the meetings of this society, whose sole object is the dissemination of practical and useful knowledge of horticulture. (It is true we have a few smart alex, but you will probably find them in all public gatherings.) When we consider the number of persons who are engaged in growing fruit and the number who have come into this county in the last two years and bought land and are engaging in the fruit business, and a large majority of them have had no practical experience in growing fruit, one would suppose that it would be difficult to obtain a hall large enough to accommodate these monthly meetings of this society, but, alas! at a majority of these meetings you could count them on your fingers. When we consider the revenue our annual crops of fruit are sold for, and that is the principal source from which we expect it in the future, and the rapid ratio in which the fruit business is increasing in the whole Ozark country, one is amazed at the lethargy and indifference manifested by the fruit growers.

When one looks at the interest that the general government is taking and the money it is annually expending in maintaining a department of pomology and horticulture. The hundreds, and I might say the thousands, of useful bulletins they are annually distributing free to all who will apply for them, and when we consider the investigation and tests that our State Experiment Stations are making and the work they are doing for our benefit, which information is distributed through their bulletins free to all those who ask. When many states are aiding their state societies by appropriating funds to publish their annual reports which are collections in book form, of all the valuable papers read and the discussions that follow on various lines of horticulture, such as how to plant, prune, cultivate, spray and market, and a thousand and one different phases of horticulture by fruit

growers of different parts of the country giving their experience with different fruits, different locations, different soils and different conditions, also the reports of the state entomologist upon the different injurious insects and how to combat them, also the reports of the chemists as to the different fertilizers for the different fruits and different soils required and the different spraying compounds, how to mix, what for, and when to apply, all of which may be obtained by becoming a member of some good live society by paying a membership fee of \$1.00 and to think so few fruit growers will avail themselves of these golden opportunities free of cost. It is no wonder that fake fruit tree agents can do a thriving business in our midst. Another evidence of gross ignorance is the number of whole root nursery signs you see in driving through the country. Pardon me for mentioning a dead issue, for that question long years back has been thoroughly discussed by most of the state societies and tested by many of the experiment stations in the different fruit states and I supposed was settled to the satisfaction of all intelligent fruit growers, who read and attend horticultural societies; but I am sorry to find there is a large class of fruit growers who do neither, hence they are easily imposed upon in buying fruit trees and plants, they do not know what it takes to constitute a good tree, vine or plant and usually pay well for their ignorance. I find on observation, in judging there are tens of thousands of second and third class (very inferior) trees being set; cheap trees which will add no new lustre to the Ozark's reputation as a fruit country. The best trees we can obtain are none too good. What is a few cents on the tree compared with the results ten or fifteen years hence? I mention this part of the business because in fruit growing it is of vital importance that you commence right by setting good, healthy, thrifty, well grown trees, vines and plants. Having had twenty-five years' experience in propagating trees, I feel competent to advise planters to plant nothing but the best.

I want to see our fruit growers wake up, join some good live society, attend regularly its meetings, attend the state meetings, take one or more good horticultural papers, send in your name and get our state experiment station reports, send to Washington, D. C., get a list of the bulletins published there, select such as would be of most interest to you as a horticulturist, read them carefully and apply the information they give to your business and grow number one fruit, for the day is fast coming when it will not pay to market any but number one fruit and to do this we must keep abreast with the time and we cannot do this without education—horticultural education.

IN PUBLIC SCHOOLS—WHAT IS HORTICULTURE—WHY STUDY IT, AND WHERE?

(J. C. Blair, Assistant Professor of Horticulture, University of Illinois.)

ROOM FOR THE STUDY.

A few days ago this question was asked me and it set me to thinking: "Now what is there in horticulture to interest the boys and girls of our public schools? They surely have enough to study already." I answered the latter statement with the wise words of an Iowa teacher when he spoke of introducing Nature Study into the schools: "A glass may be brimful of water, and yet we may gradually add a spoonful of sugar and it will not run over. The teacher's daily cup is full; but let her put in Nature Study gradually, gently, and it will sweeten the whole, and her cup will not run over." If this is true, it will not be hard to see how one step farther may be taken and the pupils interested in some of the simple principles of horticulture, which in turn may interest them in the home farm and again in country life in general. As Professor Bailey well says: "The district school cannot teach agriculture any more than it can teach law or engineering or any other profession or trade, but it can interest the child in nature and in rural problems and thereby fasten its sympathies to the country. And the child will teach the parent."

DEFINITION OF HORTICULTURE.

Professor Bailey gives us an excellent definition of this word. He says: "Horticulture may be defined as the art and the science of the cultivation of garden plants; and the garden is understood to be that part of an estate which is devoted to fruits, vegetables and ornamental plants." Since growing of flowers and trees of all sorts comes under the head of horticulture, which is the growing and care of those plants used in beautifying the landscape, it is also made a part of horticulture.

THREE DIVISIONS OF HORTICULTURE.

Now let us see exactly what is implied by saying that horticulture means the growing of fruits, vegetables and flowers. It means grape-growing, which is called viticulture, or vine culture; it means orchard culture, or the growing of apples, pears, quinces, plums, cherries, with oranges and lemons and all the nut-fruits as well. It means the growing of the small fruits as they are called—strawberries, raspberries, currants, gooseberries, etc. Therefore, that branch of horticulture having to do with fruits only is called pomology. The culture of vegetables of every

variety is called olericulture, and is another branch which the horticulturist may pursue. Flower growing, which ought to occupy a part of every child's daily life, is called floriculture, and is the third great division of horticulture.

HORTICULTURE, BOTANY AND NATURE STUDY.

These lessons themselves may be used merely as suggestions for work to be given in connection with botany—or better still, with nature study. It has been said of botany and with some truth—more's the pity—"when one begins seriously to count stamens and cut sections he has started on a road that will take him away from gardening. The plant should be studied first as a thing that has life and needs food and water and culture—by that time the chances are that the student of it can tell you more about its stamens and various other essential parts and functions than can your mere student of botany, and he will do it with twice as much enthusiasm.

AGRICULTURAL AND HORTICULTURAL LESSONS.

If studies having a bearing on agriculture are introduced into the common schools, it does not follow that all the students will have their energies directed to farming any more than the study of physiology makes physicians of us all. But heretofore our common schools have been justly accused of training the young away from rural life, and it is high time that the needs of the sons and daughters of our great farming population be recognized in the common schools throughout the land. It may be asked "why not let them go to an agricultural college?" This is exactly what they should do if they desire a superstructure of agricultural training. But what can these higher schools of learning do with students who come from public schools where all mention of agriculture has been excluded—in fact if not by design—at least from the curriculum.—*Farmers' Tribune.*

FUNDAMENTAL PRINCIPLES OF PLANT BREEDING.

By LUTHER BURBANK.

(Read before the International Plant Breeding Conference, New York, September 30 to October 2, 1903.)

Only the most limited view of plant breeding can be given in an ordinary thesis. It would be necessary to extend the subject through many volumes to give even a general view of what has already been demonstrated, and that which the clear light of science has yet to bring forth

from the depths is too extensive even for the imagination to grasp, except through a full knowledge of what practical field work has already accomplished.

The fundamental principles of plant breeding are simple and may be stated in a few words; the practical application of these principles demands the highest and most refined efforts of which the mind of man is capable, and no line of mental effort promises more for the elevation, advancement, prosperity and happiness of the whole human race.

Every plant, animal and planet occupies its place in the order of nature by the action of two forces, the inherent constitutional life force with all its acquired habits, the sum of which is heredity; and the numerous complicated external forces, or environment. To guide the interaction of these two forces, both of which are only different expressions of the one eternal force, is, and must be, the sole object of the breeder, whether of plants or animals.

When we look about us on the plants inhabiting the earth with ourselves and watch any species day by day we are unable to see any change in some of them. During a lifetime and in some cases perhaps including the full breadth of human history, no remarkable change seems to have occurred. And yet there is not today one plant species which has not undergone great and to a certain extent constant change.

The life forces of the plant in endeavoring to harmonize and adapt the action of its acquired tendencies to its surroundings may, through many generations, slowly adapt itself to the necessities of existence, yet these same accrued forces may also produce sudden, and to one not acquainted with its past history, most surprising and unaccountable changes of character. The very existence of the higher orders of plants which now inhabit the earth has been secured to them only by their power of adaptation to crossings, for through the variations produced by the combination of numerous tendencies, individuals are produced which are better endowed to meet the prevailing conditions of life. Thus to nature's persistence in crossing we owe all that earth now produces in man, animals or plants, and this magnificently stupendous fact may also be safely carried into the domains of chemistry as well, for what is common air and water but nature's earlier efforts in that line, and our nourishing foods but the result of myriad complex chemical affinities of late date.

Natural and artificial crossing and hybridizing are among the principal remote causes of nearly all otherwise perplexing or unaccountable sports and strange modifications, and also of many of the now well established species. Variations without immediate antecedent crossings occur always and everywhere from a combination of past crossings and environments, for potential adaptations often exist through generations without

becoming actual, and when we fully grasp these facts there is nothing mysterious in the sudden appearance of sports; but still further intelligent crossings produce more immediate results and of great value, not to the plant in its struggle with natural forces, but to man by conserving and guiding its life forces to supply him with food, clothing and innumerable other luxuries and necessities. Plant life is so common that one rarely stops to think how utterly dependent we are upon the quiet but magnificently powerful work which they are constantly performing for us.

It was once thought that plants varied within the so-called species but very little, and that true species never varied. We have more lately discovered that no two plants are exactly alike, each one having its own individuality, and that new varieties having endowments of priceless value and even distinct new species can be produced by the plant breeder with the same precision that machinery for locomotion and other useful purposes is produced by the mechanic.

The evolution and all the variations of plants are simply the means which they employ in adjusting themselves to external conditions: Each plant strives to adapt itself to environment with as little demand upon its forces as possible and still keep up in the race. The best endowed species and individuals win the prize, and by variation as well as persistence. The constantly varying external forces to which all life is everywhere subjected demand that the inherent internal force shall always be ready to adapt itself or perish.

The combination and interaction of these innumerable forces embraced in heredity and environment have given us all our bewildering species, none of which ever did or ever will remain constant, for the inherent life force must be pliable or outside forces will sooner or later extinguish it. Thus, adaptability as well as perseverance is one of the prime virtues in plant as in human life.

Plant breeding is the intelligent application of the forces of the human mind in guiding the inherent forces into useful directions by crossing to make perturbations or variations of these forces and by radically changing environments, both of which produce somewhat similar results, thus giving a broader field for selection, which, again, is simply the persistent application of mental force to guide and fix the perturbed forces in the desired channels.

Plant breeding is in its earliest infancy. Its possibilities, and even its fundamental principles, are understood by but few. In the past it has been mostly dabbling with tremendous forces which have been only partially appreciated, and has as yet to approach the precision which we expect in the handling of steam or electricity; and notwithstanding the occasional sneers of the ignorant, these silent forces embodied in plant life

have yet a part to play in the regeneration of the race which, by comparison, will dwarf into insignificance the services which steam and electricity have so far given. Even unconscious or half conscious plant breeding has been one of the greatest forces in the elevation of the race. The chemist, the mechanic have, so to speak, domesticated some of the forces of nature, but the plant breeder is now learning to guide even the creative forces into new and useful channels. This knowledge is a most priceless legacy, making clear the way for some of the greatest benefits which man has ever received from any source by the study of nature.

A general knowledge of the relations and affinities of plants will not be a sufficient equipment for the successful plant breeder. He must be a skillful botanist and biologist, and, having a definite plan, must be able to correctly estimate the action of the two fundamental forces—inherent and external—which he would guide.

The main object of crossing general species or varieties is to combine various individual tendencies, thus producing a state of perturbation or partial antagonism by which these tendencies are, in later generations, dissociated and recombined in new proportions, which give the breeder a wider field for selection. But this opens a much more difficult one—the selection and fixing of the desired new types from the mass of heterogeneous tendencies produced—for by crossing, bad traits, as well as good, are always brought forth. The results now secured by the breeder will be in proportion to the accuracy and intensity of selection and the length of time they are applied. By these means the best of fruits, grains, nuts and flowers are capable of still further improvement in ways which, to the thoughtless, often seem unnecessary, irrelevant or impossible.

When we capture and domesticate the various plants, the life forces are relieved from many of the hardships of an unprotected wild condition, and have more leisure, so to speak, or, in other words, more surplus force to be guided by the hand of man under the new environments into all the useful and beautiful new forms which are constantly appearing under cultivation, crossing and selection. Some plants are very much more pliable than others, as the breeder soon learns. Plants having numerous representatives in various parts of the earth generally possess this adaptability in a much higher degree than the monotypic species, for, having been subjected to great variations of soil, climate and other influences, their continued existence has been secured only by the inherited habits which adaptation demanded; while the monotypic species, not being able to fit themselves for their surroundings without a too radically expensive change, have only continued to exist under certain special con-

ditions. Thus, two important advantages are secured to the breeder who selects from the genera having numerous species—the advantage of naturally acquired pliability and in the numerous species to work upon by combination for still further variations.

The plant breeder, before making combinations, should with great care select the individual plants which seem best adapted to his purpose, as by this course many years of experiment and much needless expense will be avoided. The difference in the individuals which the plant breeder has to work upon are sometimes extremely slight. The ordinary unpracticed person cannot, by any possibility, discover the exceedingly minute variations in form, size, color, fragrance, precocity and a thousand other characters which the practiced breeder perceives by a lightning-like glance. The work is not easy, requiring an exceedingly keen perception of minute differences, great practice and extreme care in treating the organisms operated upon; and even with all the naturally acquired variations added to those secured by crossing and numerous other means, the careful accumulation of slight individual differences through many generations is imperative, after which several generations are often but not always necessary to thoroughly “fix” the desired type for all practical purposes.

The above applies to annuals or those plants generally reproduced by seed. The breeder of plants which can be reproduced by division has great advantage, for any valuable individual variation can be multiplied to any extent desired without the extreme care necessary in fixing by lineal breeding the one which must be reproduced by seed. But even in breeding perennials the first deviations from the original form are often almost unappreciable to the perception, but by accumulating the most minute differences through many generations the deviation from the original form is often astounding. Thus, by careful and intelligent breeding any peculiarity may be made permanent, and valid new species are at times produced by the art of the breeder, and there is no known limit to the improvement of plants by education, breeding and selection.

The plant breeder is an explorer into the infinite. He will have “no time to make money,” and his castle—the brain—must be clear and alert in throwing aside fossil ideas and rapidly replacing them with living, throbbing thought, followed by action. Then, and not until then, shall he create marvels of beauty and value in new expressions of materialized forces, for everything of value must be produced by the intelligent application of the forces of nature which are always waiting our commands.

The vast possibilities of plant breeding can hardly be estimated. It would not be difficult for one man to breed a new rye, wheat, barley, oats or rice which would produce one grain more to each head, or a corn which would produce an extra kernel to each ear, another potato to each plant, or

an apple, plum, orange or nut to each tree. What would be the result? In five staples only in the United States alone the inexhaustible forces of nature would produce annually without effort and without cost:

5,200,000 extra bushels of corn,
15,000,000 extra bushels of wheat,
20,000,000 extra bushels of oats,
1,500,000 extra bushels of barley,
21,000,000 extra bushels of potatoes.

But these vast possibilities are not alone for one year, or for our own time or race, but are beneficent legacies for every man, woman or child who shall ever inhabit the earth. And who can estimate the elevating and refining influences and moral value of flowers with all their graceful forms and bewitching shades and combinations for color and exquisitely varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously, and thus with better and still better fruits, nuts, grains and flowers will the earth be transformed and man's thoughts turned from the base destructive forces into the nobler productive ones, which will lift him to higher planes of action towards that happy day when man shall offer his brother man not bullets and bayonets, but richer grains, better fruits and fairer flowers.

Cultivation and care may help plants to do better work temporarily, but by breeding, plants may be brought into existence which will do better work always, in all places and for all time. Plants are to be produced which will perform their appointed work better, quicker and with the utmost precision.

Science sees better grains, nuts, fruits and vegetables all in new forms, sizes, colors and flavors, with more nutrients and less waste, and with every injurious and poisonous quality eliminated, and with power to resist sun, wind, rain, frost and destructive fungus and insect pests; fruits without stones, seeds or spines; better fibre, coffee, tea, spice, rubber, oil, paper and timber trees, and sugar, starch, color and perfume plants. Every one of these and ten thousand more are within the reach of the most ordinary skill in plant breeding.

Fellow plant breeders, this is our work. On us now rests one of the next great world movements; the guidance of the creative forces is in our hands.—American Gardening.

GROWING BLACK WALNUT TREES.

Walnut trees are propagated by seeds. The seed of the walnut tree is the nut we eat. To start a grove of walnuts the seeds should be gathered soon after dropping and planted the same fall before drying

out. When done this way they sprout the following spring. It is not necessary to hull them, but, on the contrary, it may be better to leave the hulls on. They should be planted two or three inches deep. Ordinarily they will grow from a foot to a foot and a half high the first year. During the first year it is easy to transplant them, but after the first year they form such strong tap roots that it is difficult to transplant them. They should be planted 4 by 4 feet apart, or alternated with other trees the same distance, making the walnuts 8 by 8 feet. This is to keep the lateral branches from growing too large, and to cause the tree to grow tall, straight and slender. When the trees begin to crowd each other they should be thinned.—Colman's Rural World.

NUT GROWING A BIG INDUSTRY.

That the growing of nuts in the United States has never been properly appreciated is attested by the fact that our domestic nuts for the most part come from wild trees, and that every year we buy millions of dollars worth of nuts from Europe.

The three best table nuts are the almond, the English walnut and the pecan, and they can all be grown in this country, although the almond would probably be restricted to the Pacific slope.

The pecan grows wild in river bottoms of Iowa and has been raised in Michigan, but the south is the section where it is produced best in quality and greatest in quantity. It matures all of four years earlier there also. Trees will bear in six years, although a paying crop will not be taken under ten years, and it will probably be eighteen years before its full bearing capacity is reached. The age of the trees is remarkable, some trees which are splendid nut producers with no sign of coming decay, being known to be at least 100 years old.

Their great length of life and service makes an orchard much easier to be cared for than a fruit orchard. Nor is any cultivation or care necessary after they have begun to bear. The lack of enemy insects is another favorable point.

Pecans will thrive on a variety of soils, but a sandy loam with a clay subsoil is probably best. On clay soil trees bear well and early, but the nuts are small, while on a purely sand soil, trees are longer in coming into bearing, but produce good nuts.

About eighteen trees may be set out to the acre. An acre will return about \$300 a year. A Mississippi nut grower was offered \$1,300 an acre for his orchard, but he positively refused to sell.—Prairie Farmer.

THE NUT GROWERS' CONVENTION.

Good results are expected from the annual convention of the Southern Nut Growers' Association which will assemble in Macon, Ga., next Monday. The pecan industry has already attained to great proportions in the South, and is growing at a remarkable rate.

While some other southern states, notably Texas, are now ahead of Georgia in this business, no state is progressing in it more rapidly than Georgia, and not one has better prospects of great profits from it, says the Atlanta "Journal." It has been demonstrated conclusively that the soil and climate of almost every section of Georgia are admirably adapted to the successful cultivation of pecan.

The tree, if properly cared for, comes to its fruiting stage quite as rapidly here as it does in Texas, Florida or any other state in the Union; yields quite as abundantly and bears nuts as large and as fine in every respect as those that go to market from any region. A few years ago the only pecans we could get were small nuts with thick, tough shells, containing comparatively little meat; and that interlaid with a bitter substance that made the eating of the nut a slow and unsatisfactory process.

The scientific cultivation of the pecan in the South has had wonderful results. The nuts have increased very greatly in size, and have improved quite as much in quality. The larger paper-shell pecan of today is a revolution. The verdict of the great majority of those who have tried this southern product in its latest development is that it is superior to any nut on the market. Selection has done its work in this industry quite as notably as it has in the propagation and culture of any other nut or fruit. They begin to pay when they are no more than five years old, and from that on for many years their value increases steadily. There is no limit to the demand for them, and they never fail to bring fine prices.

Few persons, even among those who think they are well posted as to the agricultural development of Georgia, are aware of the extent and importance of this industry in our state.

Persons who are engaged in it are enthusiastic over its prospects, and many who have observed their success are preparing to go into pecan growing on a more or less extensive scale.

The coming convention of nut growers will open the eyes of those who may attend.

In the call for this important meeting, it is stated that, "Many matters pertaining to the industry will be discussed by able speakers of na-

tional reputation. Much practical business of far-reaching importance will be considered, and systematic plans for progress in this promising branch of agriculture inaugurated.

“Not only members and prospective members, but every one interested in the progress of the South along agricultural lines is cordially invited to attend.”—Fruit Trade Journal.

USE OF FUNGICIDES—SPRAYS EFFECTIVE IN PEACH ROT.

(J. H. Hale, Connecticut.)

Spraying our dormant peach trees in Georgia last spring, we used the 5-5-50 formula, that is, five pounds bluestone, five pounds lime and 50 gallons water. We covered the trees thoroughly, so that when dry they were the bluest kind of blue, from the tip of every branch to the base of the tree. The work was more thoroughly done than any I have ever seen. My superintendent, Mr. Baird, was after the boys all the time. By having a perfect mixture and using the finest sort of spray it took a little less than a gallon per tree.

If my memory serves me right, a 250-gallon tank covered about 325 trees. It cost considerable money, but I am sure it paid us well. We had far less rot in our orchard than in any surrounding ones. Of course, it was not all due to the spraying. We shall keep it up again this year over every part of the orchard, where there was any rot last year. I believe that owners of plum and peach orchards in the North, where monilia or rot is prevalent, will find it profitable to spray each year, providing of course they will follow it up by picking and burning all decayed fruit during the ripening season.

PREVENTING APPLE SCAB.

This fungus disease has been discussed several times in bulletins sent out by the Illinois Experiment Station. It is so destructive that bulletin 6, just issued and prepared by George P. Clinton, is devoted entirely to the discussion of the injury caused by scab, preventive measures, methods of infection and a large number of illustrations showing the disease in different stages of development.

In suggesting preventive measures, Mr. Clinton states that injury from scab can be stopped largely by proper attention to spraying. Bordeaux mixture has been found to be the most valuable fungicide. The present tendency is to use it made as follows: Copper sulphate, four pounds; lime, four pounds; water, 50 gallons. The copper sulphate may

be dissolved in hot water, the lime slacked in a suitable quantity of water, the two being mixed together and strained into a barrel containing the remaining amount of water. Much of the success in the use of this fungicide depends upon the proper application and the time of spraying. The trees should be thoroughly sprayed. The first application should be made soon after the leaves begin to unfold, followed by a second soon after the petals begin to fall and by a third in less than two weeks if the season has been favorable for the development of scab. Later sprayings are apt to burn the foliage and russet the fruit and so are not very desirable. Some writers advocate two sprayings before the petals fall, the first with the swelling of the buds and the second after the leaves have expanded, but before the petals are open. Winter spraying with a strong solution of copper sulphate has also been found to retard the first appearance of scab, but it is questionable if it is worth the extra expense and trouble, provided the first treatment with Bordeaux mixture is made promptly and thoroughly. In case the codling moth is injurious, Paris green, at the rate of one pound to 200 gallons of Bordeaux mixture, may be added for the second and third sprayings.

Besides, proper attention should be given to pruning, as properly pruned trees are more easily and cheaply sprayed and also because unpruned trees afford greater protection against quick evaporation of moisture and just so far favor infection by scab. The same holds true of proper cultivation, since orchards neglected in this respect offer greater protection to the fallen leaves, which are the means by which the permanent stage develops and produces infection in the spring. No careful experiment of raking together and burning all of the fallen leaves from an orchard has been carried on and so nothing definite can be said of the advantage of this procedure. However, in a small plat in an orchard from which the leaves had been so removed the first appearance of scab on those trees seemed to have been retarded and reduced. Such work to be of any value should be done very thoroughly in the autumn after all of the leaves have fallen.—Orange Judd Farmer.

A SPRAY.

At the agricultural college they have found rosin much better than kerosene emulsion for spraying to kill soft-bodied plant lice. Eight pounds of rosin and four pounds of sal soda are mixed with a little water and boiled until thoroughly mixed. It takes a good deal of boiling and the ingredients should be stirred frequently. Add enough water to make five gallons of stock solution. For spraying, use seven to nine times as much water as stock solution.—Western Fruit Grower.

THE BIRDS, GOD'S INSECTICIDE.

Prof. Lawrence Bruner, State entomologist, talked interestingly about birds. Nebraska has an Ornithologists' Union, which publishes an annual report without state aid. The object of the society is not so much to find out what birds are as to what they do; how they live and what they eat.

Attention was called to the fact the birds are God's insecticide. In a new country the balance between animal and vegetable life is preserved by nature. When man comes with his artificial methods this equilibrium is destroyed; insects multiply as birds and other animals become less numerous.

As an illustration of the number of insects destroyed by birds, the following figures were given: One bird will eat at least 25 insects a day, and counting three birds for every two acres in Nebraska and 120,000 insects per bushel, it would take nearly a million insects in Nebraska in two months.

The robin eats about nine quarts of cherries and wild fruit in a year, but he also consumes nine quarts of cutworms and seventeen quarts of caterpillars. On the other hand, crows, rooks, magpies, sparrows and bluejays probably do more harm than good.—Western Fruit Grower.

THE PLANTING OF A TREE.

Wouldst thou upbuild a home where sweet wild lives are nested,
 Glad with the sound of song, quick with the flash of wings,—
 Where the soft broods may rock, warm-housed and unmolested,
 Deep in the leafy nooks, through all the changeful springs?

Or wouldst thou rear an arch of noblest grace and splendor,
 Lifted in air and light, shaped by the sun and storm,
 Moved by the wandering wind, swayed by each influence tender,
 Yet by the hand of life molded to steadfast form?

Wouldst thou make day more fair, and night more rich and holy,
 Winter more keenly bright, and summer's self more dear,—
 Grant the sweet earth a gift, deep rooted, ripening slowly,
 Add to the sum of joys that bless the rounded year?

Go, then, and plant a tree, lovely in sun and shadow,
 Gracious in every kind—maple and oak and pine.
 Peace of the forest glade, wealth of the fruitful meadow,
 Blessings of dew and shade, hereafter shall be thine!

For though thou never see the joy thy hand hath granted,
 Those who shall follow thee thy generous boon may share.
 Thou shalt be Nature's child, who her best fruit hath planted,
 And each of many a spring shall find thy gift more fair.—St. Nicholas.

Jack, when ye hae naithing else to do,
Ye may aye be sticking in a tree ;
It will be growing, Jack, when ye are sleeping.—Scott.

THE TIMBER SUPPLY.

Dr. B. E. Fernow, director New York State College of Forestry, in an address before the American Association for Advancement of Science, Washington, D. C., said: As Cotta pointed out a hundred years ago, forestry is a child of necessity. It is only when the wood supplies grown by unaided nature are exhausted or near exhaustion, and when it becomes apparent that reproduction is not replacing the harvested virgin crop as rapidly as required, that forestry—systematic utilization and reproduction of wood supplies—becomes necessary.

While much has been said and written regarding the influence of forest cover on climate and waterflow as calling for the application of forestry, it should be understood that these considerations apply mainly to specified localities, that some of the claimed beneficial influences are often questionable or at least unproven, and that, moreover, the forest effects may be secured incidentally. The supply question remains uppermost and is the most important.

It behooves, then, every forester, to find justification for his art and for his own existence in the answer to the inquiry which will bring out the fact that natural supplies are waning and are not being replaced as fast as consumed. Such inquiry involves knowledge, on one hand, of the consumption of wood products in the given country, the possibility and probability of substituting other materials, and the opportunity of supplying it wholly or in part by importations, and on the other hand, knowledge of the amount of standing timber ready for use, the condition of the forest areas, as far as promise of reproduction is concerned, and the rapidity with which such new growth may become available.

Ten years ago the chief geographer of the United States Geological Survey came out in print refuting the writer's contention that a more conservative and rational forest policy in the United States was needed; because, he asserted, the relations of forest growth to climate, soil and water conditions are presumably of not practical significance, and because, in his opinion, the timber growth is certainly renewing itself much faster than it is being consumed.

This year, by a peculiar irony of fate, the chief geographer, now also in charge of the survey of the Federal forest reserves, furnishes, as compiler of the statistics of the lumber industry in the twelfth census, the most satisfactory data upon which to discuss the supply question and to

prove wrong his position of ten years ago. The gathering and the interpretation of statistics of forest industries are beset with more difficulties than are encountered in most other industries, largely because of their very diversified character and the very scattered and inaccessible locations of their sources. All census statistics have the tendency to remain below the truth—"some little pigs will not let themselves be counted"—and the statistics of forest products are probably more subject to this defect than others.

The final object of census statistics is, of course, to furnish basis not only for comparison between the various industries, bring out their relative importance, but also to record the progress of development from decade to decade. Unfortunately for this last object especially, the absence of a uniform method of enumeration from census to census, added to the variable success of enumerators in securing information, render the data of uneven value. A direct comparison would lead to erroneous conclusions.

With this warning as to the mathematical use and interpretation of available forest statistics, we propose to present the data of the last census, and draw our conclusions as to the probable status of the timber-supply question in United States.

The census of 1900, however, for the first time, seems to have secured tolerably full, although still incomplete, statistics of the United States, which show that the estimate of the writer made a few years ago of 40,000,000,000 feet, b.m., annual consumption, including all material requiring log and bolt size, is as near the truth as it can be possibly stated. The saw mill product is placed by the census as 35,000,000,000 feet, precisely the amount which the writer deducted from the saw mill capacity in 1898, and allowance of 5,000,000,000 feet for amounts not enumerated, such as staves, headings, railroad ties, round and hewn timber used locally, telegraph poles, etc., is, indeed, hardly sufficient. Since, however, in the census statistics there are undoubtedly duplications, we may perhaps still adhere, for all purposes of economic discussion, to our round figure of 40,000,000,000 as representing fairly the present annual consumption. The summary of the 1900 census of the saw mills, planing mills and timber camps stands as follows, saw mill product, output of planing mills, custom work, etc., and product of timber camps being mixed together—the number of establishments (reporting or existing) 33,035:

Capital invested	\$611,611,524
Salaried officials, 12,530	11,260,608
Wage earners, 283,260	104,640,591
Miscellaneous expenses	17,731,591
Cost of materials used.....	317,923,548
Value of products—total.....	566,832,984

Saw mill	\$422,812,061	
Planing mill	107,622,519	
Timber camps	36,398,404	
Quantity of sawed lumber, 1,000 feet, b.m.....		35,084,166
Value of same		\$390,489,873

AMERICAN FORESTRY: A NEW CAREER.

The young forester has prospects of a salary that equals, or slightly exceeds, that of the college professor, and the location of his home will usually make his necessary living expenses less than those of the teacher. Within a decade he may be in the employ of a railroad company and have charge of many pieces of woodland which he will be able to reach easily by rail. He may secure a position as a State Forester or as a member of a State corps. This is a promising field. Several of our forested States are coming into the possession of abandoned stump lands, and the care of them requires a forester who can supervise the work, look after the public interests and disseminate information among the people. The State of New York is even buying up hundreds of square miles of woodland to add to its forest reserve. The United States Government has a constantly increasing need for men. The public holdings are tremendous. For each of the last three years the forestry appropriation has been doubled and the work that is being done for the private citizens is growing as rapidly as are the appropriations. These government foresters are in attendance in the department at Washington during the winter, but with the coming of spring they are scattered throughout the United States. They go to the woods of New England, of the South and of the West, and return in the fall to make out their reports in the office. Eventually a large part of our government force will be stationed in various parts of the West nearer to the center of the greatest activity in public forestry.

Another class of positions will be with the lumber and paper companies. From all sections of the country these companies are inquiring into the methods of conservative forestry, and, as has been shown, some are already employing foresters, while others will probably follow their example. The men so employed will spend a large part of the time in the forests under their care; but in the winter season some of them, busy with their office work, will be located for a few months in the town or city headquarters of their corporation. This will enable their children to have the advantage of better schooling than that afforded by a paper factory town or a sawmill town.

Wherever he may be, the average American forester during the next thirty years will have a very different task from that of his European counterpart. In Europe everything is carefully worked out and reduced to system. The forests are cropped as regularly and as methodically as a farm. One forest crop is followed by another in regular rotation, and every phase of the question is definitely known and recorded in a forester's manual. In America the field still lies open for original work.—J. Russell Smith, in the *Forum*.

ROADSIDE TREES.

A highway without trees is not only bare and ugly, but under the blistering sun of mid-summer a menace often to the life of man and beast. The past two summers have been so cool and moist that Mr. Squiers has perhaps forgotten how dangerous an unrelieved exposure to the sunlight sometimes is: how grateful the shade of a broad-spreading tree, falling like the shadow of a great rock in a weary land. Undoubtedly it is possible to have too many trees along a road. We know one near Albany that is completely over-arched, and it is not a good road to drive on early in spring or for some days after a rain. But everything can be overdone. The man who never plants a tree and the man who never cuts one down are both extremists whose example is profitably avoided.—Country Gentleman.

Give me the splendid silent sun with all his beams full-dazzling,
 Give me juicy autumnal fruit, ripe and red from the orchard,
 Give me a field where the unmowed grass grows,
 Give me an arbor, give me the trellised grape.
 Give me odorous at sunrise a garden of beautiful flowers where I can walk undisturbed.
 Give me away aside from the noise of the world a rural domestic life.

—Walt. Whitman.

THE FARM BEAUTIFUL.

How to cultivate the beautiful and make money at it is the old problem in new form. Can our land cultivation include an equal care of the beautiful and the useful? We have in mind a country place, which at first view is artistically designed for the cultivation of all trees and shrubs of a purely ornamental sort. Yet, the owner replies, "The fact

is, there is money in it in every direction." A grove of chestnuts is one of the handsomest sights that a lawn can present. But it is also profitable. Even a row of butternuts by the fence at the rear of the property pays better than the garden in the middle. When such trees fail to yield a harvest of nuts the timber will be valuable. Every plot of ten acres should not only feed the occupants, but furnish wood for fuel. The annual trimmings and decay will supply this if properly collected. These handsome lawns mean that they are constantly under the owners' eye: so carefully that decay is promptly removed, and vacancies promptly filled with new trees.

Now, if you follow the drives of this country homestead you will find that they lead through vineyards and berry gardens. These are so planted as to harmonize with the general plot and purpose. There is no reason why any object in nature should lack esthetic value. A corn field is one of the most beautiful sights in the country. Note the grace of these rows of raspberries, ten rods long. Trellises of grapes constitute every tenth row. The secret is to have an esthetic soul at work—then everything is compelled to be beautiful. An educated mind is not only educated by nature, but educates nature. Blackberries and apple trees are as plastic as roses to a fine will. But you must see these long lines of bushes in blossom, and then in fruit. In blossom they invite the bees; in fruit the birds. No bird is allowed to be molested. They are held to be a part of the family. Their nests are hid all about us in the bushes, and they swing from the trees. "This," says the owner, "is not a matter of sentiment, but of economy and profit. I cannot get on without both bees and birds. The bees pollenize the fruit blossoms; the birds destroy injurious insects.

Here we come upon a group of buildings that are highly ornamental; yet they cover all the purposes of the ordinary barns—yet more. The owner declares that he would not undertake to run his place unless the esthetic could be associated with barns as well as houses. In fact, nothing is easier. Cattle enjoy the beautiful. Give them clean yards and they appreciate it—even growing cleanly in their habits. A cow will always lie down facing a landscape, and at night facing a moon—providing her quarters give her an opportunity. Nothing is more detestable than the ordinary barn and its appurtenances—wretched buildings, a filthy yard, brush, old lumber and stone heaps surround them.

We are shown that order and system work revolution. But nothing can be done by work alone; there must also be study and amusement. So we have a fine laboratory at one end of the barn buildings, fitted up inexpensively, but thoroughly, for investigation in entomology, botany, geology, chemistry. Here soils are studied, and manures. The collection of insects made by the family would honor a university; and it

is not an idle collection, made simply to be looked at. The whole study is applied to furthering farm work and bettering the crops. As a result ten acres, with over half of the surface applied to ornamental trees and shrubbery, bring in a better income than an ordinary farm of one hundred acres. Under the laboratory is a thoroughly furnished workshop, where farm repairs may be attended to and inventive skill developed and encouraged. This is the new agriculture; study applied to farming. "Thought and thoroughness work all our modern miracles." It is easy to see that in such an arrangement of buildings, shops and laboratories, money is saved and money made, while character is built.

"Experiment is the life of right farming, as it is the life of all right labor." It is the keenest delight that we know to find out new things. It is possible every year for a thinking agriculturist to create a new plant or vegetable or fruit; and in this creation it is also probable that he will add something valuable to the world's store. It is this creative agriculture which brings a man into relation with the Supreme Creator. Boys once engaged in such enterprises will never be content to give it up. Or if a special aptitude calls them into some other occupation, they will carry with them the taste and the sentiment which is here created; and, sooner or later, you will find them combining their mechanics or commerce with ideal farming. Land culture, with all its toils, combines more that is attractive than any other possible business. Work! Hard work? Yes, but where has nature provided a cushion except for fools? Work is the chief charm of life—if rightly apprehended.

This, then, we find by such a farm as we have described—and we have seen it—that the beautiful may be cultivated in conjunction with the useful, without pecuniary loss; or, as the owner expressed it, "Anyone may cultivate the beautiful and make money at it." His sales are almost strictly confined to fruits; but he contends that it is quite as easy to combine the beautiful with vegetable gardening and with dairy farming.

The bee keeper and the poultry raiser are especially inviting to the esthetic. Our country places should blossom as the rose; our farms should be infinitely more beautiful than anything the towns or cities can offer, with their parks and architecture. The first need is sympathy with nature. "Nature gave me nearly every finest thing that I have. I have simply let nature have elbow room, and have never cut down a tree without thoroughly studying it for a whole year." This co-operation with nature, backed up by a gentle soul, makes the problem easy.—E. P. Powell, in *Home and Flowers*.

"Fruit well sprayed is fruit half sold."

CITY TREE LIFE.

To the Journal:

While trying to beautify our streets and lawns, it would be well if we first understand what beauty of tree life means. Trees, to be beautiful and remain beautiful, must, of course, need (not only need but absolutely demand) roots, body, branches, twigs and leaves, and no tree can be beautiful nor can it be itself, show its own individuality, if the tree-pruner cuts off any of these vital parts.

We have to contend for the life of our trees with three sets of vandal tree butchers. The first is the sidewalk builder, who cuts off the roots of a tree, so that many trees give up life in the course of a few years, or eke out only a precarious existence, or if they do recover, start a new growth and try their best to repair the damage done, and finally do succeed in making a good tree once more, then along comes the second of these beauty destroyers, the tree-pruner, and he at once cuts off the tops of the trees worse than the root-pruner has done, and leaves only a lot of bare branches; while the first may be a necessity, the second is nothing but abuse. The trees doing their best to recover from this terrible butchering will, of course, send out hundreds of young shoots and branches and in the course of years may recover their original beauty and individuality, but in all probability they will always be monstrosities.

Now, we find that the third set of men come along to still further desecrate the beauty of the trees and he or they or it (a prosperous power) takes these trees in hand and prunes off all the small twigs and small branches from the larger, main branches of the trees to a height of at least twelve feet or more. What this means to the tree is still further to destroy the life, vitality and beauty of trees, and I do not hesitate to say that these last are by far the worst desecrators of tree life, beauty and individuality, of any of the so-called tree-pruners who have ever had anything to do with our trees.

I do not understand by what authority or by what plan or scheme any set of men have the right to destroy the beauty of our trees in this outrageous manner. It is certainly bad enough for men to hire such pruners and let them so butcher the trees, because they know not better, but when these men, without authority, come to mutilate, desecrate or destroy your own beautiful trees, even after you have notified them to let them alone and not touch them at all, it is beyond expression.

It is well known that trees cannot grow well if a large part of the leaves are taken off, as is done when all the young twigs and buds are cut off of the main branches of the trees. These small twigs because of

their leaves are really the life of the tree, just as much as our lungs are our breathing machine. The cutting off of these small twigs and the leaf surface is just as injurious to the life of the tree and to its branches as the loss of part of our lungs would be to us, or as cutting off the large branches of a tree is to the tree itself.

The beauty of any tree is to have all its parts, branches, twigs and leaves, and not to have a lot of bare poles for branches, with only a bunch of leaves at the top. Trees need to be thickened up by encouraging twig growth in the center and among the branches of the tree, and by no means do shade trees need to be thinned out under any circumstances, except to take out dead or decaying branches. Hence the cutting of trees is not as injurious as thinning them out.

The beauty of every tree is in its own individuality, which it maintains if it is not interfered with, just as we ourselves have our own individuality, and when you destroy that, by abuse in pruning, you destroy the grandest beauty of our trees, as well as damage the tree life.

L. A. GOODMAN, Kansas City.

A BEAUTIFUL EXPOSITION RELIC.

(By Prof. H. E. Van Deman, ex-U. S. Pomologist.)

Editor Rural World: During my recent trip in the South it was my good fortune to have opportunity to visit Audubon Park, which is within the limits of the city of New Orleans, La., and where the Cotton Centennial Exposition was held during the winter of 1884-5. It will be remembered by many of the many fruit growers, especially those of the West who were there and witnessed the fruit show that was held there, what a beautiful building we had to show our exhibits in and its delightful location among the live oaks. Now an experiment station is on the grounds between the horticultural building site and the river, but there has been no destruction or desecration of it or its surroundings. It is in a good state of preservation, after nearly twenty years of time, and we know that time usually works many changes. One reason of this is that it was substantially built, and with a view to leaving it stand as one of the permanent features of the park. The same green, grassy lawn stretches abroad, the moss hangs gracefully from the live oaks, swinging lightly in the breeze, while the balmy air is as warm and comfortable as ever to one from the stormy North. Inside, instead of rows of tables covered with fruit are palm trees, vanilla "bean" plants and other climbers, giant ferns, delicate flowering plants from the tropics and hundreds of other rare

specimens. All these are arranged very artistically and kept in excellent condition.

It was here that our good old friend and lover of horticulture, Parker Earle, presided over the Department of Horticulture in the most able and affable manner, during the entire winter, while the exhibits were being made and judged. The corner where we had our offices is now a bower of plants. The place where the memorable contest between the citrus fruits of Florida and California was held is all quiet now, not even a smell of the oranges, lemons, limes, pomelos and kumquats remaining. In another familiar place where the apples of Arkansas, Colorado, Minnesota and Kansas were shown to such good effect and so surprisingly to nearly all the horticultural world, a quiet display of rare plants and tropical trees is now seen.

It was here that our good friend, Dr. B. T. Galloway, now chief of the Bureau of Plant Industry at Washington, got his modest start in the public service, potting plants and picking the decayed fruit from the tables. How well I remember the spot where my dear old friend, Peffer of Wisconsin, made a remark to me that led me to think of the origin and organization of the Division of Pomology in the U. S. Department of Agriculture; and it was from this exposition that I went home to Kansas by way of St. Louis, where I met Commissioner Norman J. Colman, recently placed in office at Washington, and there, in the office of the Rural World, spoke to him of the establishment of that division of the government work, which he afterwards carried into effect.

Here many of us fruit lovers met one another for the first time, or renewed acquaintance and deepened our respect and love for each other.

We entered into friendly competition with our fruits. We discussed varieties, and tested them. In a larger building on the grounds we held a delightful and instructive meeting of the American Horticultural Society.

But there is a minor strain echoes through the memory. Where are all those who met in this beautiful building that is now the only relic of the exposition? Some are with us yet, busy in life's horticultural work. Parker Earle is at Roswell, New Mexico, planting orchards; W. H. Ragan is at Washington, D. C., working on the government fruit list; J. C. Evans and L. A. Goodman are at Kansas City, Mo. But many left us, among whom are Geo. P. Peffer, J. M. Smith and J. C. Plum of Wisconsin; N. Ohmer and Geo. W. Campbell of Ohio; Samuel Barnard of Nebraska; Dr. Shaw of Colorado; J. Guy Lewis of Arkansas; Prof. Geo. Husmann and W. H. Jessup of California; P. M. Augur of Connecticut; Dr. H. E. McKay and W. H. Cassell of Mississippi; O. P. Rooks of Florida; T. T. Lyon of Michigan; A. J. Caywood of New York;

Wm. Perry and E. Williams of New Jersey, and Charles Gibb and D. W. Beadle of Canada. These are among the noble and useful men who have made the world better and happier, by their labors in horticulture. They and others that might be mentioned were active participants in the scenes that were transacted in and about Horticultural Hall at New Orleans. There may be many readers who will be interested in reading of this building and its surroundings, and any who have the opportunity should visit it and see for themselves this place of rare beauty and where some of the historic events in American horticulture occurred.

THE VALUE OF THE APPLE IN THE HOME.

(Read before a meeting of the Central Illinois Horticultural Society, by Mrs. H. M. Dunlap of Savoy, Ill.)

When your worthy secretary assigned me this topic, the apple was so much in evidence at our orchard farm, which we call "Rural Home," that he thought I could entertain you at length upon its value to every American at least. He found me in the orchard surrounded by the big red Ben Davis, and I know its beauty and its attested usefulness from a dietetic standpoint immediately suggested this topic to him.

Truly, for ourselves and our foreign neighbors, the apple is beginning to be recognized from a dietetic view as one of the most valuable of fruits. One dietetic authority going so far as to assert that the two items, wheat and apples, are capable of supplying all the elements of nutrition. Now, by wheat he did not mean food made from our patent process flour, but he meant food prepared containing all the elements contained in the wheat grain that was given it by nature. Notwithstanding the conclusions arrived at by some of our chemists—that the patent process flour is as nutritious and hunger satisfying as that made from the whole wheat grain, there are some who still testify to the fact that nature in the whole grain has certainly provided better for man than that accomplished by the patent process, when some of the grain's elements have been eliminated.

A food expert once said to me: "I wish that plenty of apples could be supplied to every school boy and girl, for I am assured that better health and consequently better morals would be the result." She thought it would be an excellent plan to place barrels of them where they could have them for their noon-day lunch. I know every apple grower here would second that movement if made by our school board.

Some of our horticultural pessimists are declaring that we are having

too many orchards planted, that a demand can never be created equal to the supply. I do not believe any of the horticulturists here are wasting energy worrying over such results. I presume in the neighborhood of every horticulturist you can count the farm orchards on the fingers of one hand and then not use them all. The man that grows grain or stock does not think it worth his while to bother with an apple tree. You must attend to that delightful soul uplifting business for him. I only hope he will get such a price for his products that he will feel that he can afford to provide his family with the apples that you raise, for I believe there is more health to be derived from the free use of apples than there is from the free use of beef, sheep and hogs that he raises. In fact, many of our physicians and dietetists are saying less meat for the American people and more of the fruit and vegetables if we wish to maintain our prestige at home and abroad. You must educate the farmers in your midst to sell some of the meat fed upon their tables and spend that money for fruit and vegetables (as they seldom raise either), and when doing so you may feel assured you will be doing them a great kindness and at the same time providing a market for some of your fruit. With the large increase of population in town and city, if we do our part, the demand for apples will keep pace with the increase of population. There should be no more fear about an over-supply of apples than there is about an over-supply of corn, because we are going to educate people by our domestic science schools, our farmers' institutes, horticultural societies, etc., to use them as a part of their daily diet in a much greater amount than ever before. The minds of many are being turned in the direction of eating to live: eating that the physical and mental powers of a human being may be at their best fifty to seventy-five instead of being on the wane. To do this, rest well assured the American grown apple will be called upon to do its full share towards bringing such a state of affairs to exist.

I sometimes think that the human family has been about as slow to appreciate the value of an apple as they have been in grasping many of the spiritual and physical truths that were taught by a few in the ages past. Solomon said: "Stay me with raisins and comfort me with apples." Some of us have improved our opportunities and wish to be comforted three or four times daily of the three hundred and sixty-five days of the year. It should be the duty of every one who thinks thus to convert some neighbor to the same thought that the good work may continue.

The history of the apple I need not give, for of course every horticulturist is familiar with that from the time of Eve to the present. I will say this, that Siberia receives the credit for growing the smallest apples, while our country that of growing the largest, and here they have reached the highest perfection in every respect.

The analysis of the apple shows that it contains :

Water	83.0
Albuminoids	0.4
Sugar	6.8
Malic acid	1.0
Pectare, Pectin and Gum.....	5.2
Cellulose	3.2
Mineral matter	0.4

In the use of the apple one must study their own idiosyncrasies and if raw apples do not agree with one, use them baked or stewed. Use them in some form, and mercurial and other purgatives may be dispensed with. Many dollars are spent annually for drugs that could be put to much better use by buying fruit and using it freely. Certainly the fruit habit would give greater pleasure to the participant than the drug habit.

I am glad to see that fruit stands are springing up on our candy stores. Let us educate people to its use by placing it before them in as attractive packages as the candy man does his wares, and provide fruit palaces, where it can be obtained at all hours of the day at a reasonable price. It certainly will help to correct the evil effects of the near-by saloon, one writer stating that an apple eaten before breakfast and one each at 11 a. m., 3 p. m. and 6 p. m., is very effective in removing the desire for intoxicants.

It is said the apple excites the action of the liver and influences the secretions of the kidneys, preventing calculus growth, while they relieve indigestion and are one of the best preventives known for diseases of the throat.

As for brain food, the apple has been considered of great value, containing more phosphoric acid than any other fruit. No doubt the apple is the cause of so much brain power found in every horticultural society.

It can be ranked with the cabbage, carrot, beet and onion to be recommended to the fair sex, that they may secure a clear complexion or to retain one already possessed.

Every farmer should have an orchard with varieties of apples that will last from early summer until late in the spring, but he does not, and you must provide him against this great lack of valuable food. The resident of town or city is more apt to make greater use of the apple than the country resident, for they are before him at store or market, and with their tempting color and odor persuade him to indulge.

The culls or inferior stock can be made into apple butter or evaporated. When you can place a good grade of apple butter upon the market you are certainly aiding the busy housewife by lessening her tasks and also give a good food to her family. With two steam cookers, a colander run by steam and the industrious help of about six women

and one man, one hundred and forty gallons of apple butter can be made daily. When it is placed in neat stone jars it makes a product worthy of display and use in any market.

The apple, like every article of food when cooked, to gain proper results must be handled with care and some degree of science. Take the Ben Davis that some are trying to rule out of existence, and it can be made very delicious and palatable.

There are many ways of preparing apples for use, and one domestic science writer in a recent article gave thirty-five ways of preparation. It would seem from this that we need not grow tired of the apple when such a variety of ways of preparation is made possible.

I shall give a few ways only that we have found of special value in our home. Apples in some form are usually found upon our table three times a day. I can truly say a great demand has been created in one household.

Baked Apples.—To bake an apple, remove the core and place in granite pan; fill space of removed core with sugar; add a little water and bake in a quick oven. Either baste frequently or cover with a pan. Good receipt for Ben Davis apple.

Baked Apple Sauce.—Pare, core and slice Ben Davis apples; place a layer in a baking dish with a sprinkle of sugar; then another layer of apples and so continue until the dish is filled. Cover and bake thirty minutes.

Stewed Apples.—Core apples without paring; stand in granite or aluminum pan or kettle; add sufficient water to cover the bottom; cover and cook slowly until they are soft; lift up with skimmer and place in dish; add sufficient sugar to the water to sweeten; cook and pour syrup over apples; serve either hot or cold.

Sliced Apples for Breakfast.—Pare and slice several apples; put them into a baking dish; cover with cream; bake for twenty minutes. Another way is to cover them with well cooked oatmeal and bake fifteen minutes. Serve with milk. (Mrs. S. T. Rorer.)

Apples and Rice.—A simple dessert may be made from apples and rice. Pare and core the apples; stand them in a baking dish; fill the spaces from which the cores were taken with chopped raisins and citron; fill the spaces in the dish to the very top with rice that has been boiled for fifteen minutes. Stand the dish in the oven, covering it for fifteen minutes; taking in all thirty minutes; serve warm with milk or cream. (Mrs. S. T. Rorer.)

Apple Omelet.—Add to one pint of hot drained apple sauce sufficient sugar to sweeten, and three tablespoonfuls of butter; then set aside until cold. Add to it five well beaten eggs and turn into a baking dish which has been well greased with soft butter; then dredge with fine bread crumbs

Over the top sprinkle a thick layer of bread crumbs and bake in a hot oven for about a half an hour. (The Cooking Club.)

Apple Pudding.—Pare, core and quarter a pint of tart apples, mix two cups of bread crumbs. Beat together one egg, one pint of sweet milk and two tablespoonfuls of sugar; add a grating of nutmeg, a saltspoonful of salt and pour the custard over the mixture. Bake slowly one hour. Serve with sweetened cream.

I am sure if you eat these various preparations of the apple and give them to your guests you will find an increase in the consumption of apples at once.

When away from home, at a restaurant or hotel, assist in creating a demand for the apple by asking for a baked apple or apple sauce. A good advertising medium it will be, and like the shredded wheat biscuit, it will not be long until every lunch counter and restaurant will have them ready on demand.

PRACTICAL EXPERIENCE WITH LIME, SALT AND SULPHUR WASH.

The article in the January number, by Prof. Keffer, concerning the treatment of trees infested with San Jose scale with the lime, salt and sulphur mixture, attracted much attention. We present this month the experience of a practical orchardist, in a commercial orchard. This report is from the stenographer's notes of the remarks by Mr. A. N. Brown of Wyoming, Del., before the late meeting of the Maryland Horticultural Society. Mr. Brown said that he had the second worst infected orchard on the peninsula; the worst one was just across the road from his trees. Mr. Brown had experimented in the use of oils somewhat, but was afraid of them. The neighbor used crude petroleum and killed the entire tops of trees, while trees sprayed with lime, salt and sulphur were unhurt. Mr. Brown had had some difficulty with the mixture as made according to the published formula, because there was more or less sediment left in the barrel. Accordingly he experimented a little, and now makes the mixture as follows:

"First, I take 20 pounds sulphur (flour of sulphur) and 2 gallons of boiling water and make a sulphur paste by adding a little of the water at a time to the sulphur, stirring it well during the process, by the time you have the water all stirred into the mixture, the sulphur is not all dissolved because this cannot be done, but I have broken up the globules of sulphur into most minute parts, so that it can be taken up and perfectly distributed in the lime. This fact is indicated by the bursting of these globules of sulphur showing that I am making them smaller.

"Second, I take a common sugar barrel, put two wire hoops around it, put into it 40 pounds of the best stone lime obtainable, pour on it 12 gallons of boiling water, immediately add the sulphur previously prepared, cover the barrel with a burlap sack and let boil for 20 minutes. It is essential that you work rapidly as any interruption of the slacking process may destroy the effectiveness of the wash. I do not stir during the boiling process, only with an ordinary garden hoe, occasionally raise the lime from the bottom so that it will not settle and burn before it is thoroughly slacked. After boiling ceases I add 46 gallons of water (warm preferred) and finally the 15 pounds of coarse salt, stir well, strain into the spray tank through a strainer having thirty meshes to the inch, and apply while fresh and warm. This wash is more effectual if applied when made than if left stand. This wash is adhesive. I have no trouble in that direction, as the wash applied last February is now plainly visible. It is stated the salt adds no value to the wash, but I shall be very loath to leave it out. I may add some bluestone hereafter, about one pound to every 20 gallons, as I believe it will add to the adhesiveness of the wash and will strengthen its value as a fungicide. I do not believe that caustic soda added is any improvement, at least experiments along this line have not shown any beneficial results. As I have already stated, I have killed the scale and other insects harboring upon the surface of the trees as well as the various forms of fungi."

A member: "Do you use hot water only?"

Mr. Brown: "I use 2 gallons boiling water to make my sulphur paste, 12 gallons to slack my lime, then fill to the required sixty gallons by adding 46 gallons of cold water, although if slightly warmed it would be preferable. My experience is that best results follow when this wash is made just when you wish to use it and used as soon as made. While at Geneva, N. Y., last week, Prof. Parrott, of the Geneva Station, stated that the addition of caustic soda to the lime, salt and sulphur wash was no direct benefit, but that the soda of itself 10 pounds to 40 gallons of water would kill the scale."

A member: "Do you have to strain it or do you make it right in the barrel?"

Mr. Brown: "I make it in barrels and strain into the spray tank from the barrel."

A member: "You want an agitator to work all the time, do you not?"

Mr. Brown: "I use a 'Friend' pump which is not supplied with an agitator, the boy driving the team in the orchard does all the stirring required. This pump costs more than others, but has more power and is more easily operated. A boy does the pumping, with two discharge hoses and 4 or 6 nozzles. In my method of mixing the material does not sep-

arate as readily as when made by the California method. In conversing with J. H. Hale some time since he told me that he had sprayed 60,000 peach trees in his Georgia orchards with oil with success; he ran six pumps, but kept an expert with the pumps and tested each one of them every fifteen minutes to maintain the solution of proper proportions. His neighbors not exercising these precautions, lost their trees by the thousands. In Mr. Hale's Connecticut orchards he used the lime, salt and sulphur wash and the oil, and was so pleased with the results of the lime, salt and sulphur wash that in the future he will use nothing else. He purchased three carloads of sulphur last week for his spraying purposes this spring.

"I have a neighbor who last spring had the finest six-year-old peach orchard I ever looked at, there was some scale in it. He procured a pump, applied oil 20 per cent. and he has badly injured the orchard. He tells me that there are places in that orchard where he has lost two dozen trees in a single block. The danger of using the oil has left a sad impress with him. No one doubts Mr. Hale's success as a fruit grower. He says the greatest blessing he has ever received as a horticulturist was the San Jose scale, because it taught him the use of the lime, salt and sulphur wash, which was a great fungicide as well as a perfect insecticide. My Elberta peaches the past season from the sprayed trees were one week later in ripening than any in the Wyoming peach section, because of the vigorous growth and heavy foliage caused by the beneficial effect of this wash."

A member: "What is the cost of your spraying outfit?"

Mr. Brown: "My outfit cost about \$38, myself and four sons do the mixing of the wash and apply it. We have but one aim, and that is thoroughness. We cover about 1,000 seven-year-old peach trees daily. There was an exhibit of almost every style of spraying outfit manufactured in the United States at the late Fruit Growers' meeting at Geneva, N. Y., and as we are looking for power sprayers, I examined them with considerable care. I find four methods by which to apply power to our sprayers. The gasoline or steam engine, of which the 'Fairbanks' seems the most complete. The traction method of producing air pressure, 'The Compressed Air Sprayers,' and the 'Niagara Gas Sprayer,' the two latter doing away with the use of pumps; in the Niagara Gas Sprayer the carbonate of soda is the source of power. This is the cheapest and from experiments has proven eminently successful. It is worthy of trial before investing in the more costly devices."

A member: "How many trees will that one barrel of 60 gallons cover?"

Mr. Brown: "That depends entirely upon the size of the tree. We used in one orchard of 5-year-old peach trees of large growth, 1 $\frac{3}{4}$ gallons

per tree. Our material cost us less than two cents per gallon. The caustic soda if used in connection with the lime, salt and sulphur wash will increase the cost of the mixture about 1 cent per gallon. I notice most of our scientific men in conducting their experiments are using the lime and sulphur in equal quantities. This, I am satisfied, is a great mistake, and doubtless accounts for the varying successes with this material. My experience is that where used in equal quantities the wash is thin, and will not 'set' when applied to the tree as where it is made according to the original formula. I can best illustrate this by calling your attention to the effect produced in the use of a poorly mixed paint in comparison with that which is mixed perfectly. The former will never stay where it is put when applied to the surface where wanted, while the latter always does and makes a lasting and effective covering. By using 40 pounds of lime, 20 pounds of sulphur to 60 gallons of water, I get a composition when properly prepared that stays just where I put it, does just what I want it to do and just what I put it on for. When this wash is properly made and strained you will have no trouble whatever with the nozzle clogging. I use a Seneca nozzle, which I prefer for this work to the Vermorel. The Gould people have a new nozzle which they claim surpasses anything on the market."

A member: "What do you strain this wash through?"

Mr. Brown: "I advise the use of a galvanized iron strainer, running about 30 to the inch in mesh. The lime, salt and sulphur will destroy a copper strainer in a very little while."

A member: "Do you get heat enough in your method of cooking?"

Mr. Brown: "Yes. You cannot begin to generate the intensity of heat by artificial means that you get by the slacking of good lime with boiling water. The difference is about 90 degrees greater with the slacking lime."

A member: "Will lime, sulphur and salt prevent the leaf curl of the plant?"

Mr. Brown: "I have never been troubled with leaf curl, but in New York and Western Maryland peach districts I am informed by persons who have used it, that it will prevent leaf curl. I wish to add one more word and that is, that San Jose scale has no terrors for me, and orchardists need fear it no more than other insects which prey upon our trees. We need only use the lime, sulphur and salt wash once a year, making the mixture perfectly and applying it thoroughly. This is my positive experience."—Western Fruit Grower.

EXAGGERATION—PLANT BREEDING.

As a rule, it is bad policy to exaggerate. Things should be told exactly as they are, and if there should be any variation from this it should be in the way of an under-estimate. There are, however, exceptions to this good rule, as there are to all others. For example, if a certain individual had not gone to extremes on the plant breeding and pedigree, the important subject of improving plants by selection would not have received the attention it has during recent years. There is not only "something" in it, but there is a great deal in it. We should endeavor to set only the best plants grown from selected stock. One can go into almost any orchard of Ben Davis apple or Elberta peach and pick out trees that produce larger and better fruit and have better points generally than other trees of the same variety all around them, which can only be accounted for by bud variation. Such trees should be marked and propagating wood or buds taken from them. There is one Bartlett pear tree growing on my grounds that is about 40 years old, that has never shown any blight, notwithstanding that it stands in a cultivated field. It bears more regularly than other Bartlett trees, and the fruit is larger. Naturally I go to this tree each year for buds. I also have a favorite tree of Seckel that furnishes my propagating stock. A friend of mine at a distance of several miles has a remarkable old tree of Anjou pear from which I took buds last fall, and I hope to be able to get them from there in the future. We have an exceptionally fine row of Elberta peach grown from one tree showing superior points, and from this row my supply of buds is taken each year. I am constantly on the lookout for these superior specimens of the different varieties of plants and trees from which to propagate. Sometimes I hear of a neighbor or friend at a distance having a tree of a particular variety that is unusually good. That tree is borne in mind and visited with the view of perpetuating its good qualities. Such work pays without question, and every reader of our paper should put forth their earnest efforts along the line of improving by selection. It will accomplish wonders in years to come.—E. H. Riehl, Alton, Ill., *Colman's Rural World*.

"THE BREEDING OF APPLE TREES, BY PROPER SELECTION, ETC."

This was the subject of a good paper presented by I. Henthorn of Bentonville. He said much of the orchardist's troubles start with the

stock he uses for planting. Seedlings used for propagation usually grown from seed that came from cider presses, from fruit picked from old worn out and diseased trees cause the seedlings to be weak and diseased in turn. He believes that here was the foundation of root diseases that are so prevalent. To these seedlings were grafted scions cut from nursery row, which in turn have come from weak and diseased trees in many instances. He condemns the scion orchard, owing to the tendency of these scions to produce weaker trees, subject to barrenness and late bearing habits. Grafting is often improperly done, a large root being placed with small scion, or vice versa, the poor union producing a tree with unnecessary opportunities for the introduction of disease.

Seedlings grown from selected seeds from healthy fruit, grafted carefully with scions cut from healthy trees that bear large, well colored fruit, will in time materially improve the varieties now grown. He is satisfied that they can be improved in the life time of a man fifty to one hundred per cent. Trees thus selected are worth five times as much as commonly grown trees, costing no more to plant and grow and will produce several times as much fruit.

Much discussion followed this paper, developing facts that nurserymen generally believed in and practiced plant breeding and selection, but along with it must keep in mind the practical features. As a matter of fact the influence of the tree above will partly change the effect of roots. It is quite possible to develop root diseases by planting with certain surrounding conditions, entirely independent of the health of the seed. The cutting of scions must also be practically dealt with. This year, for instance, bearing apple trees did not afford enough new wood growth to furnish over ten per cent of the necessary scion supply, if depended upon these alone, and few orchardists would consent to the cutting of this very small growth from their trees.—Ruralist Report of Arkansas State Hort. Meeting.

WORKING FOR BETTER FRUIT—SELECTION OF GOOD ROOT STOCK.

At the present time much talk prevails among horticulturists in regard to improvement by selection. It is not improbable that in the near future they will be offering pedigree scions for sale. While selection is all right and important, snap judgments are to be avoided.

A few years ago a neighbor of mine found on a farm on the border of a meadow a tree bearing extra fine Porter apples. The next spring he took scions from that tree and asked me to graft them upon a Porter tree standing on his own grounds. I expressed to him a doubt as to their

being any better when grown on his tree than that tree was growing. But he claimed that it was a different kind of Porter; was dead sure of it, in fact. I grafted his tree, and while doing it I cut scions from the tree and grafted them into a branch in the top of the tree, and when I had finished the job I told him what I had done, and told him that if, when the grafts commenced to bear, he could tell me which grafts came from that tree, I would pay him back the money that he had paid me for doing the work. In due time the grafts fruited, and he was unable to distinguish one from another by any difference in size or quality of fruit. This case of selection did not meet expectation.

Improvement by selection must begin further back. It must commence with the roots, or graft stock. Plant a large quantity of seeds and bud the young trees thus produced that are growing under exactly the same conditions, with the same variety, and select for graft stocks those that show the best results and propagate them from their roots, until scions can be obtained from such propagation to graft on roots of same. When that is done, an improvement is already established. So much depends on the stock and the conditions under which a tree is growing that it is folly to expect that the extra fine quality of the fruit of a tree growing under most favorable conditions can with certainty be perpetuated when worked on haphazard stocks, however favorable other conditions may be. I have five choice seedling apples, and I shall propagate them from their roots as well as from their tops, to make sure whether they will do better on their own roots or on roots of some other variety. To test old varieties where the original trees are gone, with this object in view, I will say that cuttings from these can be rooted if properly prepared, which will accomplish the same object or results.

The importance of starting with a vigorous stock is well illustrated by two apple stocks. One where the scion has very much outgrown the stock, the other when the scion and stock are of about equal vigor. They were growing in a nursery row quite near to each other under the same conditions, and grafted to the same variety of apple. The first scion was evidently not getting the nourishment it needed, and if it had been covered with earth at the union it would have put out roots of its own.—N. B. White, Norfolk County, Mass., in *American Gardening*.

APPLES THAT PAY.

From an article by George T. Powell, an expert orchardist of Ghent, N. Y., we quote as follows: In the planting of fruit upon a commercial scale a number of important factors need to be taken into consideration

by the grower, among which may be named in their order, first, the consumer; second, the character of the variety he plants—as to vigor in growth of vine or tree and its productiveness, or shipping quality.

The commercial grower, however, generally reverses this order of consideration. As he plants upon a large scale and his object is to handle fruit from the standpoint of wholesale operations, his first consideration is that of quantity, and, second, carrying quality.

He gives but little thought to the consumer. His dealings are with the broker, and when he has unloaded upon him the largest quantity of fruit that he is capable of producing he feels that there his responsibility has ended.

He gives little consideration to the manner in which the consumer receives his product—whether with satisfaction or with the feelings of one who may have purchased a gold brick.

So far has the interest of the consumer been ignored, and even imposed upon, that he now not infrequently offers public protest against the quality of fruit that he is expected to consume.

In apples, of which we have a very large number of varieties of all grades of quality as to flavor, there are a few well-established, well-known standard sorts that have commanded the first attention in all markets. Among those most prominent may be mentioned in summer varieties—the Red Astrachan, Benoni, Early Harvest, Primate, Sweet Bough, Williams and Yellow Transparent.

This class of apples is used more largely for cooking purposes than for dessert, and from these might be selected, according to the section or location, as possessing excellent cooking quality, and in general demand, the Astrachan, Primate, Sweet Bough, Williams, the two last named when ripened coming within the list of excellent dessert fruits.

In the autumn varieties there is an imposing number to select from. Alexander, Duchess and Twenty Ounce may be considered as highly profitable varieties, yet not possessing the highest quality. Their chief value is in their cooking quality, while the Gravenstein, Fameuse, Porter, Rambo and Smokehouse may be ranked among the finest of dessert fruits.

With the exception of the Alexander, the first named varieties are generally large yielders, while the last, with possibly the Gravenstein to be excepted, are equally productive.

In the planting of the commercial orchards of winter varieties we would follow the same principle—choosing those varieties that combine the highest quality for both dessert and cooking purposes.—The Practical Fruit Grower.

GETTING THE MOST FROM FARM PRODUCTS.

(T. J. Foster, Barry County, Mo.)

I have been devoting more thought of late years to the marketing of my farm products. I find that much of the profit realized over and above the cost of production is the result of using good judgment in selling to the best advantage. Our farm consists of 235 acres; 70 acres in apple orchard, the remainder cultivated in corn, wheat, cowpeas, clover and grass for hay and pasture, also some berries.

Berries are usually the first crop ready for market in the spring. I have sold in many different ways with fair success. However, the best plan that I have ever practiced is to sell to local fruit dealers or grocers in nearby towns, branching out to adjoining towns as far as necessary to sell my crop. By following this plan, I save the commission, and the results are more satisfactory.

By marketing as near home as possible, the express charges are not nearly so much, and I can sell at considerably lower price and still realize as much for my berries as I would to ship them to commission men at more distant markets. I secure a list of all the grocery dealers in the town where I want to ship berries. I send them letters stating what I have for sale, informing them that I can furnish nice fresh berries, put up in neat packages, direct from the farm, every day. They are usually very glad to avail themselves of such an opportunity, as they get the fruit fresher and in better condition than they can from the commission men. I have each man notify me either by letter or wire the number of crates he wants each day, and what he can pay for them, and they are shipped directly to him.

HONEST PACKING MEANS LARGER SALES.

There is no uncertainty about this way of selling, as I know just what I am going to get for my berries before I ship them. I put up nothing but first-class fruit in every package. When I sell to a man once I can retain him as a customer as long as I have fruit for sale. I find it very profitable to do considerable judicious advertising and create a demand for my products, then I can dictate in a measure my own terms. The producer who is a producer only must depend upon the commission man and take whatever he can get.

I have nothing to say against the reliable commission man. I have shipped lots of farm products to commission men and received satisfactory results. The only trouble is that markets too frequently become overstocked and the shipper never knows when he will strike the market in

this condition; hence the advantage of selling as much as possible in smaller towns. When I say advertise, I do not mean that it is necessary to advertise in a newspaper, although this would not be a bad plan, by any means. When I produce first-class products and send them out in first-class shape I am doing advertising that pays and pays well.

HOW APPLES ARE SOLD.

I sold a part of my apple crop in the orchard last season, selling the apples on a stated number of acres for a stipulated sum, irrespective of the amount of apples. Half was paid down and the other half when the purchaser commenced to gather them. Last year was the only time I have ever sold apples in this way. While I realized about 25 cents per barrel more for them than I would have received from local shippers, I do not intend to regularly follow this plan of selling. It is better, however, than selling by the barrel in the orchard, as there is likely to be more or less trouble between buyer and seller in regard to the manner of culling and grading, unless there is a very specific contract in regard to this. Even then, unscrupulous buyers are sometimes disposed to impose on the seller.

By selling the crop in the orchard this is avoided, as the buyer can cull and grade to suit himself. For the man with a small orchard, this is a good plan to follow if care is used in estimating the crop. My plan was to select a number of average trees and make a very careful estimate of the bushels thereon. Then to count the number of trees in the orchard and base my estimate for entire yield on the average of the trees estimated. It is necessary to be very careful in estimating an orchard in this way. It doesn't pay to guess at it without being exceedingly careful.

The remainder of my apples were disposed of in local towns as an experiment, and I am well pleased with the result. I shall follow this plan more extensively next season. By packing the apples in bushel boxes, they sell better than in barrels. The consumer buys the boxes with more confidence. So many packers put inferior fruit in the center of barrels that consumers rather expect it, and will not pay as fancy prices for apples packed thus. I sent these apples to a town of about 30,000 inhabitants and the dealers informed me that they could sell several carloads put up in this manner each season. They say boxed apples show up much better and sell for better prices, even when there is plenty of barrel stock on the market.

MAKING WASTE PROFITABLE.

I have an evaporator in connection with my orchard that will cure 100 bushels per day. It was built on the hop kiln plan, costing me about \$100. It has proved capital well invested, productive of much interest. The product made from the culled apples in this way more than pays the

expense of harvesting and packing the entire crop. Some seasons I have realized as much profit from the culls as from the shipping apples.

I hire the most careful hands I can get and pay them by the day. Most evaporators pay their hands so much per bushel. When hands work by the bushel they will rush to get as many bushels done as possible, paying but little attention to the manner of trimming the apples. A poor grade of fruit will be the result. I make nothing but fancy fruit and get fancy prices for it.

I ship my evaporated fruit to a commission house in St. Louis known to be reliable. I have shipped all my evaporated products to this firm for a number of years, receiving from 2 to 3 cents more per pound than common evaporated fruit sells for. The commission men write me that by receiving frequent and large shipments of this kind of fruit from year to year, they are able to build up a special trade to customers that want a fancy article and are willing to pay well for it.

When shipping any of my farm products, I consign to but one commission firm in a city. It doesn't pay to ship to any house that offers good prices and prompt returns, without giving the matter of their reliability some thought. There are commission houses in all large cities that do an honest business. I select one of these and give him all my shipments to that city. The commission men will furnish better service to the regular than they will to the transient shipper who divides his trade among a number of firms in the same town. It is business for them to do so. The regular shipper's business is worth looking after. His products are more even as a rule and easier sold than an odd lot of different grade stuff.—Orange Judd Farmer.

NOTES.

Samuel A. Miller, Sussex, N. J., in his essay on "The Most Profitable Management of Peach Orchards," recommended the purchase of trees from Southern States or from Western New York in order to lessen danger of "yellows." Discussion brought out instances where orders for peach trees placed with nurseries in these localities by Jersey-men were filled with trees grown in New Jersey to the mutual satisfaction of all concerned, except that the wrong nurseries got the credit for producing such excellent stock.

EVAPORATING APPLES.

B. J. Case's paper on evaporating apples and berries was a revelation to Jersey growers, accustomed to losses occasioned by gluts in the market.

He said that while all growers should strive for highest quality adverse conditions were certain to produce at times fruits of lower grades that never should be put on the market in a fresh state. Canners and evaporators are useful to dispose of these grades. Evaporated fruits may be kept for years in cold storage and disposed of as the market demands. About 75 per cent. of the apple growers in Wayne county, New York, have evaporators, and in 1902 cured enough apples to load 800 cars with the dried product. This immense quantity would make 120,000,000 pies if used at the ordinary rate. It was all sold for good prices. On an average one bushel of apples turns out $7\frac{1}{2}$ pounds of the evaporated article. The process is a great safeguard against glut of fresh fruits and has driven out about all cider mills and distilleries. Evaporation in Northern New York has gone through long and expensive evolution, but is now cheap and practical. Most of the Wayne county apples are dried in cheap "hop kilns" made with a slatted floor on which the pared and sliced fruits are placed, with a furnace below and cupola above, to carry off moisture, but there are more expensive and elaborate plants.

NURSERY STOCK.

W. H. Skillman, Belle Mead, N. J., had some experiences with nursery stock to relate. He claims there are more defective orchardists than nurserymen, but that tree buyers have grievances other than substitution and disease infestation. One cause of weak trees is bad seeds. More "Tennessee natural pits" are planted than are collected in the Southern States. Too rapid forcing of young trees by nitrogenous manures is in the end injurious. Stripping off leaves in the fall to aid early shipments is often harmful to young trees. Poor digging greatly lessens vitality, while the practice of cutting back young trees to hold them another season tends to stunt future growth. Root gall is a serious trouble; it is not always evident, and may not kill the tree, but leaves it a cripple. Bad heeling-in hurts great quantities of stock. Fumigation with hydrocyanic gas may injure trees if carelessly performed. "Black pith" in young orchard trees is an indication of low vitality, such trees should not be planted. While black pith is usually attributed to freezing, it is not clear this is the real cause.

PROPAGATING FROM BEARING TREES.

An excellent paper on propagating from bearing trees and nursery rows and the general influence of stocks on grafts, from the nursery standpoint, was read by E. S. Black, Hightstown, N. J. Grafting and budding from choice bearing trees to produce "pedigree strains" is all right in theory, but in practice most experiments have failed. It is the business of mature trees to produce fruits, or in other words, to reproduce.

themselves by seeds. The grafts and buds taken from such choice trees are often weak in vegetative force and fail to preserve their superiority when removed to other conditions. Young trees produce leaf buds of high vitality, and are best for propagation. It is their mission to make strong trees before fruiting begins. Many old trees are diseased, and sometimes put forth a supreme effort to bear fine fruits. If propagated from, diseased conditions follow. There are many contradictions and little-known conditions in nursery practice. Kieffer pears and seedlings are useless as stocks for European varieties, but the combination works to perfection the other way. California peach pits, strenuously advocated a few years ago, are not as good as the Tennessee product.—Rural New Yorker.

QUALITY AND STYLE PAYS.

B. Newhall: "Quality pays; style pays still better; and both together best of all; you growers know it, but possibly we dealers realize it even more fully. For instance, we were getting at one time in the same carload, apples which were selling at the rate of \$9 per barrel, and not enough to go around, and those which sold at \$1.50, and slow at that—both called No. 1, both sound, but the former of higher flavor, high color, perfect as to shape and in an attractive package, finely packed; the latter sound, but dull and uninviting in color, of poor flavor and in a slovenly looking package and poorly packed. We sold Seckel pears at \$8 and \$2 per barrel last fall on the same day, and we got full price on both. It was quality and style that made the difference. Not once, but many times, we have sold apples of fancy varieties, sound and freshly received the same day, at \$2 and at \$10 per barrel. Few shippers realize the value of just a little of nature's tinting on the skin of an apple, or how slight a difference in this line will mean a difference of from 50 cents to \$1 per barrel in the price. Quality pays. Choose your variety wisely, take pains with your orchard treatment, study the market's needs, but above all, cultivate style in fruit packing and package, and when to this style you add quality, you have a combination that will sell fruit at prices that will often surprise you."—Country Gentleman.

NUMBER ONE APPLES.

The International Apple Growers' Association has fixed the size of the No. 1 grade at not less than two and three-fourths inches in diameter, must be well matured and without blemish.—Practical Fruit Grower.

CANNING VERSUS CONSIGNING.

The canning industry is competing very largely, with the commission merchants. Truckers and growers all over the country are beginning to realize that canneries offer a positive price for produce, and many of them prefer to sell in this way rather than to take chances on consigning their produce to some of the markets.—Country Gentleman.

AMERICAN APPLES IN GERMANY.

Consul-General Mason, at Berlin, in a recent report says: "Under the familiar headline, 'Another American Danger,' the agrarian and conservative press in Germany is commenting somewhat demurely on the unprecedented influx of American apples this season. There is not a fruit store or hardly a market fruit stall or retail grocery shop in Berlin or its suburbs that does not display as a prime attraction one or more barrels of Baldwins, Pippins, or other standard varieties, surmounted by a placard bearing the legend 'Echte Amerikaner.' Not only this, but wagons piled with the same attractive merchandise patrol the outlying streets and peddle the American fruit at the uncommonly low price of 20 pfennigs (5 cents) per pound. This, at a time when ordinary cooking apples grown in Germany and Austria retail for from 6 to 7 cents per pound.

"American apples have generally arrived in excellent condition, showing that American fruit growers and dealers have greatly improved their methods of picking and packing for export. The point is proven that, given a good, sound apple crop in the United States, the standard varieties can be exported with entire safety, in ordinary ventilated barrels, without any of the elaborate and more or less costly paper wrappings that are used in putting up apples of choice quality from France, Italy and the Tyrol. Much is also doubtless due to shipping in properly cool and ventilated steamers.

"The general tenor of agrarian press comment on the present Yankee apple invasion is that it proves the inadequacy both of the German home-grown fruit supply and of the existing import duty rate to protect the farmers of the Fatherland from this fatal competition. To this is usually added the fervent hope that these colossal importations will not result in filling the orchards of Germany with the San Jose scale.

"Official statistics show that in 1900 Germany imported 124,874 tons of fresh apples; in 1901, 118,233 tons, and in 1902, 112,635 tons, of which

the United States supplied 1,972 tons and 5,835 tons, respectively. This year the American contribution will far surpass that of any previous, but it will be after all only a small fraction, probably not more than eight or ten per cent. of the aggregate apple imports of Germany. There is, therefore, and will always be, abundant room for expansion in this branch of American exports to Germany. If the trade is vigorously pushed and judiciously managed, the tendency of our fresh fruit exports will be to replace more and more the vast quantities of apples that are now imported from Switzerland, Austria, Holland and Italy."—Country Gentleman.

PEACHES SUITED TO A CHANGEABLE CLIMATE.

J. R. Haldeman of the Committee on Orchards reported peaches about all killed except on seedling trees. Quite a discussion followed the question put by one member as to what had killed the peaches, the buds having been in a condition to resist a very cold snap. Mr. Cole replied that the warm weather caused the sap to rise filling the buds with moisture, and the thorough soaking from the heavy rain had made them very susceptible to any sudden change. Mr. Hopkins, Mr. Brereton and other members emphasized the fact that for this section we must have a peach suited to our peculiar changeable climate, one originated in the Ozarks that has stood the test for years, and plant that only, or quit trying to raise peaches for commercial purposes. The freeze seems to have exhibited the same freaks as did the frost last spring, some members reporting that live buds were found to be in the topmost limbs, some just otherwise.—Practical Fruit Grower.

CARE OF A MISSOURI VINEYARD.

In the outset a suitable site is of importance. Our vineyard is located on a southeastern slope, protected on north and west by timber, buildings and other fruit trees. On April 30 last a severe frost and freezing weather killed almost all other vineyards about here that were exposed to northwest winds, while ours bore an exceedingly heavy crop. We plant Concord and Worden in rows eight feet apart; vines 12 feet apart in the rows, rows running north and south. Holes 12 inches deep and wide enough to receive the roots without bending are all that is necessary. Prune the vine back to two buds, letting only one cane grow the first season. This cane can either run on the ground or be tied up to a stake the first season, the stake preferable. Thorough cultivation both ways

should be given the first year. Potatoes, beans or cowpeas can be grown between the vines the first season.

The young vine should go on a two-wire trellis the second year, and the wires should be stretched tight to prevent the vine sagging. A sagging vine is unsightly, in the way of cultivation and hoeing, bears fruit near the ground that it always gritty, does not ripen evenly, is more subject to black rot, and difficult to spray. The third year another wire should be added, making three wires. At this age, with proper care and cultivation (cultivation should always be thorough), the vines should yield 20 pounds each, worth here five cents per pound or \$1 to the vine. Thorough spraying with Bordeaux is as essential to a good grape crop as cultivation. In order to do perfect work with the sprayer and for the grapes to set well and ripen evenly, the vines should by all means be spread properly on the trellis, and so fastened there that the wind cannot bunch them. First spraying should be given when the buds begin to swell; second spraying when bloom drops, and third spraying when grapes are the size of duckshot. Cultivation should be continued until grapes commence to ripen. All weeds and grass should be kept from under the trellis as they collect dew and dampness, which is favorable to black rot.

To market the grapes we use five and seven-pound grape baskets, the five-pound selling for 20 cents, the seven-pound for 30 cents; loose in 10, 15 and 20-pound baskets at five cents per pound; 100-pound lots \$5. We have a home market second to none anywhere. Our vineyard covers a little the rise of one-half acre, is six years old, and has yielded the past four years \$1,126 worth of grapes. While I make my vineyard very profitable I have all conditions in my favor; location, market, etc. I have omitted fertilizing, which is one important point. All leaf mold, rich earth, decayed wood, etc., that we haul from the forests and use as scratching material for the poultry goes into the vineyard when it becomes soiled; also the droppings of the fowls.—E. W. Geer, Farmington, Mo., in *Rural New Yorker*.

VARIOUS STRAINS OF WILD GOOSE PLUM.

In your report of the discussions of the Kansas Horticultural Society, in January issue, Professor Waugh and Major Holsinger disagree as to Wild Goose plum. They are both correct. I wish to tell what I know about it, for the benefit of the horticultural world, because there is a constant complaint of this plum. I am seventy-two years old. I don't know the exact year when it was brought to notice by Mr. Downer, but it was about 1856. I lived at a small town in the southwest corner of Logan

county, Kentucky, Keysburg by name. Downer's nursery was at a small town west from Elkton, the county seat of Todd county, which lay west of Logan county, Fairview by name, distant from Keysburg about fifteen miles. At Keysburg lived a remarkable man in several ways, Robert F. Reeves by name, a Cumberland Presbyterian preacher. He and his wife taught a sort of high school and he had a small nursery. He knew all about the best varieties of fruit, put his knowledge to use and grew everything. I never saw up to that time such success. He was absorbed in all lines of horticulture and about that time was made president of the Kentucky State Horticultural Society. I was intimate with him and I saw him constantly. He was always talking horticulture. Everybody knew both him and Mr. Downer, at least by reputation. To my certain knowledge the two gentlemen were intimate and fast friends.

Well, in one of our talks I remember distinctly, he told me that Mr. Downer told him that there was one tree he was propagating from and sending out as Wild Goose, and it was far superior to any other in the vicinity. But people were coming from everywhere and digging sprouts anywhere in the grove and calling them Wild Goose.

Now, is it any wonder there are two strains in Kansas. The wonder is there are not ten, when the whole grove where it was found was dug, scattered and called Wild Goose. Some years ago I tried to trap some of the spurious ones by sending back to that country for sprouts. But when they fruited they proved to be the same as what I had previously got from the old Phoenix nursery, which fruit singly or in clusters. It has never been my lot to have any of the spurious ones. But I know from people's talk there are too many scattered over the country. The reasonable remedy for its unsatisfactory behavior is careful propagation. If there can be a reform in this, I believe in a few years all will be well, when a good strain can be had I believe it will do best on its own roots. It is being carried too far north of its own latitude and is not hardy on its own roots. It can renew itself by suckering, which it does very freely. —J. W. Turner, Albany, Mo., in *Western Fruit Grower*.

IOWA GROWERS' COMPLAINT OF FREIGHT DISCRIMINATION.

Southwestern Iowa fruit growers are up in arms because they believe that the railroads of the West are discriminating seriously against them. They insist that under existing conditions it is impossible for Iowa apple growers to enter into competition with Eastern growers, who have in every way the best of it.

These matters were discussed at some length at the meeting of the Southwestern Iowa Horticultural Society in Glenwood recently, and at that time a special committee, consisting of D. L. Heinsheimer, of Glenwood; J. P. Hess, of Council Bluffs, and W. M. Bomberger, of Harlan, was appointed to interview the various Western railroads upon the matter, and get a readjustment of rates, if possible. The committee will take up the matter at once and make a vigorous campaign to establish more equitable conditions for Western fruit men.

Especial complaint is made of the Western rates on apples. It appears that the rate on apples is about three times that on grain and other produce. The apple men of Iowa say this stands in their way more than anything else. They can't compete with the apple growers of Michigan and New York, who have only to pay about half the freight rate that Iowa growers do. For instance, it only costs \$111 on a car of apples from New York to Omaha, while from Glenwood to Western Nebraska, a third of the distance, the rate is \$240 a car.—Fruit Trade Journal.

RED RASPBERRIES ALWAYS PAY.

Very few people know how to properly care for a red raspberry patch or else they don't do as well as they know how. As one rides through the country he is met with the unsightly briar patch in the farmer's garden, which is a nuisance, instead of being a source of pleasure and profit to the farmer and his family. The source of the trouble is in the fact that red raspberries increase or make new plants from the roots, unlike the blackcaps or purple raspberries, which increase from the tip ends of the canes when buried. The farmer sets out 100 raspberry plants and, in a few years, he has thousands of them. The more plants, the fewer berries. The secret of getting good crops is to treat the young plants that come up outside the hill, just as you would thistles or other weeds, cut them off with the hoe.

The red raspberry is the most popular small fruit grown. It always commands a ready sale, because of the exquisite quality and the fact that most farmers are too shiftless to properly care for them. These berries sold in Boston during the season of 1902, when shipped from Oswego, N. Y., as high as 20 to 25 cents per quart wholesale. When we learn that with right culture they are nearly, if not quite, as productive as strawberries, we can readily see that they are very profitable to grow.

Knowing that the red raspberry yield is in inverse proportion to the number of canes, the farmer should see to it that he gets just the right number and length of cane necessary for maximum crops. To do this, he should proceed about in this line.

The plants should be set about one foot apart in rows that are five feet from each other. The first year, the canes should be allowed to run at will, as it is only during the late fall of the first year or spring of the second or succeeding years that the suckers bother. In the spring of the second year the cultivator should be run shallow, as close up to the plants as possible, without breaking them; and the remaining suckers cut off with hoe in the hands of a skillful workman. I prefer to keep the red raspberry row in a narrow continuous row, rather than to grow them in hills. When the canes get about two feet high, they should be nipped back. This causes them to branch and make fruit buds close to the ground. If the canes are allowed to grow full length, the fruit buds will be nearly all located on the end of the cane and if the bush be trimmed, they will be cut off and the bush bear no fruit. This cutting back the suckers as they spring up and nipping in the ends of the canes must be resorted to every year, in order to get paying crops. The dead canes should also be cut out at the close of each fruiting season. It is a very good plan to mulch about the roots as far out as the cultivator goes, just before every fruiting season. This keeps the moisture in the ground and prevents weeds from growing.

The fertilization of the red raspberry has much to do with its yield and ability to withstand winters. While it requires rich soil, the soil should not be too rich in nitrogen. Nitrogen encourages the excessive growth of canes or suckers. It is very well to use stable manure on the crops that precede raspberries, but I should not use stable manure after the plants were set, unless after they have been in fruit for several years, they show a lack of vitality; then, use a shovel full of rotted manure about each hill, put on in the fall or very early spring when the plants are not growing. Commercial fertilizers are the kinds of manures to use in the raspberry patch. They may be put on just before winter sets in, or early in the spring, on the last fall of snow. Scatter between the rows and among the plants. Remember that the feeding roots of the raspberry run all through the soil, filling every particle of the surface. Use high grade fertilizers. They cost less in the long run. The raspberry needs lots of phosphoric acid and potash. I would recommend a fertilizer containing two per cent. nitrogen, ten per cent. phosphoric acid, and ten per cent. potash, or, if the fertilizer is compounded at home, get the ingredients as close to these proportions as possible.

There are many varieties of red raspberries, but few good ones. For a very early variety the Miller is largely planted in the South. We prefer the Marlboro in the North. Among late varieties, honors are about equally divided between Cuthbert and Loudon. On our own soil, the Loudon is best, because the Cuthbert is liable to winter kill.

Thorough, systematic culture and right fertilization is the real secret of successful red raspberry culture. The suckers must be kept down, and the soil stirred frequently during the growing season, and about 500 lbs. of good concentrated fertilizer applied between the rows every year. Once get a crop and the disagreeable part is ended, the berries sell themselves.

J. FARMER.

Pulaski, N. Y.

GROWING RASPBERRIES SUCCESSFULLY.

(William H. Strong, Missouri.)

This fruit has been cultivated in Barry county to a considerable extent for 10 to 12 years. It does well. Some seasons there is a partial failure due to drouth and hot winds, which frequently prevail during July and August. Raspberries need considerable moisture during the latter part of the season, and if this is not supplied in liberal quantities the rainfall must be conserved by cultivation at the right time. I find that it is a satisfactory plan to plant corn between the bushes and cultivate thoroughly. The crop requires a fertile soil, but not too heavy or wet. If the land is not rich, well-rotted manure should be used. Raspberries do well on new land and the finest crop I ever saw was grown on virgin soil.

The plot of ground set aside for the berry field should be plowed deeply, marked off in plots 4x8 feet. Plant a row of corn between the rows the wide way. Omit every other row, so that you can cultivate both ways, using the double shovel plow or the ordinary horse cultivator. In planting, use tips, as they are much better in every respect than old plants. Tips are secured by bending the main branches down the previous summer and covering the ends with earth when the soil is moist. By the next spring they will be rooted and can be taken up and set. When the plants begin to grow, pinch them off at a height of 2 or 2½ feet. This prevents a spindling growth and causes branching. Treated in this manner no stakes are required to prevent their falling down. It may be necessary to pinch off the tips two or three times in one season.

Begin cultivation in spring, at the same time cutting out all dead wood and all branches which interfere with cultivation. After the berries are harvested, trim out all the old vines and cultivate both ways, so as to keep the plants from drying out during the hot periods of July and August.—Orange Judd Farmer.

A MODEL SMALL STRAWBERRY PATCH.

On the outskirts of the town of Columbia, in Central Missouri, there is a strawberry patch which deserves to go on record as a model plantation for its size. It covers barely three-fourths of an acre, and is the property of a market gardener, Mr. Henry Kirklin.

As a commercial enterprise this patch has proven highly successful. During the year 1903 when the strawberry season was so cold and wet that no fruit was formed in ordinary plantations, this patch of Mr. Kirklin's netted the owner over four hundred dollars. From the beginning to the end of the picking season, which covered a period of four weeks, there was picked off of this small area a total of 4,074 boxes, or 166 crates. On an acre basis this would have been a yield of 212 crates.

This yield, and especially in such a wet season as the past, has been due entirely to the watchfulness and care of its owner. The small size of the patch makes it possible for each plant to have more or personal attention than would be possible were they scattered over a wider area. As it is, they are in matted rows 400 feet long, and the luxuriant, deep green foliage of the plants spreads out, making the rows fully a foot and a half wide. During the picking season the edges of these rows are bordered on either side with a crimson fringe of delicious berries, and almost a solid layer of fruits in the center.

As for cultivation, Mr. Kirklin is a firm believer that strawberries and weeds do not do well together, and the result is that this patch is kept so clean, that a weed, no matter how respectable, ever dares to show its head. As soon as the picking season is over, Mr. Kirklin begins cultivation, and keeps it up until late in the summer. On his place he has found that the most useful tools for his purpose are a fine-toothed cultivator, a hoe and a spading fork. These tools are used as necessity demands; the cultivator doing the most of the work, and the hoe and fork being serviceable principally in cleaning out the corners and others places not being easily reached by the cultivator. These tools are kept going all summer long, as frequently as the owner thinks the patch needs it, which is occasionally as often as two or three times a month. With the approach of autumn, when all plant life begins to prepare itself for a long cold winter, cultivation is stopped and as soon as the first freeze occurs, Mr. Kirklin puts a straw mulch on the patch. By this means he keeps the plants perfectly dormant from the time the mulch is put on until it is removed in the spring.

The picking and marketing of the berries is done by Mr. Kirklin and his family, and perhaps assisted by two or three children, who receive

one cent a box for what they pick. The work of picking begins as early in the morning as it is possible to see the berries and is continued throughout the day until the patch has been covered. In the height of the season this often keeps the limited number of pickers busy all day long. The berries are sold on the local market and always find a ready sale, most of them being engaged for several days before they are picked.

Mr. Kirklin grows four varieties of berries: the Clyde, Jessie, Warfield and Dwarf Champion; and by far the largest percentage of the berries during the past season were picked from Clyde. This berry he finds to do especially well in a wet season. Jessie, Mr. Kirklin has found to be an uncertain bearer, but producing good sized fruits when it does bear. Warfield is with him a good producer, but the fruits are not very large. Dwarf Champion has not been grown by Mr. Kirklin long enough to show what it can do. This year it produced a small crop of good berries.

Now the question may be asked, if Mr. Kirklin can get 166 crates off of his three-fourths of an acre why can't we get berries in the same proportion off of a hundred acres? As a rule, such a thing is seldom done. The reason is due to the difference between intensive and extensive cultivation. In intensive cultivation of strawberries, as practiced by Mr. Kirklin, the plants are growing close together and each individual plant gets such care as to make it produce to the utmost of its ability. The small area of the plantation makes it possible for each plant to get more attention and have its needs better looked after than if the same number of plants covered twice the ground they do. Within the small limits of the estate of most market gardeners it is necessary for every square inch of the ground to produce the largest amount of money in the form of plants or plant products as is possible. Just such a condition of affairs as this has made it possible for Mr. Kirklin to reap such a bountiful harvest from his plantation.

The possibilities of the intensive cultivation of strawberries are only in their infancy, and as soon as we reach a point where it is necessary to make a given area produce to the utmost, then this manner of farming will be more extensively practiced.

Like all other plants, the strawberry has its peculiarities, and for best development demands certain requirements, yet any one who is a close observer of plant growth will soon learn what these requirements are after a very few trials at cultivation. The strawberry responds so quickly to good care that a small area can be made to give large returns for the labor expended on it and near all small towns a patch conducted on the plan carried out by Mr. Kirklin will turn into the coffers of the owner, at the period of its prime a good substantial profit.—E. H. Favor, Columbia, Mo., in *Western Fruit Grower*.

PROTECT OUR TREES

Ahwahnee, Madera Co., Cal., August 24th, 1903.

Major Frank Holsinger:

Let me grasp your hand, Major, and thank you for saving those trees. What vandals some people can be. They can't see beauty or utility beyond the size of a dollar. I sometimes think our people have acquired a mania for destroying trees. Many of them never stop to think of the trees as one of the greatest blessings nature ever gave to man. We have been destroying forests from the Atlantic to the Pacific. No tree was safe from the ax. When we think of the fact that it requires the destruction of near thirty thousand acres of forest timber every twenty-four hours to supply the lumber demand of this country, and that that demand is fast growing day by day and our forests growing smaller from the effects of the ax and fires, we begin to realize that we must learn to protect our trees; not only on our streets and in our grounds and dooryards, but on our mountains and plains wherever trees will grow. What would our whole country be without them? I wish we could all think of them as the crowning beauty of our hills and valleys, and give them that loving care and protection their great beauty and vitality demands. Yes, trees have rights that men should be brought up to respect.—Western Fruit Grower.

FRANK FEMMONS.

A BIRD BOOK FOR FRUIT GROWERS.

Mrs. Fannie Holsinger had a selection on "Nature's Militia," from the "Great World's Farm," by Selma Gage, the text of which was "If Nature's Militia, the army of birds, be killed, it will be impossible to find a substitute for their faithful guardianship." Birds are Nature's soldiers and keep in subjection the inferior animals. Their other uses are scarcely worthy of notice compared with their labors in the destruction of insects.

She said, "In reading the first chapter of this book, I thought it well worth reading before this society. On reading the second chapter I was undecided which to read, and so on, each chapter offering so many suggestions that I was in a state of perplexity which was best; so not having the time to read the whole book, I have selected the last chapter. I would, however, recommend the book to every farmer and fruit grower, believing a careful reading will repay you for so doing."—Western Fruit Grower's report of Mo. Valley Meeting.

AGRICULTURAL APPROPRIATIONS.

A member: The tendency in Washington this winter is to cut down all agricultural appropriations. Secretary Wilson says it is impossible to do the work asked of the department on the beggarly sums allotted to it.

Mr. Hale: For much of this you can blame your Congressman.

A member: Then it's time we had men at Washington who will respect the wishes of farmers and fruit growers. If those now there won't do it, let us send men who will. Let us stop this cutting down of our appropriations. Better take nothing at all than the pitiful sums they dole out. (Loud applause.)—Poughkeepsie Meeting—Country Gentleman.

W. H. C.

ONE WAY OF FIGHTING THE BORERS.

B. F. Pancoast, Iola, Kan., has the following method of fighting borers in peach trees:

"Two years ago I was examining some young trees for borers. I found them abundant. I removed the dirt from the trees preparatory to digging them out. I was then called away on some other business and the trees were forgotten until more than a week later, when I returned to finish the borers. I found the heat of the sun had dried the exposed roots, and the borers were all dead. Since then I destroy borers by cleaning a way the soil and letting the sunshine do the work for me. It does not hurt the trees as much as the cutting necessary to dig them out. I have had good results from sowing a quart of common salt under each tree. The foliage is improved in color, and it destroys insects that come in contact with it."—Western Fruit Grower.

KILLING BLACKBERRIES AND GRAPE VINES.

(Z. T. Russell, Missouri.)

A Washington correspondent wants to know how he can kill blackberry plants in an old patch of Kittatinny and also how to kill grape vines. Grape vines may be killed by grubbing, provided they are cut off below the crown.

Blackberries may be killed quite effectually by the following method: Mow off the vines with a brush scythe at the close of the fruiting season

and burn on the ground as soon as dry. Next plow deep with a sharp plow, cutting only about two-thirds as much as the plow would turn in order that every root may be cut off. Soon after the plowing has been done, say in three or four days, harrow the ground thoroughly, tearing out as many roots as possible, and exposing them to the air and sunshine until they are dry, when they should be burned. In two or three weeks the plowing and harrowing may be repeated, but I have seldom found that necessary. If the work has been done thoroughly and at the right time (close of fruiting season) there will not be many sprouts to mark the location of the old plantation, but if done in the spring it would most likely increase, rather than diminish, the number of plants. It is important, therefore, that the right time be chosen for the work.—Orange Judd Farmer.

SOMETHING BADLY NEEDED IN THE COUNTRY AT LARGE
TO WIT: LOCAL DEALERS IN (UNMIXED) AGRICUL-
TURAL CHEMICALS.

Editor Rural World: Do we live in an age of progress or do we not? Are chemical fertilizers a necessity to be employed by the many, or simply a luxury to be enjoyed by the few? If they are an actual necessity, and we fully believe that in thousands of instances they are, why not place them within reasonably easy reach of those they are calculated to benefit? After an extended tour of the rural districts of almost the entire south, and conversations innumerable with hundreds of the most progressive, up-to-date and wide-awake farmers and planters of this section, we have no hesitation in making the assertion that, enormous as the sale of commercial fertilizers—in the aggregate—may now appear to be, the amount sold would easily be doubled, trebled, or even quadrupled, if the soil tillers of this broad land could but get what they needed and wanted, and at the time they needed and wanted it.

The terms nitrogen, potash and phosphoric acid have—to all truly progressive farmers—become as familiar as household words; they know what they are, whence derived, and what they are good for; but, unfortunately for them, and unlike any and every other article of commerce, when the farmer undertakes their purchase, he finds so many obstructions and restrictions thrown in his way, that he has to either give it up in disgust or buy something he neither wants nor needs. For quite a number of years the farmers of the interior have been acquainted with the fact that when purchasing any of the salts of potash, it could be purchased in the form of muriate cheaper than it could in any other form, this latter

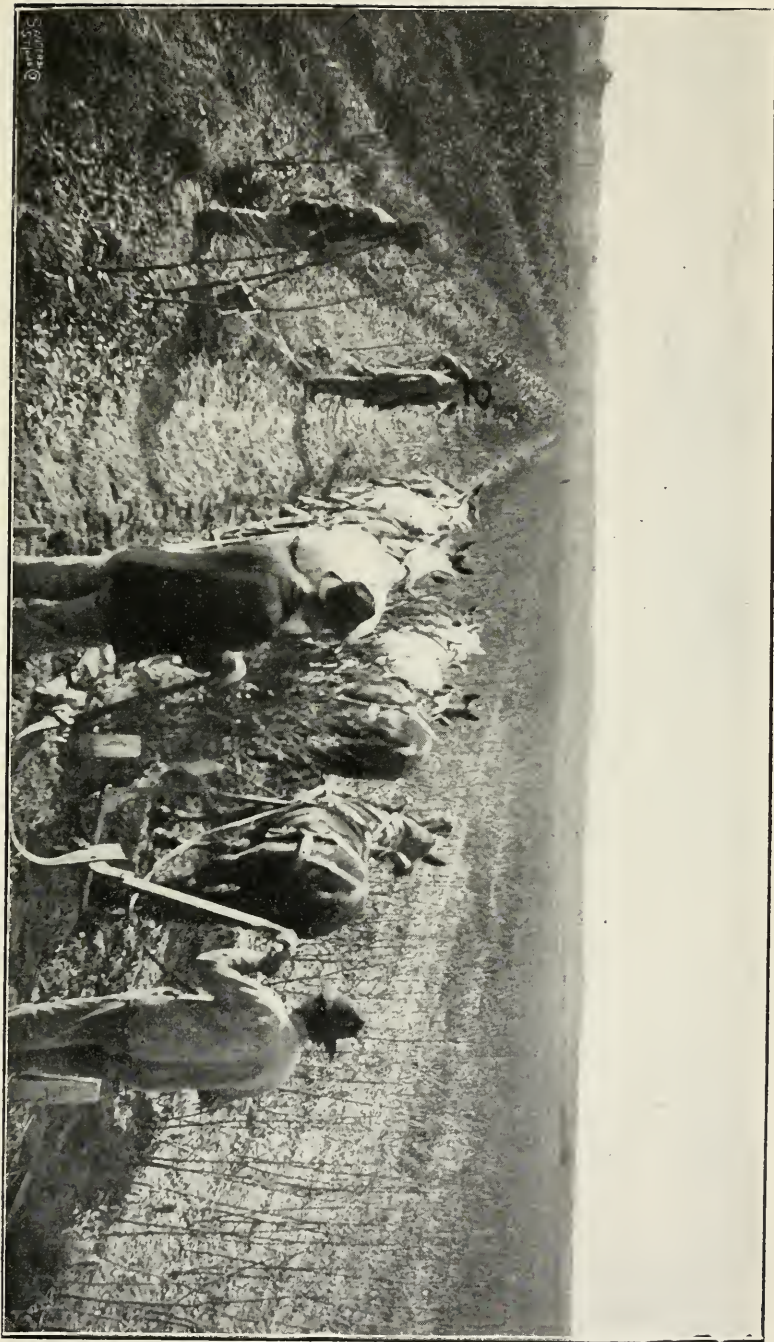
agent containing at least one-half its weight, or 50 per cent. pure potash. They are also acquainted with the fact that Kainit contains but 12 per cent. or just 12 pounds of pure potash in each 100 pounds, and that in paying the freight on same from seaboard to the interior, they are paying freight on 88 pounds of comparatively useless material in each 100, or 1,760 pounds in each ton. We say they know this, and they know likewise that they cannot afford it; but what are they going to do about it? How are they going to help themselves? 'Tis true the dealer quotes muriate of potash as for sale among his other wares, but what matters his quoting it if he has not got it, and tries to put one off with some complete mixture of his own make? Why is this? Are the profits greater on his mixture than on the muriate? Whatever be the reason, the fact remains the same, the complete fertilizer with little potash is omnipresent, while the muriate is invariably conspicuous for its absence. So also the sulphate, which, by the way, has proven superior and given better and more immediate beneficial results with us than has even the muriate, is actually scarcer and harder to obtain than is the muriate.

There are probably some of our readers who think, and with some show of reason on their side, too, that "fertilizers don't pay," and that "there is too much of them used already," to both of which assertions we are both ready and willing to subscribe a hearty "Amen." "Fertilizers don't pay" when used blindly, ignorantly, indiscriminately and without either discretion or judgment; and as there is quite a large amount annually used in this manner, to that extent, it were better for the country, better for the user, and even better for the manufacturer, if less instead of more had been used. But, while this is true, it is also true that, judiciously used, they are one of the sources of greatest profit to the user thereof, and within reasonable bounds, the more one can use to advantage, the greater the profit accruing therefrom. Many farmers purchase a low grade fertilizer because it can be obtained at a comparatively low price per ton; but the fact should be borne in mind, that low ton prices mean either low content of good forms of plant food or the use of poorer forms. Fertilizer, high grade both in quality and quantity of plant food, can not be purchased at a low price per ton. In purchasing low grade goods one is paying freight on a mass of useless material. Not only is there a loss from this cause, but, homeopathic doses of a low grade fertilizer merely act as a stimulant, forcing the crops to an overgrowth, hence resulting in a more speedy impoverishment of the soil than would have been the case had no fertilizers been employed. Many dealers handle those brands, and only those that give them the greatest immediate profit, utterly regardless of the adaptability to the soil or crops of the immediate section. Even after they are purchased by the soil tiller, they are in far too many instances applied to crops and all soils alike. It is needless for us to say

that where their employment proves profitable under these circumstances, it is merely the result of accident and not good judgment.

On our small farm of but 220 acres we have five or more distinct classes of soil, each demanding different combinations of fertilizing agents, widely different forms, too, for best results, as well as widely varying quantities, and this regardless of crops to be grown thereon. No scientist much less a fertilizer manufacturer, 1,000 or even 50 or 250 or 10 miles from here, could possibly devise a formula that would suit our farm. No two, or three, or even four formulas would answer. What folly then 'twould be to limit oneself to one; and how much better it would be, how much more sensible and business like, to get the ingredients at first hand, at first cost and mix at home a fertilizer, adapted to the soil to which it is to be applied and also to the needs of the special crop to be grown thereon. We are far from opposing the fertilizer manufacturer or "mixer." Their facilities for mixing are undoubtedly better than can be found on the ordinary farm; but it does look like to us that, unless they exact from their customers exorbitant charges for this self same mixing, it would be just as profitable for them to sell the unmixed goods. The extra profit is bound to be in the mixing, or in the substitution of poorer forms of plant food: if the former, the farmer can do as well if not better (for reasons given above) himself; while, if the latter, as "the best is none too good," we would favor boycotting the manufacturer. Frauds of that description are of altogether too common occurrence as evidenced by the fertilizer-inspection bulletins of the various states. Take the state of North Carolina for instance. In 1898 of 823 brands registered in the state, 53 of which were analyzed, one out of every four and one-fifth of the whole number analyzed fell below its guarantee in some ingredient. Of the superphosphates with potash, one brand in every seven and one-half fell below guarantee in available phosphoric acid; one in every four and one-half in potash, and one in nearly every three in available phosphoric acid and potash. Of the so-called "complete" fertilizers, one in every nine and a fraction fell below guarantee in available phosphoric acid; one in nearly every twelve in ammonia; one in every ten and one-third in potash; and one in about three and one-half in either available phosphoric acid, ammonia or potash."

It would be a very unskillful workman who could not have done this well, or better, and with no better implements than shovel and hoe on a tight barn-floor. But by far the major portion of these brands fell off in valuation, yet the farmers of the State footed the bill, cheerfully, we suppose, because ignorantly. In this instance, at least "Ignorance was bliss." We may be 25, or 50, or 100 years ahead of the progressive age in which we live, but sooner or later the time is bound to come when the American farmer will assert himself, and purchase his phosphoric



Digging Nursery Stock. Wild Pros., Sarcoxie, Mo.

acid or potash and even nitrogen, when needed, at his own county seat, the same as he now purchases his soda, sugar or coffee. What is to hinder? Each separate article entering into the composition of a commercial fertilizer is already an article of commerce, and has a certain, definite value as such. The trade in them should be unrestricted, as free for one as for another.—G. H. Turner, Lafayette Co., Miss.

NEW THINGS SHOULD BE TRIED.

The progressive fruit-grower is continually on the outlook for something new in fruit production. While he holds on to some of the old standards for safety, he believes that in the great abundance of life and nature that fruits of all kinds may be brought to a higher standard. So as we grow in the knowledge of fruit, our ideals move upward. Hence should the ideal fruit be discovered progress in new fruit production would cease. But in order to be active and useful in our day, we should have an ideal apple, peach, pear, cherry or one among the small fruits to look for.

There never was a time when fruit was being used for "meat" as it is today in our country. Since so much progress has been made in the past one hundred years, there is no doubt but that there are greater things in store for progressive fruit men in this the twentieth century.

With every new year comes some new fruits that are offered by originators for trial tests. Most of them are worthy of trial and they should be thoroughly tested by fruit men all over the land to find their value and where they will succeed best. It is through many trials and much tribulation that fruit men in the past one hundred years discovered the valuable fruits we now grow.

Owing to the short time in the trial tests of the small fruits, there is more activity in their dissemination than with the tree fruits. While we have a great many good apples, the writer has faith to believe that there are yet better apples in the hidden resources of apple creation. We are co-workers with the great Master Creator. So let us cross, fertilize and plant and grow seedlings from the best varieties of apples. Every fruitman should set aside an acre or more land for tree fruit experiment, especially with apples and peaches.

The new berry fruits tested on our soil this year were the Parson's Beauty, McKinley, August Luther, Dunlap, Cumberland, Sutherland, Miller, Texas, Hero, Kansas, Dunlap. Parsons and Luther gave the most satisfactory results. These will doubtless take high rank among those recommended for commercial purposes. McKinley is late, but

of medium size and poor in taste. The Cumberland, Texas and Miller were injured by the May frost. They will be held for further trial. The Hero is an Arkansas seedling of fair size and color, but not sufficiently productive. The Kansas was not in the least damaged by frost, but berries were not up to even a fair standard in size. Its plant growth is strong and hardy. The New King red raspberry is an improvement on most of the older ones. The bush is healthy, hardy and of fair size. Its fruit is about the size of the Miller, but in color a shade darker. One good point in its favor is in its long fruiting season, continuing over three weeks.

The Kenoyer is without any doubt the best blackberry that has been introduced for several years.

The new strawberries that will show us their size and value in 1904 on our soil are the Challenge, Uncle Jim, Nichols, Granville, Sykes, and Suggs, the latter two of Kansas origin. The plant growth of these is strong and indicative of large fruitage in 1904.

Not much attention has been paid to the suggestion of the American Pomological Society about shorter names for new fruits and a striking out of a part of the long names of the older fruits. Originators or disseminators of new strawberries seem (from the double names they use), to think that the double name gives their berries a better introduction to the fruitmen which is certainly a mistake. Several new strawberries have been introduced the past two years with double names. These are Nichols Granville, Parson's Beauty, August Luther, Senator Dunlap and Uncle Jim. As one of your committee on nomenclature, the writer would suggest that our society drop Granville from the name of Nichol's Granville. In Parson's Beauty, drop "Beauty" and retain "Parsons." Then use Luther for August Luther, and Dunlap for Senator Dunlap. Now, what do we berry growers care for an Uncle in the name of a strawberry? Let us drop the Uncle and hold on to the homely name of Jim. Then we have Nichols, Dunlap, Parsons, Luther and Jim. The value there is in a fruit of any sort will soon make the name familiar to the fruit men.

We are opposed to naming any new fruits after famous men of our times. When one is so named it is a sure sign that it cannot stand on its own merit.

Let originators attach their surname or some neighboring friend or the name of a town or state. I have not noticed any double names being wedded to any new apples of recent introduction. We might divorce "Ben" from Davis. There is nothing in "Ben" indicative of taste, size or color of this famous apple. Apples like the Grimes' Golden may be excused for carrying a double name, as "Golden" indicates a beautiful

yellow color. Now before closing this paper I would suggest that the next really good and valuable commercial apple (introduced from the West) be called for our honored president, "Wellhouse," of the Kansas State Horticultural Society. We have a Smokehouse apple and a good Wellhouse apple would not be out of place.—B. F. Smith, Lawrence, Kan. Western Fruit Grower.

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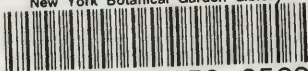
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