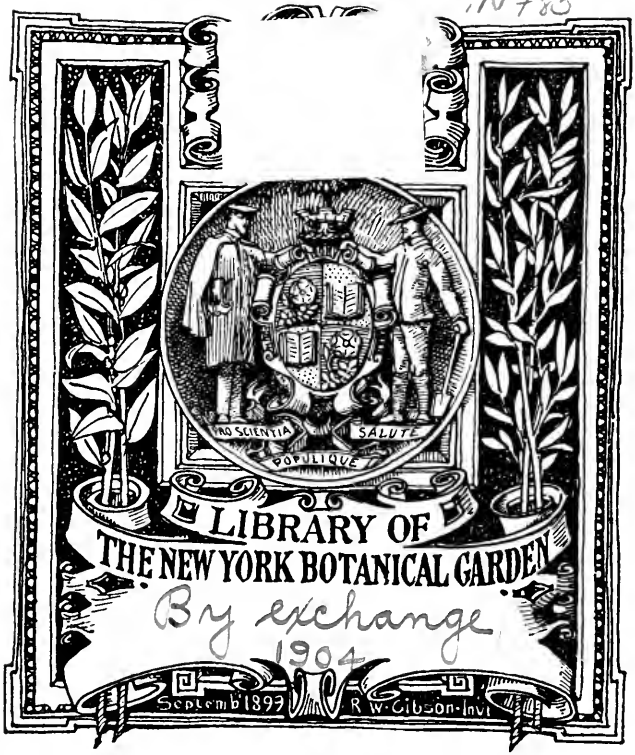

REPORT

OF THE

Missouri State Horticultural Society,

FOR THE YEAR 1885.

REPORT OF THE

28th Annual Meeting Held at Warrensburg, December 9, 10, 11, 1885.

ALSO, A REPORT OF THE

Semi-Annual Meeting Held at Butler, June 10 and 11, 1885.

AND

"SECRETARY'S BUDGET."

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

JEFFERSON CITY, MO.:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1886.

OFFICERS ELECTED FOR THE YEAR 1886.

President.
J. C. EVANS, Harlem.

Vice-President.
J. A. DURKES, Weston.

Secretary.
L. A. GOODMAN, Wesport.

Treasurer.
D. S. HOLMAN, Springfield.

OFFICERS FOR THE YEAR 1885.

President.
J. C. EVANS, Harlem.

Vice President.
E. P. HENRY, Butler.

Secretary.
L. A. GOODMAN, Westport.

Treasurer,
Z. S. RAGAN, Independence.

LIST OF HONORARY MEMBERS.

Geo. Hussman	Napa, Cal.
Marshall P. Wilder	Boston, Mass
T. T. Lyon	Grand Haven, Mich.
C. W. Murtfeldt	Kirkwood, Mo.
Hon. N. J. Colman	St. Louis.

MISSOURI STATE HORTICULTURAL SOCIETY.

To His Excellency, JOHN S. MARMADUKE, *Governor of the State of Missouri:*

Believing that our report should be under the control of the State, and that we should report to our Governor, as do our other State officers, I take the liberty of addressing this report to you.

L. A. GOODMAN, Secretary.

STANDING COMMITTEES.

Orchards,

W. G. GANO, Parkville; CHAS. PATTERSON, Kirksville; D. S. HOLMAN, Springfield.

Vineyards,

GEO. E. MEISSNER, Bushburg; JACOB ROMMEL, Morrison; C. TEUBNER, Lexington.

Small Fruits.

S. MILLER, Bluffton; WM. HOPKINS, Springfield; JACOB FAITH, Montevallo.

Stone Fruits,

D. F. EMRY, Carthage; E. F. HYNES, West Plains; JACOB MADINGER, St. Joseph.

Vegetables,

J. W. KIDWELL, Kansas City; Prof. L. R. TAFT, Columbia; J. N. MENIFEE, Oregon.

Flowers,

ROBT. S. BROWN, Kansas City; H. MICHEL, St. Louis; MRS. WADE BURDEN, Springfield.

Ornamentals,

Z. S. RAGAN, Independence; MRS. C. I. ROBARDS, Butler; R. E. BAILEY, Fulton.

Entomology,

MISS M. MURTFELDT, Kirkwood; DR. A. GOSLIN, Oregon; H. SHEPLEY, Nevada.

Botany,

Prof. S. M. TRACY, Columbia; G. C. BROADHEAD, Pleasant Hill; FRANK BUSH, Independence.

Nomenclature,

T. W. GAUNT, Maryville; J. B. WILD, Sarcoxie; A. AMBROSE, Nevada.

New Fruits,

F. LIONBERGER, New Florence; A. H. GILKERSON, Warrensburg; W. B. STARK, Louisiana.

Ornithology,

CLARK IRVINE, Oregon; A. W. St. JOHN, Carthage; W. H. THOMAS, LaGrange.

Injurious Fungi,

B. T. GALLOWAY, Columbia; Prof. W. TRELEASE, St. Louis; C. W. MURTFELDT, Kirkwood.

CONSTITUTION

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

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 on the payment of one dollar annually. The payment of ten dollars at one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the society. And any lady may become a member by giving her name to the Secretary.

ART. III. The officers of this society shall consist of a President, Vice President, a Secretary and a Treasurer, who shall be elected by ballot at each regular meeting, and whose terms of office shall begin on the first day of March following their election.

ART. IV. The elective officers of the 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 of December, 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 respec-

tive 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.

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

HOW TO ORGANIZE A HORTICULTURAL SOCIETY,

ALSO THE

CONSTITUTION FOR A LOCAL ORGANIZATION.

Any one much interested on this subject of Horticulture can organize a society if he will speak to five or six different persons who are known to be prominent in this matter. Tell them that there ought to be a society in your county, and as it is such a good fruit country, ask them if they do not want to help organize one. You will hardly meet a refusal, but will be met with the remark "that they do not believe there is interest enough in your county to keep one up." Never mind this, but make an appointment to meet in some office in town on some Saturday. If you can get five to come together, organize and elect officers. Make the meetings regular each month and on the same Saturday. Some lawyer will let you have the use of his room to hold the meetings. Have the meeting in the best town in the county even if you have to go some distance to meet there. Talk this up until the next meeting, and let each one promise to bring another. Do not expect to have every one belong, for they will not. Hold six winter meetings (November to April) in the city or village, and at the March or April meeting, select the places to hold the six summer meetings (May to October) at the homes of the members. Make this a pic-nic dinner, meeting about 10 o'clock, and after the dinner hold the meeting and discussion; offer a few premiums for fruits and flowers, and have a general good time. Do not be afraid of a dollar or two, but use as much judgment in this matter as you would in any business of your own, and you will succeed. Talk to your neighbors about it if they are interested in fruit growing, if not, choose those who are so interested. They will not be much help to you if they are not fruit

growers. Make out a programme for the year, choosing one or two for an essay at each meeting. When the reports of the standing committees are made, have it done in writing, and have a report at every meeting. You cannot expect to have everything work in complete order at first, and do not get discouraged if you find trouble at the start. Take your wives with you and have a good social time also. If I can be of use to you at any time, I will come and visit you if it is possible for me to get away. I will try and bring some one with me also to help along the good work.

L. A. GOODMAN,
State Secretary.

CONSTITUTION.

ARTICCLE I. This Association shall be known as the ——— Horticultural Society.

ART. II. All persons interested in the subject of Horticulture may become members of this society by signing the constitution and paying annually to the treasurer the sum of one dollar: *And provided further*, That any person paying at one time the sum of ten dollars to the treasurer, may become a life member, and thereafter exempt from annual dues: *Provided further*, That all ladies may become members by signing the constitution without the payment of one dollar.

ART. III. SEC. 1. The officers of this society shall consist of a President, Vice-President, Secretary, Treasurer and Executive Committee consisting of five, of which the President and Vice-President shall be *ex officio* members.

SEC. 2. The President shall exercise a general superintendence of the affairs of the society; preside at all meetings of the society; appoint all committees unless otherwise provided; draw all orders on the Treasurer as directed by the society, call special meetings of society or Executive Committee when deemed necessary; he shall be *ex officio* President of the Executive Committee.

SEC. 3. The Vice-President shall assist the President, and in his absence perform his duties, and be *ex officio* a member of the Executive Committee.

SEC. 4. The Treasurer shall receive all moneys belonging to the society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the President, countersigned by the Secretary. At the meeting of the society on the ——— Saturday in December in each year, (or oftener if required by the Executive Committee) he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office, turn over all books, papers, and all money or other property belonging to the society, to his successor in office. The Treasurer, before entering on the discharge of the duties of his office, shall enter into a bond with sufficient security, to be approved by the President of the society for its use, in the sum of ———, conditioned for the faithful performance of the duties required of him in this section.

SEC. 5. The Secretary shall keep a full and complete minute of each meeting of the society, and the proceedings of the Executive Committee. He shall receive and safely keep all books, periodicals, stationery, seeds, fruits and other like property of the society subject to its order; shall correspond as may be necessary with all persons or societies as the welfare of the society may demand. He shall report all the proceedings of the Executive Committee to the society at its first meeting thereafter. He shall countersign all orders drawn upon the Treasurer by the President under the direction of the society, and have the care and custody of the seal of the society.

SEC. 6. The Executive Committee shall assist and advise the officers in the discharge of their duties; prepare all premium lists; make all necessary arrangements for holding and conducting any and all such fairs as the society may determine to hold, and such exhibitions of fruit as the society may determine to make, and exercise a general supervision over the same, and generally to provide for the arrangements and business of the society.

ART. IV. The officers of this society shall be elected by ballot from among its members for the term of one year. The annual election shall be held at the regular meeting of the society on the —— Saturday in December, where the general business of the society shall be transacted. Vacancies may be filled at any regular meeting of the society.

ART. V. The regular meeting of this society shall be held on the —— Saturday of each month, at 1 o'clock P. M., at such places as the society may select, at ————: *Provided*, That the meetings in the months of May, June, July, August, September and October of each year may, by a vote of the society, be held at the residence of any of the members outside of the city.

ART. VI. Executive Committee may provide: (1st.) For the payment of premiums to members of the society for the best display of fruit, flowers or vegetables made at any regular meeting of the society; (2d.) For essays on any subject of interest to the society, and arrangement of program for the year; (3d.) And for determing the places for each meeting of the society for the months of May to October inclusive.

ATR. VII. Five members of the society shall constitute a quorum at any meeting, and three members of the Executive Committee shall be authorized to transact business at any meeting of the committee duly called. Special meetings of the society or Executive Committee may be held by order of the President or any three of the committee on one week's notice to all members of the society or board (as the case may be), given personally, or through the post office. Adjourned meetings, may be held from time to time, as the society may determine.

ART. VIII. The funds of this society shall not be appropriated to any purpose, without a vote of a majority of the members present at any regular meeting of the society.

ART. IX. This society shall have the following standing committees, which shall be appointed by the President at the January meeting in each year: Small Fruits, Stone Fruits, Orchards, Vineyards, Vegetables, Flowers, Ornamentals, Entomology, Botany; to each of which shall be referred all matters relating to those particular subjects. Each of said committees shall consist of one to three members.

ART. X. This Constitution may be amended by a two-thirds' vote of all members of the society, at any regular meeting: *Provided*, That notice of the intentioned amendment shall have been given at least one month prior to any action taken thereon.

ART. XI. The meetings of this society shall be governed by the parliamentary rules usual for deliberative bodies.

ART. XII. Order of business:

1. Reading minutes of last meeting.
2. Report of Executive Committee.
3. Report of Standing Committees.
4. Essays, or subjects for discussion.
5. Discussion.
6. Old business.
7. New businesss.
8. Report of Special Committees.
9. Adjournment.

LIST OF MEMBERS AND CORRESPONDENTS
GIVEN BY COUNTIES.

LOCAL SOCIETIES ARE ALL PLACED AS MEMBERS.

A good number of these names are correspondents, and *not members*, but their names are placed as such to reward them for their answers to our questions; and we have the hope of their becoming members. We should have a thousand members in our State.

Some members have not renewed their membership, but their names are still retained on the list.

We live in hopes that we will some day have *enough money* given us by the legislature so that all fruit growers may be members without money and without price. But at present we need the few dollars we thus get to help us along.

L. A. GOODMAN.

ADAIR COUNTY.

Charles Patterson.....Kirksville.
Geo. Rice..... "
W. O Patterson..... "

ANDREW.

Wm. Ent.....Savannah.
Gtl. Segessemann. .....Amazonia.
J. Zimmerman..... ..... "
W. S. King..... "
S. K. Falkner..... ..... Whiteville.

ATCHISON.

Geo. Steek.....Rockport.

AUDRAIN.

B. F. Wild.....Benton City.

BARRY.

Isaac Stapleton.....Seligman.

BATES COUNTY HORTICULTURAL SOCIETY.

J. B. Durand, President.....Prarie City.
Henry Speers, Secretary.....Butler.
E. P. Henry, Treasurer..... "
Thos. Irish.....Rich Hill.
S. W. Frederick.....Butler.
J. R. Harriman..... "
J. B. Innis..... "
Miss Ida Crume ..... "
Mr. and Mrs. W. H. Halloway..... "
" " " C. I. Robords..... "
" " " A. C. Skinner..... "
" " " D. W. Thompson..... "
" " " W. M. Wilson..... "
" " " D. W. Garst..... "
" " " M. Ryan..... "
" " " J. F. Boyd. ..... "
" " " W. Ritter..... "
" " " Johnson Hill..... "
" " " I. W. Brooks.....Pleasant Gap.
" " " Ava E. Page..... Reynord.
" " " H. B. Francis.....Mulberry.
J. W. Hall..... "
D. C. Forbes.....Vinton.
W. P. Whitney.....Adrian.
W. M. Stephens.....Lone Oak.

BARTON.

C. H. Fink & Son.....Lamar.
M. M. Spear..... "
S. G. Avery..... "
C. H. Shepley.....Nashville.
W. H. Thrapp.....Milford.

BOONE.

Prof. and Mrs. S. M. Tracy.....Columbia.
" " " J. W. Sanborn ..... "
" " " L. R. Taft..... "
B. T. Galloway..... "

BENTON.

F. Schwettman.....Lincoln.
W. G. Mathews.....Fairfield.

BOLLINGER.

David L. Phelps.....Lutesville.
L. R. Johnson.....Patton.

BUCHANAN.

Mr. and Mrs. Jacob Madinger.....St. Joseph.
" " " S. N. Cox. ..... "
H. T. Kelsy..... "
Mr. and Mrs. N. P. Sommer..... "
J. W. Fleeman..... "
Mr. and Mrs. Hans Nielson..... "
L. Zaigler..... "
W. Hafferlie.. ..... "
L. G. Munger..... "
J. L. McAleer..... "
Hon. Joseph Grubb..... "
Chris. Diegel..... "
J. C. Bender..... "
W. Wiedman..... "
H. Keene..... "
John Hall, box 301..... "
Karl Wiedman..... "
Mr. and Mrs. J. Krischner..... "
Gilbert Blake... ..... "

BUTLER.

J. T. Tubb..... ....Poplar Bluff.

CALDWELL.

Wm. McCray.....Glassville.

CALLAWAY.

R. E. Baily.....Fulton.
D. M. Dunlap..... "
J. W. McIntyre..... "

CAMDEN.

W. G. Brown.....Linn Creek

CAPE GIRARDEAU.

G. G. Kimmel.....Cape Girardeau.

CARROLL.

W. O. Crouch.....Carrollton.

CASS.

G. C. Broadhead.....Pleasant Hill.
R. A. Conover.....Peculiar.
W. B. Mandy.....Harrisonville.
Mr. and Mrs. T. J. Sehatz.....Lone Tree.

CEDAR.

L. Liston.....Virgil City.

CHARITON.

G. W. Dewey.....Keytesville.

CHRISTIAN.

J. K. Weaver.....Ozark.

CLAY.

Mr. and Mrs. J. C. Evans.....Harlem.
Dan Carpenter.....Barry.
Mr. and Mrs. A. D. Barnes..... "
Mr. and Mrs. J. B. Johnson..... "
Mr. and Mrs. Z. Todd..... "
Sam'l Dooley..... "
Chris. Schroeder..... "
D. T. Bronaugh..... "
Conrad Aul.....Smithville.

CLINTON.

Worley Shinn.....Lathrop.
W. L. Culver.....Grayson.

COLE.

Fred. Yost.....Jefferson City.

COOPER.

Dr. J. B. Holman.....Boonville.

CRAWFORD.

H. C. Minter.....Keysville.

DADE.

Jesse Hiatt.....Lockwood.

DENT.

E. T. Butler.....Salem.

DAVIESS.

Woodruff Nursery.....Gallatin.

DALLAS.

S. A. Latimer.....Lang Lane.

FRANKLIN.

J. Bagby & Son.....New Haven.

GASCONADE.

F. Fleischer.....Gasconade City.
Rommel & Sobbe.....Morrison.
Stone Hill Wine Co.....Hermann.

GENTRY.

C. G. Comstock.....Albany.
N. C. Shultz.....King City.
Mrs. E. B. Haven.....Berlin.

GRUNDY.

E. B. Cooper.....Trenton.
Jos. Sibbit.....Tindall.
R. S. Wynne.....Edinburgh.
Thos. Luke.....Trenton.

GREENE COUNTY HORTICULTURAL SOCIETY.

M. J. Roundtree, President.....Springfield.
J. Kirchgraber, Vice-President..... "
D. S. Holman, Secretary..... "
F. F. Fine, Treasurer..... "
Mr. and Mrs. Henry Scholton..... "
Dr. Lane..... "
Miss Emma Kirchgraber..... "
Miss Rosa Holman..... "
Miss Lilly Holman..... "
Miss Lizzie Roundtree..... "
Mr. and Mrs. W. C. Freeman.....Brookline.

Mr. and Mrs. E. H. Lair ..... Springfield.
Mrs. F. F. Fine ..... "
Mrs. D. S. Holman ..... "
Mrs. M. J. Roundtree ..... "
Mrs. Charles Goff ..... "
Mrs. W. H. Burden ..... "
Mrs. Al. Demuth ..... "
Mr. and Mrs. W. E. Sheffield ..... "
Mr. and Mrs. W. H. Ritter ..... "
Mr. and Mrs. W. M. Hopkins ..... "
Mr. and Mrs. Jonathan Moore ..... "
Mr. and Mrs. —— Barnes ..... "
Mr. and Mrs. —— Meacham ..... "
Hon. I. S. Haseltine ..... Dorchester.
S. I. Hazeltine ..... "
Emmett Newton ..... Springfield.
—— Criss ..... "
John Dailey ..... "
G. W. Hopkins ..... "
W. M. Hopkins ..... "

HARRISON.

Isaac M. Neff ..... Bolton.

HENRY COUNTY HORTICULTURE SOCIETY.

M. J. Condon, President ..... Clinton.
M. L. Bonham, Vice-President ..... "
J. M. Pretzinger, Secretary ..... "
W. A. Hastin, Treasurer ..... "
W. H. Roberts ..... "

HICKORY.

Chris. Gerber ..... Wheatland.

HOLT COUNTY HORTICULTURE SOCIETY.

N. F. Murry, President ..... Elm Grove.
J. N. Menifee, Vice-President ..... Oregon.
J. M. Hasness, Secretary ..... "
C. Hoblozell, Treasurer ..... "
George Meyer ..... "
T. J. Kreech ..... "
D. Barbour ..... "
John Bond ..... "
John Callow ..... "
S. L. Huiatt ..... "
William Brodbeck ..... "

S. Blanchard..... "
T. B. Curtis..... "
L. N. Howard..... "
Henry Hughs..... "
Mr. and Mrs. Dr. A. Goslin..... "
Mr. and Mrs. Clark Irvine..... "
Mr. and Mrs. H. A. Dankers..... Corning.
Mr. and Mrs. J. W. Davis..... New Point.
Mr. and Mrs. N. F. Murray..... Oregon.
Mr. and Mrs. J. N. Menifee..... "

HOWARD.

R. T. Kingsbury..... Estill.
A. S. Wolcott..... Fayette.
A. McCray..... "

HOWELL.

Mr. and Mrs. E. F. Hynes..... West Plains.
Mr. and Mrs. P. P. Dobozy..... " "
Dr. H. T. Smith..... " "
R. S. Hogan..... Willow Springs.
Mr. and Mrs. A. Harrison..... Olden.
G. L. Sessens..... "

JACKSON.

Mr. and Mrs. Z. S. Ragan..... Independence.
Mr. and Mrs. L. L. Seiler..... "
Mr. and Mrs. L. M. Sea..... "
Mr. and Mrs. J. T. Head..... "
George J. Dod..... Greenwood.
Mr. and Mrs. C. E. Kern..... Westport.
Mr. and Mrs. L. A. Goodman..... "
Mr. and Mrs. F. Eslinger..... "
Mr. and Mrs. J. A. Bayles..... Lees' Summit.
M. B. Butterfield..... " "
G. Threlkald..... Kansas City.
Mr. and Mrs. F. D. Atkins..... " "
Mr. and Mrs. William Kidwell..... " "
Mr. and Mrs. L. E. Bosley..... " "
Mr. and Mrs. R. S. Brown..... " "
Mr. and Mrs. J. K. Cravens..... " "
Mr. and Mrs. J. H. Lewis..... Blue Springs.
William Byers..... Kansas City.

JASPER COUNTY HORTICULTURAL SOCIETY.

D. F. Emery, President..... Carthage.
Bennett Hall, Secretary..... "

A. C. Carson, Treasurer..... "
W. H. Smith..... "
M. I. Parker..... "
A. W. St. John..... "
P. Jackson..... "
J. B. Wild.....Sarcorie.
H. W. Wild..... "
J. K. Glassford.....Carthage.
H. W. Maxwell..... "
L. C. Amsden..... "
C. A. Emry.....Carthage.
D. L. Emry..... "
Z. T. Russell..... "
J. W. Baird..... "
W. J. Sieber..... "
P. Finn..... "
J. Ames..... "
W. C. Downs..... "
Nicholas Siebert..... "
Z. Freeman.....Joplin.
F. A. Hazen.....Dudenville.

JEFFERSON.

W. S. Jewett..... Crystal City.
G. E. Meissner.....Bushburg.

JOHNSON.

Prof. Geo. L. Osborne.....Warrensburg.
A. H. Gilkerson..... "
W. M. Mohler..... "
J. J. Cockrell..... "
M. G. Mullins.....Centerview.
Mohler & Son.....Cornelia.

KNOX.

Sinnock & Co..... Edina.

LACLEDE.

M. W. Serl.....Lebanon.

LAFAYETTE COUNTY HORTICULTURAL SOCIETY.

Dr. W. A. Gordon, President.....Lexington.
U. G. Phetzing, Vice-President..... "
C. E. Teubner, Secretary..... "
G. M. Catron, Treasurer..... "
H. S. Van Anglen.....Waverly.
John Aull.....Lexington.

W. M. Poge..... "
A. A. Leseuer..... "
Ethan Allen..... "
Geo. F. Maitland..... "
Fred Neet..... "
R. T. Russell..... "
Zack. W. Wright..... "
James Aull..... "
C. F. Lane..... "
W. K. McChesney..... "
Robt. H. Smith..... "
Dr. J. B. Alexander..... "
Robt. A Hicklin..... "
John S. Blackwell..... "
Mrs. Florida Graddy..... "
Mrs. M. V. Gordon..... "
Mrs. Cerelia Thomas..... "
Mrs. Jeannie Finley Shultz..... "

LAWRENCE.

Alfred Johnson.....Pierce City.

LEWIS.

W. G. Downing.....Canton.
E. Burrows..... "
Frank Harlan..... "
W. H. Thomas.....LaGrange.
H. C. Kirschbaum.....Tolona.

LINCOLN.

A. M. Shultz.....Troy.

LINN COUNTY HORTICULTURAL SOCIETY.

Ralph Smith, President.....Laclede.
Joseph Gamble, Vice-President.....Brookfield.
G. W. Martin, Secretary..... "
R. W. Davis, Treasurer..... "
A. P. Crosby..... "
James Hall..... "
Danforth Chinney..... "
W. D. Crandall..... "
W. L. Laing..... "
A. P. Wolverton.....Meadville.
J. W. Turner..... "
S. A. Field..... "
L. D. Walbridge..... "
A. P. Swan.....Bucklin.
O. S. Fay.....Boomer.

LIVINGSTON.

J. W. Green.....Chillicothe.
H. V. Lewis.....Bedford.

McDONALD.

S. G. Welborn.....Pineville.

MACON.

Green Bros.....Macon City.
J. M. Randall.....Callao.

MARIES.

D. W. Tainter.....Vienna.

MARION.

Wray Brown.....Hannibal.
W. S. Hallock..... "

MERCER.

R. J. Lewis.....Princeton.
J. A. Kennedy.....Ravenna.

MILLER.

N. J. Shepard.....Eldon.

MISSISSIPPI.

W. T. Phœnix.....Charleston.

MONROE.

J. D. Hawkins.....Paris.

MONITEAU.

R. A. Snorgrass.....Tipton.

MONTGOMERY COUNTY HORTICULTURAL SOCIETY.

Judge Samuel Miller, President.....Bluffton.
F. Lionberger, Secretary.....New Florence.
F. Gaueteman, Treasurer..... "
W. Loane..... "
J. S. Drummond..... "
D. P. Taylor..... "
Ch. Laney..... "
Fred Utz..... "

MORGAN.

Caleb Gunn.....Versailles.

NEW MADRID.

C. C. Thomas.....Pt. Pleasant.

NEWTON.

H. Jaeger.....Neosho.

NODAWAY.

T. W. Gaunt.....Maryville.

OREGON.

Ben. Gunn.....Alton.

OSAGE.

Christ. Heyer.....Byron.
Jesse Moore.....Linn.

OZARK.

Wm. Mahan.....Almartha.

PETTIS.

J. H. Monsese.....Beaman.
Phil. Pfeiffer.....Sedalia.
J. Laney.....Green Ridge.
Ed. Brown.....Sedalia.
G. H. Shepard.....LaMonte.

PLATTE.

Mr. and Mrs. W. G. Gano.....Parkville.
Mr. and Mrs. J. A. Durkes.....Weston.
Mr. and Mrs. C. Thorp..... "
Mr. and Mrs. J. J. Blakely.....Platte City.
W. R. Keller.....Weston.
F. Hollied..... "
J. P. Reichard..... "

PIKE.

Stark & Bros.....Louisiana.

PUTNAM.

J. T. Scott.....St. John.

RAY.

Alex. Maitland.....Richmond.

RIPLEY.

J. G. Hancock.....Doniphan.

ST. CHARLES.

Chas. Golterman.....Foristelle.

ST. CLAIR.

Wm. Hook.....Lowry City.
Mr. & Mrs. G. S. Allison.....Johnson City.

ST. LOUIS.

P. M. Keily.....St. Louis.
E. Hollister..... "
Miss Mary Murtfeldt.....Kirkwood.
Isidor Bush.....St. Louis.
Levi Chubbuck..... "
Geo. H. Gill.....Kirkwood.

SALINE.

J. T. Stewart.....Blackburn.
Wm. Folck.....Marshall.

SCHUYLER.

G. W. Morton.....Glennwood.

SHANNON.

Jas. McKinney.....Eminence.
N. Vandelft..... "

SHELBY.

Jas. Hanley.....Shelbina.
H. G. Bruce..... "

STODDARD.

Jesse Brown.....Lakeville.

TEXAS.

J. C. White.....Houston.

VERNON COUNTY HORTICULTURAL SOCIETY.

A. Ambrose, President.....Nevada.
H. Fuller, Vice-President..... " "
H. Shepley, Recording Secretary..... " "
E. R. Mererord, Corresponding Secretary.....Schell City.
D. W. Graves, Treasurer..... Nevada.
W. Scott.....Montevallo.
Jacob Faith..... "
F. H. King..... "
A. Ingraham.....Nevada.
J. Q. Thompson.....Walker.
Benedick Bros..... .....Enoch.
J. H. Logan & Sons.....Nevada.
H. M. Crouse..... "
Wesley Wilcox..... .... "
J. S. Hatten.....Sheldon.

WARREN.

J. E. Yocum..... .....Warrenton.

WASHINGTON.

Phil Rush..... .....Mineral Point.

WAYNE.

Henry Grifling.....Piedmont.

WEBSTER.

Geo. Lewis.....Northview.

WRIGHT.

A. D. Hanks.....Mansfield.
S. W. Anderson.....Mt. Grove.

MISSOURI VALLEY HORTICULTURAL SOCIETY, KANSAS CITY, MO.

President, W. G. Gano.....Parkville, Mo.
Vice-President, L. A. Goodman.....Westport, Mo.
Secretary, F. Holsinger.....Rosedale, Kas.
Treasurer, G. F. Espenlaub..... "
Mr. and Mrs. F. Holsinger..... "
Mr. and Mrs. G. F. Espenlaub..... "
Prof. G. E. Rose..... "
Mr. and Mrs. S. S. Ely..... "
Mr. and Mrs. S. S. Hogue.....Westport, Mo.
Mr. and Mrs. J. C. Dickinson..... "
Mr. and Mrs. L. A. Goodman..... "
Mr. and Mrs. J. C. Evans.....Harlem, Mo.
Mr. and Mrs. Z. Todd..... "
I. Orwick..... "
C. Shroeder..... "
J. F. Howell..... "
Mr. and Mrs. C. E. Kern.....Kansas City, Mo.
Mr. and Mrs. I. D. Gregg..... "
Mr. and Mrs. W. A. Gosnell..... "
Mr. and Mrs. J. K. Cravens..... "
Mr. and Mrs. Wm. Kidwell..... "
H. Kretchmer..... "
S. C. Palmer..... "
Jesse Ray..... "
J. C. Blair..... "
Wm. Butterfield..... Lees Summit, Mo.
Dan Carpenter.....Barry, Mo,
Mr. and Mrs. W. G. Gano.....Parkville, Mo.
Mr. and Mrs. Z. S. Ragan.....Independence, Mo.
Mr. and Mrs. J. A. Bayles.....Lees Summit, Mo.
Williamson.....Wyandott, Kas.
T. L. Hogue.....Glenn, P. O., Kas.
Mr. and Mrs. J. A. Durkes.....Weston, Mo.
Mr. and Mrs. Wm. Lewis.....Kansas City, Mo.
A. J. Threlkald..... "
Mr. and Mrs. C. B. Warren..... "
E. Lindsey.....Westport, Mo.
Mr. and Mrs. Harvey Hughs.....Rosedale, Kas.

CENTRAL MISSOURI FRUIT-GROWERS ASSOCIATION, BOONVILLE, COOPER COUNTY, MO.

President, W. A. Smiley.....Boonville.
First Vice-President, R. T. Kingsbury.....Estelle.
Second Vice-President, W. P. Thompkins.....Boonville.
Secretary, C. C. Bell..... "
Treasurer, Fred. Boller..... "

John Viertel.....Boonville.
C. J. Fiddler..... "
Henry Dimple..... "
H. M. Myer..... "
H. Roberts..... "
C. J. Ingersoll..... "
O. Carville..... "
L. Gieger, Sr..... "
L. Gieger, Jr..... "
H. Wooldridge..... "
Joe Glahn..... "
J. E. Elliott..... "
Will. Givens..... "
John Neef..... "
Frank Neef..... "
L. Smith..... "
A. Walter..... "

FOREIGN MEMBERS.

P. Underwood.....N. Lawrenee, Kas.
E. J. Holman.....Leavenworth, Kas.
Dr. J. Staymen..... "
F. Wellhouse.....Fairmount.
E. F. Stephens.....Crete, Neb.
G. S. Downend.....Sibley, Iowa.
E. C. Robinson.....Portland, Maine.
Thos. Fargher.....La Porte, Ind.
E. Taylor.....Edwardsville, Kas.
H. M. Hoffman.....Leavenworth, Kas.
J. W. Preston.....Blue Mound, Kas.
Perry Nixon.....Cherryvale, Kas.
A. H. Griesa.....Lawrenee, Kas.
Sam'l Grondyke.....Eugene, Ind.
D. J. Purdy.....Mason City, Iowa
L. G. Atkins.....Watson, Mich.

MISSOURI STATE HORTICULTURAL SOCIETY.

SUMMER MEETING HELD AT BUTLER, JUNE 9–11, 1885.

Upon the invitation of the Bates County Horticultural Society, the members of the society began to assemble on the 9th of June, and were at once sent to their places of entertainment so kindly provided for them. The whole of the 9th was spent in getting acquainted among the people of Butler, in the arrangement of the fruits and flowers and ornamenting the church so kindly furnished by the Presbyterian church people.

BUTLER, BATES CO., MO., June 10, 1885.

The members of the Missouri State Horticultural Society began to assemble at the Presbyterian church at an early hour. The weather was cool and the diplay of fruit and flowers exceedingly fine.

More than fifty plates of late keeping apples ornamented a large table in the center of the room, while strawberries and flowers were everywhere. Especially one star boquet of cut flowers from Phil. Pfeiffer, of Sedalia, which hung pendant from the back of the speaker's chair, called forth many expressions of delight.

The room was tastefully decorated with evergreen.

The house was well filled with an intelligent body of men and women when called to order by the President, Col. Evans.

The exercises were appropriately opened by the song of "Beulah Land."

Invocation by the Rev. Pearson, of the M. E church.

A hearty address of welcome was delivered by D. V. Brown, Mayor of this city, which was responded to in like hearty manner by Mr. Carpenter, of Clay.

THE ANNUAL ADDRESS.

BY PRESIDENT J. C. EVANS, OF HARLEM.

Ladies and Gentlemen of the Missouri State Horticultural Society, and Citizens of Butler and Bates County :

We have met to-day for the purpose of exhibiting of the products of our toil, fair fruits, beautiful flowers and useful vegetables, and to gain through the interchange of our thoughts and ideas information important to our success as horticulturists. We have come to this flourishing young city on the invitation of the Bates County Horticultural Society. We come hoping to have a meeting that will prove profitable and pleasant to all. We trust we have chosen an auspicious time and an auspicious place for this semi annual meeting, and that it will excite a still greater interest in the work here and be an honor to this beautiful and promising city.

As we meet from year to year we find much of pleasure in the social enjoyment, and we learn much from each other's experience.

We are happy to note the progress made recently in this section as well as in many other parts of the State by the organization of county horticultural societies, and we say to all others that have not—*organize* and let the good work go on until an abundant supply of the best of fruits shall adorn the tables of every house in the land, the poor laboring class as well as the prosperous farmers and wealthy people of our cities and towns. Until fruits and vegetables become leading articles of food for all classes, and flowers and ornamental trees and plants adorn every home and lawn in the land, there will be a need for these meetings.

Some of the members of this society have worked hard for a score of years, and while we are proud of the progress we have made, we must admit we have advanced but little beyond the A B C's in this great work. We have learned many valuable lessons (some by dearly bought experience), but the field for advancement is yet unlimited. Large districts of our State are still untouched as far as horticulture is concerned, and yet they contain some of the very best fruit lands in the world. Prof. Budd, of Iowa, after an extensive tour of investigation in Europe and America, has decided that the apple district of the world is here in Western Missouri, Eastern Kansas, and Northwestern Arkansas.

At the great World's Fair at New Orleans recently, the contest for the gold medal was between these three States, and I am happy to be able to say your own State of Missouri got it, Arkansas and Kansas following close behind.

So let us take courage from these facts and go on until these beautiful prairies shall emit the fragrance of the various fruits and flowers, and even the forests shall give way to orchards, gardens and vineyards.

REPORT OF THE SECRETARY, L. A. GOODMAN, WESTPORT.

Mr. President and members of the Missouri State Horticultural Society:

Another six months have passed, and I am happy to give a good report of our society.

The last few months have been eventful ones for our society. I believe we have made more history and accomplished more successful work than ever in the history of the society.

Our wonderful success at New Orleans was a glory to our State, not ever before obtained. In that wonderful exhibition of fruits we came out winners of the greatest number of premiums, medals and money of any State in the Union. It is useless for me to repeat the number of our awards, they are given in our last report for 1884. Enough, is it to say, that we received the two highest awards given to any State or society; that we were awarded twenty-two other premiums, that we will receive one gold and three silver medals; and that we took the premium on the three largest collections. 200 varieties of apples, 100 varieties of apples, and 50 varieties of apples. If it did not occupy too much space, I would give you a list of varieties in each of these exhibits. But that will not do, and we have certainly to congratulate our State on the work done by our society in this great show of fruits.

With reference to the premiums taken at New Orleans, I have made application to the U. S. Treasurer for our claim, and if there be any opportunity to get it, I expect to get it. I believe that this should be followed up, and that we make every attempt to get what justly belongs to us, as do the others.

If this great exposition be kept up next year, we will have to do something to make another display, and they will certainly pay up these bills and premiums before they ask people to come again.

One other matter with reference to this, and that is, that whatever honor has been gained at the World's Fair by Missouri has been through the efforts of our State society. For of all the displays in the Government Building from all the States in the Union, the one from Missouri stands prominently *at the bottom*. Our Commissioner certainly has been out of his place in charge of the Missouri display. Notwithstanding he had $7.700.00 in his hands, he has done absolutely nothing in the way of displaying the agricultural products of Missouri. We cannot help contrasting his opportunity, the amount of money at his command, a disgrace to the State, and the poor miserable failure of his display; with our opportunity, our means, about $500.00, out of our own pockets, and the wonderful success of our exhibition, an honor to our State. Not only was our success in the horticultural hall, but even in the State display we put some three hundred plates of fruit, according to our promise to Prof. Sanborn.

We had an exhibition at one time of nearly 2,000 plates of fruits in both buildings, and left twelve barrels of apples in the cold storage to keep up the display. And even these twelve barrels were wasted by our Commissioner, as I am informed by our President.

THE WORK OF THE SOCIETY.

Our society is taking the stand in the horticultural world, that I have been working for two years to get. We now certainly command the respect of our sister States and their societies. Day by day now continually I receive words of encouragement, questions for information, and calls for our reports. The horticultural papers of the country are asking for them also, and asking for information from our State. They begin to see that we are at work, and are making ourselves known. Hundreds are asking about Missouri as a fruit State.

After our winter meeting in December, I took the manuscript of our report to the State Printer at Jefferson City, and he agreed to have the the work complete by January 10, 1885.

On the 5th of January I went with our display to New Orleans, and did not return until the 1st February. Going to Jefferson City, I found that not one page of the report had been started. After working with them a day or two, I asked the assistance of the State Auditor, and the matter was arranged, so that I received the books about April 1st. This work was a very provoking one. I had to go to Jefferson City twice, and then go to the printers and remain for three weeks to

keep them at it, or we would not have had the report yet. I am hoping for better arrangements the coming year.

Prof. Sanborn of the State Board of Agriculture, had his manuscript ready last September, and just received the books.

As to the work done, I have obtained for the society about $600.00 in help in our printing bill, which otherwise we should have had to pay out of our appropriation.

I got an order for the paper for the report, which amounted to $150.00, from the State Printer, and then asked the State Auditor to recommend the Legislature to give us $450.00 in the deficiency bill to pay for the printing. This was received in due time, and with $150.00 out of our treasury, we have paid for our report.

One other thing I thought I would do while in Jefferson City, and that was to ask Senator A. M. Allen to introduce a bill giving us $1,000.00 to help in the New Orleans display. This bill promptly passed the Senate, and only through neglect failed to pass the House, and was cut down to $500.00 to reimburse us for money expended at the World's Fair. This money has also been received and paid out to those who paid money out of their own pockets to help the display and did the work of packing and arranging; this will appear in the financial report.

If it had not been for the help in publishing our report which was obtained, I fear we should have been bankrupt or obliged to cut short our work. I fear that our committee on legislation did not do their duty, and that what I succeeded in accomplishing was all there was done.

I asked *our friend*, the State Auditor, again to recommend our usual appropriation and all printing done also for this year. That is the way the matter stands now; after this we will get our printing done without having to use any of our State money, and it is well, for we need it all. I find that all the members of the legislature are willing, and were last winter, to give us what we might ask for; and I believe if our committee had attended to it in time we might have had our appropriation raised to what other States get, and then we could do more and better work. I am sure of one thing, that all we want is the money to pay for time spent and expenses of the workers, and that then we can do as much as any other State. Give the money and we will make this society a success. I am sure of it.

I sent out the following circular to members when Senator Allen's bill was before the Assembly, and as I said before, it was only through neglect that it failed, for many members of the Assembly promised support, and gladly assented to all I asked of them. As the matter now

stands we will get what I asked of the State Auditor, our usual appropriation, $2,500 for two years, and our printing done besides; this is better, much better than last year, but we should have double this amount in order to do the work I should like to have done.

The following report was made to our members:

SECRETARY'S OFFICE,
MISSOURI STATE HORTICULTURAL SOCIETY,
WESTPORT, Mo., February 14, 1885.

To Members of the Missouri State Society:

You are well aware that our society made an exhibit of fruits at New Orleans, and, I am glad to say, with grand success.

We have taken the three highest premiums given to any State or society, viz.:

Gold medal and $200 on 200 varieties of apples.
Silver medal and $100 on 100 varieties of apples.
Silver medal and $75 on 50 varieties of apples.

We also took two other silver medals and twenty smaller premiums, amounting in all to $495; but this money will not be paid until the close of the Exposition (even if it be paid at all).

We have done our duty as a society to Missouri, and she stands at the front as taking more premiums than any other State in the Union.

Our society has been to an expense of about $500, and now we ask our Legislature to refund this money to us and also give us $500 more to keep up the exhibit to the close of the Exposition.

A bill has been presented in the State Senate by Senator A. M. Allen, of Jackson county, for that purpose; and now, I ask *each one of you*, as members of our State Society, to write to your Representative and Senator, asking them to vote for this bill.

It is only justice to the horticulturists and the society itself that we get this assistance, and the return of the money spent. Missouri has received the honor of having the best fruit display in Horticultural Hall, through the efforts of our society. They should give us this money in return, and they will, if you *all* ask them.

L. A. GOODMAN,
Secretary.

OUR REPORT FOR 1884.

After many drawbacks, after many hitches, after many "trials and tribulations," the report was completed. I find it takes much time in this work and that I cannot give all my time as it should be done to

the work. For this reason you will find many errors in the report. I shall be glad when I shall feel able io give it my whole attention.

This report has been sent to all the prominent horticultural papers of the United States, and has been well received by some, been criticised severely by others, and recommended highly by still others.

Some have said, "it does very well for Missouri," as if nothing good could come out of Missouri. Some have said, "it lacks editorial work which will disappear with experience," intimating that the secretary should spend more of his time at the work. Others have said "that it is one of the best reports published by any Western State."

What it is, it is, and I am willing to let it stand on your judgment.

We published 1,500 copies, 1,000 cloth, 500 paper; of the cloth, only 200 remain. We shall certainly need many more next year, and will not have enough for this year, even.

SOME NEW APPLES.

The society has brought out three very excellent apples in the last few years, and I believe we will yet find some apple just the thing we want for our own State. The first is the "Gano," a seedling found by W. G. Gano, of Parkville, Mo., a large, handsome, red apple, good bearer and hardy. The apple has a bloom like the Lawver, and although not the best in quality, it is a fair apple, very attractive to the eye and will sell well, good keeper, well worthy propagating.

The second is the "Rankins," brought into notice by Mr. H. C. Kirshbaum, of Tolona, Mo., a medium to large striped apple, very fine in quality, juicy and sprightly, good bearer, hardy and good keeper. It took the first premium as a new apple at the meeting at St. Joseph, and came within one point of taking the premium at New Orleans. It is from seed brought from Kentucky by Mr. Rankins fifty years ago. It is worthy of propagation, and will become valuable in Missouri.

The above apples or scions have been distributed through the Missouri society as a gift to the members. The parties having control of them have been liberal enough to give many away and to sell to nurserymen in small lots at very reasonable prices. This is one of the offices of this society, and if valuable apples can be brought to notice and scattered through the State, we are doing a vast amount of good, as I believe there will yet be found apples which will keep well, sell well, bear well and eat well in this our State.

The third is called the "Loy," and was found at the county fair at West Plains, Howell county, Missouri, in October, 1885, and obtained through Mr. E. F. Hynes, of that place. This apple resembles the Willow Twig, is a medium to large, extra good quality, good keeper, and tree said to be hardy and productive, very valuable annual bearer. This apple took the premium as the best new apple at New Orleans, although the "Rankins" and it were on a tie for some time and only received the premium by one point; well worthy propagation, and I believe will become very valuable to our State. I took this apple with a collection made at West Plains to New Orleans, because I thought it a worthy apple, as a also took the Rankins because I thought it worthy. On my return, I wrote to Mr. E. F. Hynes relating the fact and asking him to give me a history of the apple. If favorable I wanted to distribute through the society.

(This has been just exclusively in the hands of Mr. M. J. Roundtree, of Springfield, and will be sold by him as soon as trees can be grown.)

Another new apple called the "Shackleford" seems to be a very valuable one, perhaps as much so as the others. It is a very handsome, large apple, good bearer, good keeper, tree hardy and early bearer, excellent quality and highly flavored. A cut of this is shown, and I hope to have one for each of the other apples if possible for the next report. Some of these new apples may be worth thousands upon thousands of dollars to our State, and it shall be one of the missions of this society to bring them into notice and test them. (Apples from F. Harlan, Canton, Mo.)

These apples should be tested this year in different parts of the State. Prices are not high for this, and let us test them.

[From the Report of the Committee on New Fruits, Illinois State Horticultural Society, 1885.]

But what of "new fruits, trees and plants?" This: We have travelled some hundreds of miles in making our observations; we have seen and examined hundreds of specimens; we have personally tested a great many, and yet we have found a very small per cent. of the new fruits which are being hawked about the country to be really worth the ground which they occupy.

But perhaps the most promising new apple before the public is the "Shackleford," a seedling from Clark county, Missouri. The tree is a good grower, either in the nursery or orchard; is hardy and prolific, bearing very young, and has the reputation of producing large and annual crops. Four of these trees, planted in 1880, were visited by us in October, 1884. We found them in the finest possible condition, and loaded with large, showy fruit of good quality and flavor, the yield be-

ing a full third more than any Ben Davis of the same age. The tree resembles the Willow Twig; in size, the fruit is very large; in color, yellow ground, covered with crimson, and striped and splashed with deep red; in flavor, sub acid (specimens of this fruit are herewith presented); it is a long keeper.

Two new (old) apples are so very promising in the west that they must be noticed in this connection.

The Clayton and the York Imperial, both very large and fine looking, very productive, hardy and early bearer. Both these apples will bring more than the Ben Davis wherever put upon the market in competition with them.

Let all who can get a few of these scions or trees and test them. The Clayton can be had of Z. S. Ragan, Independence, Mo., and the York of F. Holsinger, Rosedale, Kansas.

RECOMMENDATIONS.

REPORTS.

First, our reports should all be bound; we have now about 400 of 1883 reports, and 400 of 1884. Nearly all the bound copies are out, and we are still receiving calls for more. If these could be bound they would be of some service to us in the distribution. None of us like a pamphlet, and when sent it often goes to the waste basket in the course of the year. We need more of these anyway, and this is the best way to get them.

After this we will need more than 1,500 of them, and 2,000 or 2,500 will be none too many for the use of the society. Our printing is to be done by the State, and I am not certain how many we will be entitled to.

LIBRARY.

We must have some standard books in our library. $150.00 cannot be better spent than in buying some books for our use. It has come to be a necessity. I hope the Executive Committee will order this done. We should have a file of reports of all societies so far as they can be obtained. We have in our library now the following books:

LIST OF BOOKS IN LIBRARY.

Missouri Reports. 1866-67-69-70-71—2 each	10
Missouri Reports, 1872-73-74-75-76-78-79—1 each	7
Missouri Reports, 1880 and 1881, combined	50
Missouri Report, 1882	1
Missouri Report, 1883, cloth, 100; paper, 400	500
Missouri Report, 1884, cloth, 200; paper, 400	600
Colorado Reports, 1882, 1883-4	2
Ohio Report, 1883-4	3
Ohio Ep. St., 1883	2
Massachusetts Report, 1883	1
West New York Report, 1885	2
Nova Scotia Report, 1885	1
California Report, 1883	1
Mississippi Valley Report, 1883	25
Mississippi Valley Report, 1884	50
Michigan Reports, 1878-79-80-81-82—1 each	5
Michigan Report, 1883-4	10
Kansas Reports, 1881-82-83—1 each	3
Wisconsin Report, 1884	10
Wisconsin Report, 1881-2	1
Indiana Report, 1881	1
Minnesota Report, 1883	1
Illinois Report, 1882-3	4

Bushberg, Cataloge Grapes; Downing, Fruits and Fruit Trees of America; Rural Tastes, M. G. Kern, Columbia; Forestry Report of '84; Science Report of '82; Iowa Agricultural College Report on Fruits; Composition of Wheat and Corn, C. Richardson; Sorghum, P. Collier; Grasses of the U. S., Geo. Vasey; Ornament School Grounds, Michigan Horticultural Society; Cataloge of Insects at New Orleans, C. V. Riley; two French papers on Phylloxera.

PAPERS.

In March I sent to the most prominent Horticultural papers in the States asking them if they could afford to give us a copy of their paper for the year for our library, at the same time sending them one of our reports for 1884. In response to this I have received the following papers, which are kept on file for the use of the members. We should have a few dollars spent in binders, in which to keep the papers as they come, and a few dollars for a place to meet and keep them. I should like to have the members always feel free to come to such a place to talk over matters, read the papers or examine the standard works on Horticulture or "Bugology." It seems to me that this is the province of our society, and our usefulness is only limited by the money we have for our use.

List of papers furnished the society by the publishers:

Rural New Yorker, New York City, N. Y.
American Agriculturist, New York City, N. Y.
Prairie Farmer, Chicago, Ill.
Western Rural, Chicago, Ill.
Colman's Rural World, St. Louis, Mo.
Journal of Agriculture, St. Louis, Mo.
Purdy's Fruit Recorder, Palmyra, N. Y.
Kansas Farmer, Topeka, Kas.
The Home Farm, Augusta, Me.
American Garden, Greenfield, Mass.
Ladies' Floral Cabinet, New York City, N. Y.
Farm, Field and Stockman, Chicago, Ill.
Western Agriculturist, Quincy, Ill.
Dakota Farmer, Huron, Dak.
Live Stock Record, Kansas City, Mo.

STATE ENTOMOLOGIST.

We did not get the much desired State entomologist, and now the next thing to be done is to get some one to help us and help ourselves. I believe $50 or $100 given to Miss Mary Murtfeldt to assist her in the study of this matter would be well spent. We ought to get our State Board of Agriculture to take hold of this and give the money; agriculture needs it as much as horticulture, and I believe we can get the help asked for. She is now one of the assistants in this work to Prof. Riley, and could easily do this for us if called upon. I write this without her knowing of it and do not know as it would be agreeable to her. But this I do know, that it would be agreeable to us.

AMERICAN POMOLOGICAL SOCIETY.

The next meeting of this society will be held at Grand Rapids, Mich., in September, and we should also be represented there. I am holding in the cold storage some five or six barrels of apples consisting of a number of varieties, which I expect to hold for that meeting. We must also make a business of collecting specimens this summer, and placing in cold storage for that meeting all the fine varieties and specimens that can be had, and then finally make a grand show at that time.

I believe, in fact I know, that the various fruit displays have been more the means of calling attention to our State as a fruit growing district than have all other causes combined. It has cost only a few hundreds of dollars, while the other means have cost many thousands and with not half as good results. Our experience, our work, our results, our fruits, have certainly been a powerful factor in this grand horticultural work.

FINANCIAL.

The following is the amount expended by the Secretary for printing, postage on reports, other expenses:

Warrant No. 42, expenses of winter meeting	$117 50
" " 43, expenses at New Orleans, Jefferson City, postage	77 35
" " 44, expenses on reports, express and postage on reports	101 80
" " 45, binding reports, postage on 200, express and freight	218 78
" " 46, postage on reports, 200, circulars and postage June meeting	
" " 34 and 36, printing State reports	428 64

Nearly all the above expense is with printing, binding and sending out the reports, and in preparing the report for the printer. It being necessary for me to make three or four trips down and then to remain there for three weeks reading the proof.

The letter postage, postal cards, circulars, etc., are getting to be quite an item in our account. I find more and more, that much work can be done and has to be done by letter writing. Our work is continually growing and coming where I would like to see it, to a point where one man is kept busy all his time.

All we want in this is the money to do the work and the work will be done.

In May I sent out the following call for the report of the condition of fruits:

MISSOURI STATE HORTICULTURAL SOCIETY.

JUNE FRUIT REPORT.

From..... County. Made by.....

Of.....

ORCHARDS.

What are the prospects for a full crop (give percentage, taking 100 as a full crop, of

Apples - -	.....	Plums - -	.....
Pears - -	.....	Cherries - -	.....
Peaches - -	.....	Quinces - -	.....

What varieties have the best prospect?

Apple.....
Pear.....
Peach.....
Plum.....
Cherry.....

Which of the above trees were injured by the winter?

.....

VINEYARDS.

Give prospects for full crop of grapes.....

What varieties were injured by winter?

.....

BERRIES.

Give prospect for full crop of:

Strawberries..... Blackberries..... Raspberries.....

Varieties injured by winter:

Strawberries.....
Blackberries.....
Raspberries.....

Wishing to make a list of varieties adapted to every county in the State, will you please give a list of the best, hardiest and most profitable varieties of the following for your county:

Apple.....
Pear.....
Peach.....
Plum.....
Cherry.....
Grapes.....
Raspberries.....
Blackberries.....
Strawberries.....

Please answer and return to me before June 1st.

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

Also the following call for the State meeting at Butler:

MISSOURI STATE HORTICULTURAL SOCIETY,
SECRETARY'S OFFICE,
WESTPORT, Mo., May 15, 1885.

The Semi-annual Meeting of the Missouri State Horticultural Society will be held in Butler, Bates county, Mo., June 9, 10 and 11 1885, upon invitation of the Bates County Society.

It is the desire of the officers of the Society that we make this a very pleasant and profitable meeting. To do this every member must stop his work and make an extra effort to be present. You certainly can spare a day or two for the interest of the Society, and you will go home "enthused" with new life in the horticultural work.

The secretaries of the local societies will be expected to make a report of their proceedings and of papers read during the last six months, etc. Members from places where there are no societies will please report for their counties the condition of fruits, and other items. All the standing committees will bring in their respective reports in writing—this is their duty.

Papers on any subject of interest to the Society will be gladly received, and we hope no one will feel the least delicacy in bringing or sending essays to the meeting. This is as much your work as ours, and you can give us your experience, success or failure, that others may profit by it. Write them, notify the secretary of the subject, and bring them with you to the meeting.

The papers that are to be read before the Society will cover a variety of subjects, and cannot fail to interest and instruct every one.

A programme cannot be fully made out at this time, but will be arranged at the meeting to suit the members as they come.

Once more we urge upon you all to secure members for our Society. We want workers; get their names and give them to us. Every member will receive the State Reports for 1883 and 1884, either of which is worth the membership fee, ($1.00).

It is desired, also, to have a good exhibition of strawberries and flowers; so be sure to bring your fine specimens of fruits and flowers. After the meeting ice cream and cake will be furnished, the strawberries will be eaten, and a good social time will be enjoyed by all.

Premiums will be awarded as follows:

For best box of each and every variety of strawberries considered worthy, $1.00; second best, fifty cents.

Premiums of $1.00 for first, and fifty cents for second, will be awarded to each of the following:

Best hand, table and vase bouquets; best basket, wreath and collection of cut flowers.

The railroads have given us reduced rates. Full fare will be collected in going, but only one-third fare on the return. The Missouri Pacific Railroad require a certificate from the Secretary, and you will have to purchase a round trip ticket at one and one third rate.

The Bates County Society promise free entertainment to all members—and in fact to all who attend. Come, then, and bring the ladies with you.

Once again we urge you to make an extra effort and come and meet with us.

J. C. EVANS, PRESIDENT, Harlem.

L. A. GOODMAN, SEC'Y, Westport.

A list of fruits being requested from each county for the information of those wishing to plant out orchards or small fruits, they are arranged by counties in alphabetical order, so that a person can from the location of the county have a very intelligent idea of what to plant.

I have asked for a list of the *best*, *hardiest* and *most profitable* of each kind of fruit. This of course would give the best for all purposes, the best for profit, the best bearer and the most regular.

Any one by adding to this list can get what he wishes for family purposes, but the first idea should be to get good fruit, plenty of it, and as certain a crop as possible.

The county is given the list of fruit and by whom given.

I expect also a more complete list of all the varieties of fruits from each horticultural society, and this will be a star to guide all in their planting for a number of counties around where the society is located.

Our membership has increased, but more slowly than I would like; now we have nearly two hundred members, but not all pay their yearly membership. We should have five hundred yearly members, or even more.

The Rural New Yorker says, "that out of a population of over 2,000,000, we should have 20,000 members." I hardly expect that, but we must have more of our fruit men interested in the work we are doing.

According to the action of our Executive Committee, all local societies now will be enrolled as members, and be entitled to the annual report, *provided* the Secretary sends a report of the yearly meetings, the papers that are read before the Society, and a list of the members. This should certainly be an inducement for our fruit men to organize a society in their counties. I shall be glad when we can have fifty societies in our State, all working to help the cause along.

The following circular was prepared, and is sent out with every book, and has been the means of starting other societies to work:

MISSOURI STATE HORTICULTURAL SOCIETY.
SECRETARY'S OFFICE,
WESTPORT, MO.

DEAR SIR: I send you our "Report for 1884," and trust you will find something in it both to interest and instruct you in your fruit growing If you have not renewed your membership I trust you will do so now. If you are not a member I hope you will unite with us in the good work. We should have at least five hundred members in our grand old State, and I hope you will help secure them. All new members will receive the "Report for 1883" also. These Reports are filled with essays, reports of committees, items, and other matter of interest, and is worth more than $1.00 to every fruit grower.

All county societies that send a list of their members aud officers and a report of their proceedings for the year, will be listed as members of our State Society and entitled to the Annual Report. Organize a society in your county and work with us.

Membership, $1.00 per year.

L. A. GOODMAN,
Secretary.

COUNTY SOCIETIES.

Let us have more county societies: A necessity to ourselves, to our State, to our county, to our fruit growers, is a good society in different parts of the State. A few of the fruit men—a dozen or so—are enough to have a No. 1 horticultural society in your county. And now that the State society can aid you in this matter, I hope the fruit and vegetable growers, nurserymen and florists will help in this good work.

I hope to see the time when we will not only have a semi-annual meeting, but a quarterly meeting each in different parts of the State, and thereby enthusing new life into that part where the meeting is held. I expect to see this in the near future; this is one of the goals to be reached.

Farther than this, I hope and expect to go—and we will then have the help we should have when our State will give us money enough to do the work—I want three or four, chosen from the State society, who will each month visit some one of our local societies, assist them in their work, give them aid and advice.

When this is done I know a new era will dawn on our State work.

L. A. GOODMAN,
Secretary.

The following committees were appointed by the President:

Programme—E. P. Henry, of Bates,
D. S. Holman, of Greene,
W. G. Gano, of Platte.

Finance—D. N. Thompson, of Bates,
F. Holsinger, of Kansas,
A. Ambrose, of Vernon.

Obituary—M. J. Roundtree, of Greene,
Ave E Page, of Bates,
H. B Francis, of Bates.

Fruits—Henry Speer, of Bates,
J. A. Durkees, of Platte,
Jacob Faith, of Vernon.

Flowers—Mrs. Robards, of Bates,
Mrs. Goodman, of Jackson,
Mrs. Ragan, of Jackson.

Final Resolutions—Z. S. Ragan, of Jackson,
M. J. Rountree, of Greene,
E. T. Hynes, of Howell.

On Report of Secretary—D. S. Holman,
Dan Carpenter,
Z. S. Ragan.

REPORT OF COMMITTEE ON ORCHARDS.

BY D. S. HOLMAN, SPRINGFIELD.

SPRINGFIELD, MO., June, 8, 1885.

Missouri Horticultural Society:

As a member of your Committee on Orchards, I am told that each member is desired to report from his part of the State, I would then in a few words report the orchards in my locality in Southwest Missouri.

In our report last year our orchards were reported in bad shape from effects of severe winter of 1880 And while we cannot now report exactly as we would have it, we are glad to tell you they are better. We find that where fruit trees are so damaged by severe or untimely frost, it cannot be readily determined how extensive the sad work has been. In this case it is now five years, and every year some trees have died from the effects of that cold November frost. About all of such are out and new ones have their places.

The last winter was considered severe, but did not do much damage to our orchards that is perceptable.

The present year's growth of wood now being made and the healthful appearance of foliage are alike satisfactory.

The prospect for a crop of fruit is not so satisfactory. Our trees ripened up early last fall a full crop of fruit buds—the peach buds and more tender varieties of all the fruits were killed during the severity of winter. The apples, pears and all hardy kinds of fruit buds came through and gave a very fine show of bloom, which to some is a satisfactory guarantee of full crop, but we have now learned that profuse and beautiful flowers are not ripe fruit. At the base of these plump and otherwise perfect fruit buds there was left sufficient cause for disappointment of our hopes, such always causing the fruit to drop badly even though profusely set. In addition to this, after a grand show of bloom by

everything but peach, there came a cold wave from the northwest on the 6th of May, which brought a freezing rain, one-half day of snow, followed by two nights' frost, which but for the foliage, all fruit must have gone; the foliage saved them, but the shock to the young fruit was too severe and made it drop badly, and it is dropping yet from all varieties, leaving scarcely hope for one-half crop.

The number and size of our orchards upon the Ozarks have increased very much by last spring planting. While very many small farmers have only planted fifty or one hundred trees for the home use, others for the markets—for the money—have planted 1,000 and more, some ten acres, some forty, and a few have planted even more.

Our orchards as they are, and with all the disparaging freaks of weather, seasons and ravages, insect enemies, have solved the question, will it pay? A citizen of S., who had a lucrative business, bought 160 acres of land fifteen years ago and planted forty acres to orchard—apples, peaches and pears. I got his experience last week, and it has been such to indue the abandonment of the old business; he built a large two story stone fruit house for storage, and is convinced of its value by last year's use; planted forty acres more and is preparing for another forty. He both shows and says it pays better than anything else. Others are doing as near likewise as they can. One of his neighbors has gone far beyond him, having quit a large sheep busines and gone into "Ben Davis," planting field after field of nothing else.

Varieties in our orchards are being reduced to a few such as pay best as we find it by actual trial. We have it now pretty well boiled down to "Ben Davis." We replant all other varieties with this, and in first planting for profit it is by large planters nearly solid Ben Davis.

Treatment of our orchards varies from thorough annual cultivation to timothy, clover, etc., with neglect. The last is passing away and we are settling down to clover plowed under every one or two years. With moderation and discretion in pruning we avoid the extremities of him who prunes excessively as well as of him who prunes not at all. Much time and money have been lost by mistakes here at the first, in planting and then in after treatment. Our orchardists have, by working, watching and waiting, learned this, and they will not forget it; they will in future profit by the past and make corrections.

Respectfully submitted,

D. S. HOLMAM.

REPORT ON ORCHARDS.

BY CHAS. PATTERSON, KIRKSVILLE, MO.

As a general thing, I think apples made a liberal promise at the time of blooming, though I have heard some reports of old Ben Davis trees not blooming as freely as usual. After the fall of the blossoms, and until the fruit is of considerable size, I believe there is always apprehension of heavy reduction, which, therefore, can hardly be accepted as very discouraging. As far as I know we may have a fair crop yet, though I see no reason to predict a very heavy one.

But little damage to trees is perceivable yet, that can certainly be referred to the past excessively hard winter. Some few trees in my orchard and nursery were "bark bursted," which will doubtless affect them seriously in course of time, but fortunately it was only here and there one, not confined to any particular varieties. It probably occurred about the 18th of December, when the mercury suddenly went down to 12 degrees below zero, for which the trees were poorly prepared by the previous warm and growing weather.

Of cherries we again have every promise of a very full crop, as we had last year. However, this is not an unusual thing, but should serve to stimulate more liberal planting, as there is scarcely any fruit to supply the home markets in this part of the State, however abundant the crop may be.

I look for the time when native plums will be proved equally safe to plant, but have to base my hopes on what I learn from a distance, rather than numerous instances around me, because so very few trees have been planted.

Of peaches I am constrained to take a far less hopeful view. These several hard winters in succession have played mournful havoc with all the trees in this section, and the only estimate that seems safe, is that they might as well all be dead. Still, If I had known the extent of the damage in time, and had had the ground as available as it was when I planted, I should have risked planting last spring again, as we will surely have a succession of years sometime that will make them as successful as they once were.

Grapes are fairly promising at this time, but may disappoint us before ripening the fruit, as they have done before in localities con-

sidered better for them than this, and it would be rather anomolous if we should reap fair crops when many others fail.

Strawberries, raspberries, blackberries, gooseberries and currants are as promising as we could reasonably hope for. Scarcely any signs of hard winter are perceivable among them, including strawberries not covered. In blackberries I refer only to Snyder. Where I see any others they are severely cut down. I look for the time as not far distant when these shall be as common and popular among country people as they are now in the cities; when the mention of fruit will not bring apples alone to their minds, but rather put all the small fruits in the first place. I have begun rather late, but intend doing what I can hereafter to further this end, and if I should not live to see it fully attained, I want some of you to bring me word of progress when you cross the river later.

I am glad to see that many of the foremost orchardists are beginning to discover that meadow-sod is ruinous to orchards; that at least occasional cultivation is absolutely necessary. But there is reason to fear that most of our present orchards will go to distruction before this intelligence is generally accepted.

PRUNING THE APPLE ORCHARD.

BY J. B. DURAND, PRAIRIE CITY.

This is a subject of much importance to all apple growers, and one upon which there is a great diversity of opinion, and whatever we say upon the subject, here or anywhere else, we are sure to come in contact with the theories or opinions of some.

What little I have to say now, I intend, shall be practicable. But, says one who has observed my own orchard, "Sir, I would like to know where you put your ideas into practice, for most certainly your orchard does not bear evidence of that kind of treatment." So probably I would better say that my ideas are obtained more from observation than from practical experience.

There is no subject connected with horticulture which runs so much to extremes as this one of pruning. One says that nature knows

best what she needs, and therefore says let the tree alone and it will bear more fruit of just as good quality, and the trees will be a great deal more healthy, and he leaves his trees alone until they are a dense thicket of limbs and sprouts which entirely shut out the sunlight from the inner portion of the tree, and makes it almost impossible to gather the fruit, then nature begins and you will find many of the finest limbs dying out, making a very unsightly object, and often leaving bad decayed places that soon terminate its existence.

Another says you must have your trees with high tops so you can get around them with a team, you must have an open top so the fruit will ripen up nicely. He goes in with ax and saw, cuts out one half or more of the top which so weakens the vitality of the tree that it is soon gone. I do not believe in the ax and saw pruning at all, any limb larger than a lead pencil should never be cut off, but in the first place no limb that needs to come off should be allowed to get any larger. Take a good thrifty tree two years old from the nursery, trim out the top to just what should be left, leaving a center stem, with no forks, nothing will be needed the first season except good cultivation.

The next season go over the trees twice, once in June and then again about the first of September, and rub off all buds, that have started where you want no limbs, do this four or five seasons and your orchard will need no pruning afterward.

This is the way I would have a new orchard attended to. But again we must take things as we find them, and we will find but few orchards that have been treated in this manner. So now what shall we do? If your orchard has been overpruned, there is nothing much to be done except to keep the water sprouts off by rubbing off the buds and you will find plenty of them to keep you busy.

If, on the other hand, it has not been pruned, about the middle of June commence, and if your orchard is full of fruit there is not much danger of your pruning too much, as the waste of fruit is always staring you in the face, but if you have no fruit be very cautious or you will prune too much; cut but little from the south and west sides of the tree; the north and east sides are always the heaviest; cut out the crossing limbs, thin out sparingly and cover all wounds with thick paint or wax. I prefer the paint as it is more convenient; cut no limbs larger than one and a half inches only in extreme cases; don't forget the paint, as that is very important, and don't cut too much, better too little than to much, if you have not enough you can cut again, but if to much it is not so easily remedied. Be sure to follow up with the thumb and finger pruning as soon as the buds start; if it is a little late in the season they may not start before the next season, if you fail to do this, you will soon have a greater job on hands than before.

I believe that the cutting off of anything larger than a lead pencil is a damage to the tree in proportion to the amount done, but on the other hand, if we expect fine showy fruit, good size and well colored, we must have an open topped tree that will let in the bright sunshine, as that is very essential to high colored and fine flavored fruit.

June is the best time for pruning; the wood hardens sooner at that season than at any other and the wound will heal over sooner. However it may be done at any time during the summer, fall or winter months without much damage, but do not touch them in the early spring; that is the worst season; better let them alone altogether.

DISCUSSION.

Mr. Kidwell asked how high to start the head.

Mr. Durand replied about three feet.

Mr. Carpenter asked if fruit grown on the lower limbs of trees headed three feet high was as good in quality and color as if headed higher?

Mr. Durand thought that there would be no difference.

Mr. Ragan thought variety should govern the heighth of heading, as some varieties droop while others grown upright. He recommended light pruning, but avoid all extremes.

Capt. Henry suggested that for a long life tree head high. But do not do this all at once, but trim up the large limbs at the bottom so as to keep them off the ground.

Jacob Faith cautioned planting forked trees. Head three feet high; lean to the southwest; trim on the north northeast till two-thirds of the top be on the southwest side. Do not plant deep.

L. A. Goodman illustrated by a diagram how to prune a tree. Do not take the top shoot out at all. Do not trim at all the first year, but gradually trim up afterwards.

Capt. Hines asked if the above would apply to peach and cherry also?

Mr. Goodman thought it would in part, but in practice it could not be done.

Mr. Carpenter wished to enter his eternal protest against low-headed trees, if for no other purpose than to save the knees of the picker.

Mr. Durand found in his experience that in this windy country it is almost impossible to raise a tree headed high, and preferred low-heads rather than have no heads at all.

D. S. Holman gave a laughable example of high pruning. Spoke of the sun-scald found on the south side of high pruned trees.

Mr. Carpenter asked if sun scald was made in summer or winter.

Mr. Holman replied "both," they are scalded in summer and frozen in winter.

REPORT ON NEW FRUITS.

BY F. LIONBERGET, NEW FLORENCE, MO.

READ BY MR. PAGE.

L. A. Goodman, Secretary:

You asked me to write a paper for the society on new apples. I am afraid that I am not well enough posted on the subject to comply with your request. I will, however, do the best I can, and you will have to follow the old rule, "to always take a Dutchman as he means or allow him to speak twice." As to new apples we are testing quite a number on our grounds and have grafted a few of each kind for the nursery. We have one apple that originated in this county and was propagated in a local way to quite an extent, it is called Smily's Red. We have to propagate them quite largely to meet the local demand, for every one that has seen the apples wants to get trees. The apple is large, conical, striped and shaded with red, very handsome and good, meat white unsurpassed for cooking and evaporating, it needs but little sugar, if any. Season, September; trees very hardy, upright and annual bearer. I will send you a few of the apples this summer.

Another very promising variety is Lucy Pew. It originated in this county. I have never seen the fruit, but parties that have, speak of it in the highest terms. Besides these we are testing a number of other seedlings, of which I think we can send you a few specimens of fruit this summer.

Yellow Transparent we are testing as to its earliness, by having it top-grafted on Early Harvest trees.

Red Bietigheimer is very highly spoken of here by parties that have seen it in Germany; they say it keeps well there, but here, how-

ever, it is classed among fall apples, and I doubt whether it will ever amount to anything except to satisfy curiosity.

My partner, Mr. Gutemann, has come from the city of Bietigheim, where he was engaged in horticulture. He claims that the Green Bietigheimer is a much better apple and better keeper. However, new apples, in my opinion, ought to be well tested before they are introduced to the public. I think it would be better if no new fruits could be introduced exept through the societies of the respective States.

As it may be of interest to some of the members, I will here give a report on my orchard, observations, etc. I have planted this season about 350 apple trees. Most of them one year old, some, however, were three years old. Although the three-year-old were good fresh trees, the yearlings will outgrow them greatly by fall; that is the prospect now. My larger trees have come through the winter all right with the exception of Wine Sap, which is slightly injured. I had a small portion of my orchard in sod last summer, but as the trees did not grow well enough to suit me, I ploughed it up early in September. Of course it could not be harrowed then, and had to be left in that condition all winter, of which the field mouse took advantage. I could not have fixed a better place for them, the consequence was thata few of the trees got gridled. It never pays to waste time with a poor tree. As soon as I find a tree is injured badly I dig it up and put in another one. You may try to doctor them up some times, but my experience is that they are almost sure to go back on you afterwards. My peech trees were badly injured. I have cut down a good many. Amsden does the worst with me, while Steadly's Late and Foster are my best ones. The changeable weather this spring has caused the leafs on my trees as well as on others, which I am afraid will injure them still more.

Pears are growing fine. I have about eighteen varieties, Bartlett, Clapp's Favorite, Flemish B, Kiefer and Le Conte show the most vigor, while Sheldon grows the slowest of all, but they are healthy.

Quinces—Champion was killed to the ground, while R. Mammoth and Orange came through all right.

Apricot—All the trees were killed, Russian and all.

Cherries—E. Richmond, Late Duke and Reine Hortense are in fine condition, but all the sweet cherry trees were killed.

Plums—Wild Goose and Green Gage are my best, while Bradshaw, Lombard, etc., were injured.

With my dwarf trees I am getting along right well, except with peach and apricot; these generally die before any design can be completed. Dwarf apples on the paradise I find very interesting if trained

horizontally, especially in a well kept fruit garden. I have one trained so as to form the initials of my name, F. L. To get trees for such a purpose it is of the highest importance to get good healthy trees, or else your labor will all be lost.

The latter part of August, 1884, I had set out a experimental bed with strawberries. The ground had been well fertilized with barnyard manure. I have set out a short row of twenty-five plants each, of the following sorts: Cumberland, J. Queen, Daisy Miller, Big Bob, Crystal City, Old Iron Clad, C. Jack, Piper, Manchester, James Vick and Ida. They were all set out the same day, and treated alike ever since. I find the following to do the best here: Cumberland, J. Queen, Daisy Miller, Old Iron Clad, C. Jack and James Vick. It would be hard for me to tell which of them I liked best. Piper is a fine grower here and very hardy, and is going to furnish a good deal of fruit. Crystal City is claimed to be the earliest. It did not come in earlier with me than C. Jack, Crescent and Cumberland; but with my partner it was the earliest. It may do for a local market. Ida is very productive, but the fruit does not average large enough. Manchester does no good with me, though it seems to be doing fine on prairie soil. I saw some in Montgomery City a few days ago that looked very fine. Big Bob—Little Bob—would suit better for it. In my opinion the fruit of it will never bring in the money the plants did a few years ago. Besides these, I have Crescent, Sharpless, Glendale and Downing, but am not yet prepared to express myself about them, except the Crescent, which I have seen lately at other places. From what I saw and heard of it, it is certainly a safe one to plant. This report of course is based upon the present prospect, May 26, 1885.

Raspberries—I have a number of varieties in my fruit garden near the house, a few plants of each, in order to show to customers, while the others I have in the field. These at the house had been a little better cultivated last season, and for that reason were injured to a great extent last winter. Cuthbert and Moody were not injured at all. Turner was killed to within six inches of the ground; the same were Lost Rubies and Scarlet Gem. S. Colossal was greatly injured, but is now making up for lost time. Caroline came out with slight injuries, while Gregg is very badly used up. In the field the injury was not near so great. Thwack, Doolittle, Staymans No. 2 and Crimson Beauty I am not yet prepared to say much about. S. Colossal, I think, will furnish me the most fruit, though Cuthbert, Turner and Caroline will not be far behind.

Blackberries—I cannot report, for I took up all of my vines and planted a new plantation on poorer ground. I have Kittatinny, Lawton, Snyder, Western Triumph and Needham's White.

Gooseberries are doing fine. I have Houghton and Downing.

Currants—Could not say much of them at present. I have Red and White Dutch, Cherry, White Grape, La Varssailes, Fay's Prolific.

Grapes—I have but few, and could not say much about them.

Figs—I am training in the bush form according to Barry's Method. I will lay them down in the fall, and cover them with earth. I had my trees buried in the ground this winter, and they came through all right.

F. LIONBERGER,
New Florence, Mo.

Society adjourned until 2 P. M.

WEDNESDAY, 2 P. M.

The first exercise during the afternoon session was the reading of words of regrets from absent members.

COLUMBIA, Mo., May 11, 1885.

Friend Goodman:

My disposition to go to Butler and meet your good and enterprising horticulturists, is good, but I am now, when I thought to get a little relief, more busy than ever. Pleuro-pneumonia has given me three days and nights work, and am just home. Am bothered all of the time in the matter. Will come if I can. If not now, some time in the future.

In much haste,
Most truly yours,
J. W. SANBORN.

CHAMPAIGN, ILL., June 1, 1885.

L. A. Goodman, Esq.:

DEAR SIR—I regret to again have to decline your kind request to give you a paper on birds, but I am both too busy and too ignorant of

the subject to make it possible for me to contribute anything further on that subject at present.

So much of my time now goes to economic entomology that I have done very little on the other topic since I was at Columbus. I hope to find time to take that up again next year.

Wishing you a pleasant and prosperous meeting, I am,

Very truly yours.

S. A. FORBES.

COLUMBIA, Mo., May 23, 1885.

Dear Goodman:

Am sorry that I do not see any way to get to Butler meeting. I have to go to New Orleans to-morrow, and fear I shall not get back in time. Will be at meeting if possible.

Yours,

TRACY.

KIRKWOOD, Mo., May 28, 1885.

Mr. L. A. Goodman, Sec'y Hort'l Society:

DEAR SIR—Your favor of 26th with programme for summer meeting of the Society and other enclosures is received.

If the distance were not so great, I should much enjoy attending the meeting to which you so kindly invite me, but as it is, and as my father cannot leave his business, I do not think it will be possible.

I have very pressing work until after the 4th of next month, but if I can in any way gain time to prepare them, I will send a few entomological notes embodying some of my observations for the season. If I do find time for such a paper, I will send it to you at Butler just before or during the meeting.

Hoping that we may sometime have the Society meet with us in Kirkwood, instead of at such a distance, I am,

Yours sincerely,

M. E. M.

P. S.—I believe I have already acknowledged the receipt of your last report, but I am not quite sure. In any case, accept my thanks and my assurance that I was very much pleased with it, barring some printers' errors, which I presume you did not have the opportunity to correct.

The Rural New Yorker and some other journals gave the work a deservedly favorable mention, which I was much gratified to see.

M. E. M.

Continuing the subject of orchards, the Secretary read the following from T. W. Gannt, Maryville, Mo.:

Mr. L. A. Goodman :

DEAR SIR : I received the report of the State Horticultural Society for last year that you sent me. I have read its pages with much interest. I desire to contribute my mite if you think it worthy a place in the report of this year, for the benefit of all who have an apple orchard. I do not find in any books or papers that I have read that any one has offered any specific against the attack of the saperda bivittata, (Say.) the parent of the round-headed apple tree borer who deposits its eggs on the body of the tree near the surface of the ground during the months of May and June. Also the chrysobothris famorata, (Fabr.,) the parent of the flat-headed apple tree borer who makes its appearance during the months of May and June. The eggs are deposited on the trunk and sometimes on the branches. The same remedy is good for one as the other species. Some neglect their trees until nearly ruined by the borers, then the only remedy is to cut them out, and thus the tree is nearly ruined; hence, all must agree that a preventive is better than a cure. The following is a sure preventive if used as directed:

Take one gallon of soft soap, one and one-half (1½) pints of flour of sulphur; mix well; add a strong decoction of tobacco (home-raised tobacco), reducing the whole to the consistency of thick paint.

OPERATION.

The soil should be removed from the collar of the tree, scrape all the scaley bark from the body of the tree, if any, take a small hand broom and give the body and branches a thorough dressing with the mixture, replace the soil, apply through May and June; repeat the dressing in case of a washing rain.

I would say that I give the above remedy to my customers who buy trees at my nursery, and after using it say that they are never troubled with borers.

A COMPLETE VICTORY.

Some six or seven years ago I observed in my Janneton apple orchard that shortly after the putting forth of leaves they became pale and sickly in appearance. On a close examination of the trees, which were about eighteen years old, I was utterly dismayed to find that my trees were covered with the oyster shell bark louse. Some of the lower branches died from the effects of the tiny sap-suckers. I saw at once

that it was only a matter of short time and my Janneton orchard would be no more. I was not long in deciding what to try. I prepared a quantity of the borer preventive, formulated the same. I directed my man to climb the trees with a bucket full of the mixture and a small hand broom and dress with a heavy coating all the branches and the bodies of the trees, beginning in the top of the tree on branches as small as a man's little finger, working downward. This was done in the first part of June, the proper time to do this in this latitue, as the eggs hatch about that time. The result was highly gratifying, as one application was sufficient. The sulphurous fumes raised by the hot sun was sufficient to destroy the tender lice. It is impossible for them to live in such an atmosphere. Since then my trees have been dressed in beautiful dark green foliage every summer, with no trace of lice, and bearing abundant crops of fruit. It will pay to rid the trees of parasites.

Very respectfully,
T. W. GANNT.

MARYVILLE, NODAWAY COUNTY, MO.

DISCUSSION.

L. A. Goodman objected to gas tar being used as a wash for trees, as it is apt to kill the trees.

Mr. Faith emphasized this objection unless the tar be used with quick lime.

Mr. Spear, referring to the matter of pruning, stated that he had made many mistakes in heading trees; thought that the variety should determine the heighth of the head; don't believe the wine-sap can be kept from the ground even if trimmed up six feet high.

Mr. Thompson, of Butler, pastures his wine sap orchards with horses, sheep and hogs, and finds that they trim the trees sufficiently. This also rids the trees of the borer, and this part of his orchard far out bears the part of the orchard not pastured.

Mr. Thompson, from Vernon county, stated that his orchard is seeded to clover and he has had no fruit which seems to sustain the remarks of D. W. Thompson.

The question of trimming in the light or dark of the moon was raised as usual.

Mr. Faith prefers the light of the moon for trimming his trees, when the sign is in the heart.

Mr. Cunningham, of St. Louis, although not a practical horticulturist, asked if it would not pay to stack straw or corn stalks about peach

trees, as he had known cases where such had saved the peach when those on other trees were killed; also spoke of wheat bran as a fertilizer.

Mr. Hynes, of West Plains, resented the implication of the last speaker that the lands of Southwest Missouri were poor; thought that the slope of the land upon which orchards are planted, should have much weight in the matter of pruning; recommended the exercise of prudence and judgment; all, or nearly all, trimming should be done before the wood ripens.

Mr. Benedict asked the society if they endorsed the idea advanced by Mr. Thompson that orchards should be fenced and pastured instead of cultivated.

Mr Goodman stated that each man was responsible for his own statements, and the society should in no way be held responsible for any remarks made unless acted upon by the society.

President Evans would recommend pasturing orchards with sheep storage; tree, a fair bearer; apple, very late keeper and very rich flavor; has named them "Requa Seedling."
and hogs, especially if an old orchard; yet judgment should be required.

Mr. Thompson, from Vernon, again asserted that orchards well tramped by stock receive benefit therefrom.

Mr. Requa called the attention of the society to a seedling apple which he has raised in the county since 1869. He had on exhibition some well preserved fruit which has had nothing but ordinary cellar

Capt. Henry spoke in favor of pasturing orchards, especially if upon rich soil or highly fertilized; thought that trees should put out at least a six-inch growth each year.

Mr. W. Scott, from Vernon county, recommended thick planting, twenty feet apart.

Mr. D. Carpenter found in his experience that such planting smothered out the trees and produced no good effects at all; recommended planting Texas onions about each tree at planting as a preventive against the borer.

Mr. Holman endorsed the above and added tansy to the list of borer preventives; asked the gentleman who raises his apples by "horse power" if his horses be shod, at what age begin.

Mr. J. W. Kidwell thought that new land, no matter how rich, needed fertilizing to rid it of a certain wild nature detrimental to the orchard.

Mr. Hill planted his trees a rod apart and now finds them altogether too close, and asked if it would do now to trim up.

Mr. Hynes wished to ask farther in regard to tansy and Texas onions; was fooled on a receipt of that kind once, and thought that maybe the borer in different localities might have different tastes, some objecting to onions and some not.

Mr. Cunningham suggested the use of Limberger cheese, as that also had peculiar smelling qualities.

Mr. Carpenter stated that each insect had its own peculiar food, and in the insect taste could not be cultivated; stated that fruit spurs must be renewed at least every four or five years, so that an orchard may be pastured for a few years, but must then be cultivated to renew the fruit spurs.

Mr. Hill recommended girdling trees to produce fruit.

Major Ragan sustained this idea, but thought that driving in nails, chopping with hatchet, or tramping by stock, or any other method which would check a too rank growth would result in a good fruit crop.

Mr. Faith has experimented with tansy for the last fifteen years. It keeps the borer out but spreads all over the ground; objects emphatically to girdling.

Mr. King had seen an orchard near Wellington, Kansas, mulched entirely with onions with good results.

Mr. Scott recommended high cultivation.

NOTE FROM J. P. MOORE.

SPRINGFIELD, MO., JUNE 6, 1885.

To the Missouri State Horticultural Society in session at Butler, Mo.:

Being a member of the above named Society, and having no chance to be present at the Semi-annual meeting, claim the privilege of writing for consideration of the above named honorable body what I know in regard to these varieties of apples, which in a measure have not received that attention in this section that I think they deserve. I mean the Willow Twig, the Prior's Red and the Ingram. We have of each of the above named varieties, now sound, kept in an ordinary celler, selling, and have been for some time, at higher prices in this market. They are good bearers, good apples, good growers, and the latter two, hardy trees.

I am sorry that I cannot say that the Willow Twig is a long liver.

I have not known the Ingram ever to die; think the original tree is still living, and the Prior's Red live long.

I have no selfish motive in penning the above; simply think they merit more than is said in this paper. I only say what I know, hoping some one may be profited by my experience.

J. P. MOORE.

THE BEST APPLES FOR MISSOURI.

BY PHIL PFEIFFER.

SEDALIA, Mo., May 29, 1885.

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

DEAR SIR—In response to your remark to write something for the meeting of our Society, I would say:

Of apples, the most important fruit of Missouri, I think we should still plant more winter apples to enable our State to get its proper share of apples; the Southern States will always have to procure from the Northern and Middle States. Of the Summer, and even Fall apples, with the exception of the new Yellow Transparent and the Maiden Blush, are already, in proportion to the amount of Winter varieties, too many planted, and no better proof for this fact can be brought than their respective market values.

I have never seen a Ben Davis sold for twenty cents a bushel here, but have many times seen Summer and Fall apples, with the exception of Maiden Blush, Orange or Bellflower and Jonathan, sold at that price. Why, then, do the farmers still plant more Summer and Fall apples than they need for their own supply? Why do they not buy their fruit trees where they may expect to be honestly treated, from their nearest Nursery? I am confident, though acknowledging that the Tree-peddler stimulates the planting of trees and shrubs, thus helping to beautify the country in general, that the majority of the thousands of worthless apple trees that are growing, a burden rather than a benefit to the hard working farmer in our State, come from the deceiving tree agent. It is a pity to see an orchard with nice looking trees that are mostly poor varieties, being a constant loss and disappointment, and a wise man is he who takes the ax and clears out such frauds.

I say the apple is the prominent fruit for the farmer in Missouri, and we see it again this season, as all the reports to the Secretary will show.

Near a good market, the Yellow Transparent, for its extreme earliness, will be still very profitable; also will the Maiden Blush, too well known to give a description of it. Of most all the other Summer

and Fall apples, I think we have enough for market for the near future any way. Therefore, the long keeping winter apple that will sell in the South, should be mainly planted for the next ten years in Missouri, and there is no danger of growing too many of them. But an abundance of good shipping apples will induce shippers to visit our State, and a greater demand for the Missouri apple will be the result, whilst at present four-fifths of the crop is unfit to stand the shipping expenses.

There is no branch of business where there is a greater ignorance, manifested than in the planting of fruit trees, vines and berry plants, and I blame, to a great extent, the unscrupulous tree-peddler for it, as he, with his platebooks, and constantly new, and most of the time worthless fruit, creates a terrible confusion amongst the many farmers who locate as farmers, but have not in the least been educated for that purpose.

It does not matter how small a station is, if two car loads of first class Winter apples not more than three varieties, can be packed, you will find a shipper to bring about one car-load of 300 empty barrels, and buy your 300 barrels of Ben Davis, Huntsmans, Jonathan, Winesap, Rome Beauty or Newton Pippin.

More Winter apples, more pastures, more grass, less wheat, just enough corn for home demand; all the beef and milk cattle the population will need, and we soon will see the farmer prosper. Besides the varieties above mentioned, you should try the Langford's Seedling, and the newest and longest keeping, hardy apple, the Salome, which may take the lead in a few years as the best keepers.

The following letter was read:

GLASSVILLE, CALDWELL CO., MO., May 26, 1885.

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

DEAR SIR: Yours of the 15th inst. came duly to hand with your friendly request asking the fruit growers of Missouri to be present at the semi-annual meeting of the Missouri State Horticultural Society, to be held in Butler, Bates county, Mo., June 9, 10 and 11, 1885. It would afford me much pleasure to meet with the fruit growers of Missouri at that time and place if it was in my power to do so. I will probably have a light half crop of apples. Many of the trees seem to be taking a rest this year, as they have produced large crops of fruit in the past few years. This rest will no doubt be very good for the trees, and as we have about twelve acres in orchard there will likely be plenty of apples for our own family and also for several families of our children, and some to spare to others. During the past spring I care-

fully pruned my orchard, taking off the dead limbs and a few of the weak limbs. We ought, in my opinion, to prune our orchards rather lightly each year, and be careful that the trunk of the tree is shaded with leaves on the southwest side of the trees. When my orchard was young I often shaded the southwest side of the trees either by fastening a board or corn stalks or long prairie hay to the southwest side of the trees to ward off the rays of the sun, as the continual freeze and thaw process going on during our long cold winters, about ruined the sap vessels on the southwest side of the trees, and then with the hot summer sun continually striking against the diseased and sickly side of the trees, their ruin would about be complete, especially if the flat-headed borer was at work in the diseased part of the trees and the round headed borer was at work near the crown of the roots of the trees. And we will further suppose that the man who is the owner of a sick orchard as I have described, is a careless man. His orchard is about gone or will be all dead in a short time; and when the first fruit tree peddler comes along with his flaming catalogue of pictured large apples that look so tempting to the eye and palate of our good careless friend, he is charmed with the thought of fine apples again and orders $50 worth of trees to plant another orchard which will share the same fate as the first orchard. Therefore, all careful people who are planting orchards, especially men who read and try to learn something about the chemical elements composing apple trees and what these elements are and in what proportion do these elements or chemical substances exist in apple trees, and how much lime ought we to sow in the orchard annually, and how much potash, and how much of other substances is the trees compelled to lose each year by its bearing process—all these subjects the would-be successful fruit grower ought to try to learn, more or less. It is said by our wise and learned men that the soil of Missouri is composed of elements well suited to the production of apples of excellent flavor. My oldest Janneton tree is thirty-one years old, or was planted in the orchard in the year 1854. They are bearing apples this year. If I was to plant an orchard now for profit, after thirty years' experience in Northwest Missouri, I would plant largely of Jannetons and Willow Twigs. It will afford me much pleasure to give you any information in regard to our fruit prospect in this part of Caldwell county, Missouri.

Hoping that your meeting at Butler, Missouri, may result in much good for the horticultural interests of our State, I remain

Yours, etc.,

WILLIAM McCRAY.

WHAT VARIETY OF APPLE TREES SHALL I PLANT THAT WILL BRING THE BEST RETURNS.

BY A. AMBROSE, NEVADA.

This question has been asked so often that it may seem out of place at this time and at this meeting, where we find so many veterans in horticulture, and I imagine I can hear every extensive fruit grower within the sound of my voice answer this question even while I am asking it, and more especially if perchance he be from Vernon connty. True, this question has been asked hundreds of times and answered as often. But has it been answered correctly? This, of course, we cannot tell; neither do I expect that any person will answer this very important question correctly.

The great trouble and most perplexing part of it is, that we are unable to see far enough into the future, and the only safe guide left us is past experience.

Now, Mr. President, I haven't come here for or with the expectation of teaching anyone anything new on this, to my mind, very important question, but rather to learn from others, that I may (as I am a nurseryman) be the better enabled to understand what the planter wants, as I must confess that at times I have been in grave doubt as to what varieties I should graft extensively. Now, in asking the question as to what varieties of apples pay best, I have had reference especially to a commercial orchard, not even taking into consideration the apple for the evaporator. Mr. President, at former meetings of this kind I have noticed (and with some regret, too,) that there was, seemingly, a strong inclination to jump the apple question, only giving it a passing notice; and why this is, I am unable to comprehend. I have very frequently heard members speak of this as being the case, and expressing surprise and disappointment in not having the apple more fully discussed.

Now, while I am not very largely engaged in growing fruit for market myself, yet I have had good opportunities to learn from others in the business, and I have met them from all parts of Missouri and Kansas, and I have conversed very fully with them on this subject, and I have visited large orchards and have been shown through them by

the owner, and in answer to my many questions (to be brief) they usually answer me about like this as we go through the orchard :

Well, says the planter, here is Winesap; very good apples, but usually too small and not a regular bearer; don't think I will plant any more of them.

Here is Janneton of good quality and a very showy apple and very fair bearer, but not very profitable as a shipping apple, generally speaking.

Here is Willow Twig, rather shy in bearing on some soils; won't plant any more of them.

Here is Raul's Jannet, a good apple, good keeper; not very regular in bearing, and don't bring as much money as something else; won't plant any more of them.

Here is Lawver. Ah, says I; you surely will give this fine growing tree and handsome apple a favorite place in your orchard? No, says the planter, I can't do it; I am afraid to do it. I says, why? Well, it's late in bearing and it drops and—well, I wont plant any more of them.

We go on a little farther, the planter stops. He says to me, pointing to a low spreading tree here is Missouri Pippin. Well, I says, that has a good record. Yes, he says, so they tell me; but then the wood is very brittle, unable to hold up large crops of apples and resist such heavy storms as we have in Southwest Missouri, and then it is short lived. Well, says I, it bears very young and is a fine looking apple. Oh, yes, he says, that's all so, but then—well, I guess I won't plant any more of them, either.

We go a little farther we come to the orchard proper, and I am shown several hundred fine looking trees, healthy trees, trees that would, seemingly, last a century, trees that stand there on the bleak, open prairie with their large trunks and compact heads that stand the storms, the heat and cold alike.

Now, says the planter, these trees are Ben Davis, and this is the kind that I shall plant in the future.

I noticed an article in the *Prairie Farmer* sometime ago, in which the writer took occasion to censure Mr. Goodman for his favorable opinion of the Ben Davis, as expressed, I belive, in a Kansas City paper, and he goes on to state that in Illinois the Ben Davis tree is very short lived and not a healthy tree. This may be true of the Ben Davis in Illinois, but I know it is not the case in Southwest Missouri. He also asserts that in time the consumers of apples would be better posted, and that they would not use Ben Davis.

It occured to my mind at the time that the writer possibly was under the impression that this Ben Davis was a new apple.

Now, Mr. President, I don't wish to occupy any more time on the Ben Davis, but it does seem to me that it would be a good plan for this body to recommend to the public a list of commercial apples and a list for general family use. A list of apples endorsed by this sopiety would be considered reliable. Any one who plants a large apple orchard now expects to make money by so doing, and it is very essential that he plants right. And at this time, he need not make any serious mistakes. With him it is quite different to the man who planted an orchard fifteen years ago, for he has access to the experience of many large fruit growers who can and will give him the benefit of their past experience, because horticulturists, as a rule, are a generous and unselfish people, and, Mr. President, I know of no place better calculated to educate and enlighten the new beginner in horticulture than at our horticultural gatherings, and while the inexperienced can learn, the older ones may, and for this, if for no other, our State society should be looked to as the fountain head of horticultural knowledge, and in conclusion, Mr. President, I would earnestly and most sincerly urge upon every one interested in horticulture to the great importance of becoming a member of the Missouri State Horticultural Society.

A. AMBROSE.

DISCUSSION.

Capt. Henry thought it not advisable for the society to attempt to present a list of apples for planting for profit.

Col. Evans said that in the early history of this society something of the kind was attempted, but proved to be quite unsatisfactory, as in different localities different varieties succeeded while others failed.

Major Ragan endorsed the remarks of Col. Evans. When the State is divided into districts it will be time enough to recommend apples for general planting. Thought the Clayton a much better apple than the Ben Davis; had long since discarded the Ben Davis; spoke in favor of the Stach and York Imperial, also thought that the Requa Seedling bids fair to excel the Ben Davis.

L. A. Goodman stated that of the four hundred reports received from all over the State, not one failed to include the Ben Davis as one of the best varieties to plant.

Mr. Francis thought that in different parts of the State the flavor of Ben Davis might vary.

Mr Carpenter spoke in favor of the Baldwin as a good keeper, and being a good rival for the Ben Davis.

Mr. Holmrn thought in making lists of apples for planting, two should be prepared, one for profit and one for family use; had no success whatever with the Baldwin. The Ben Davis represents money, although it has nothing but show and late keeping qualities to recommend it. It is altogether the best nursery tree.

Mr. Ambrose asked for an expression upon the Missouri Pippin.

Mr. Durand has made his money out of the Jonathan, yet would not recommend it for general planting; was not in full sympathy with Missouri Pippen; are not uniform in size and color; received good returns from Grimes' Golden; Baldwin has not succeeded; fails to bear.

Mr. Faith could not endorse the Baldwin; it will take twenty years before the Ben Davis can be superseded. People now buy to please the eye. Some day they will buy to please the taste.

Mr. Spear endorsed the Ben Davis; suits his taste, and was glad to learn that the President could eat it too.

REPORT ON STONE FRUITS.

BY JACOB MADINGER, OF ST. JOSEPH.

ST. JOSEPH, MO., June 8, 1885.

FRIEND GOODMAN—I regret much not to be with you at your meeting, but I cannot attend on account of sickness. I sincerely wish you a very pleasant time, and hope nothing will detain me from being regular in attendance hereafter. As for my report on Stone Fruits, I would say that the sweet cherries were mostly winter-killed; only a few are left, and those are inferior. Of the May Duke there is about a quarter of a crop. The young trees of Early Richmond are a fair crop, while the older trees did not set well. The English Morello has a full crop. The plums and prunes bloomed and set well, but the curculio took such a hold on them that when the time comes to gather them

there will be very few left. Peaches are a complete failure, not even the trees are left, being killed out almost all over the country.

Very respectfully,

JACOB MADINGER.

The subject of the stone fruits was taken up with following discussion:

Major Ragan called the attention of the society to the fact that a northern slope would not do for all varieties of peach. Objected to a northern slope for the peach.

Henry Spear has not had success with the Amsden, while his Brice's Early are in good condition, and concludes from this that the two kinds are not identical, as some claim.

Dr. Smith stated that varieties which, with his neighbors, do not succeed, does well for him. Hale's Early has always rotted with him.

Capt. Henry has noticed that in his Hales Early, the rot will spread from tree to tree and finally spread to other varieties. Rot always begins with the Hale's Early.

Prof. Taft thought that the rot shows a weakness in a tree and unless weakened, will not rot.

Capt. Hynes could not say as to rot spreading from one variety to another, but has known the rot to skip over trees in his orchard taking all of one variety and leaving other varieties. Thought that under growth or dampness was favorable to rot. Undergrowth must be kept down.

Mr. Goodman stated that there are but three good cherries to grow; English Morrello, Early Richmond and Ostheim.

Mr. Ambrose thought the Wild Goose Plum, the only one which can be raised.

Mr. Stark finds that the English Morrello is not hardy, and thinks it has been over-estimated.

Mr. Skinner finds his Wild Goose Plum all right.

Mr. Carpenter asked how to protect against the curculio.

Mr. Taft recommended keeping chickens and shaking the curculio down to them mornings and evenings.

Mr. Skinner has tried tying sheep skin about his trees to keep off the curculio, but without success.

Major Ragan suggested that plum trees which do not produce should be cut down, as they are breeding places for the curculio.

Society adjourned to meet at 8 P. M.

WEDNESDAY EVENING.

The evening exercises were opened by prayer by Rev. Walker, of the Presbyterian church, after which followed a song entitled "A thousand Years." And this was followed by a duet by Mrs. Parkinson and daughter, a little lass of seven.

VEGETABLE PARASITES.

BY PROF. TAFT, OF COLUMBIA.

Success in horticulture is the reward of eternal vigilance. Fifty years ago an orchard could be set out, or a vineyard planted and they would rarely be imperilled by the attack of insects or blights. To-day, however, there is not a single order of plants which does not have its particular pest, and some number them by the hundred, while the farmer gives less thought to whether he may be able to cultivate and harvest a crop, than he does to whether he may be able to save it from its insect and vegetable parasites.

The attention of some of our first scientists has for years been devoted to studying the habits of our insect pests, and their investigations have enabled them to devise means for preventing their devastations. If one begins in season it is only a question of time, and a supply of Paris green, hellebore, tobacco, kerosene, etc., as to whether he or the insects shall have the crop.

The so called vegetable parasites give more cause for anxiety, as many of them are so subtle and insidious in their attacks, that they are able to completely infest the plant before their presence is perceived, and they will then require but a day or two of favorable weather to destroy the crop.

The vegetable parasites consist of such plants as draw their nourishment from the living tissue of other plants. It is well known that the dodder, mistletoe, and a few other flowering plants belong to this class, but it is not so well known that all of the smuts, mildews, blights, etc., which destroy our crops, are also parasitic vegetables.

Many of them are so delicate and of such minute proportions that the highest powers of the microscope are necessary for studying their structure and classification.

One form of these parasitic plants are known as *bacteria*. They are the lowest of all vegetable organisms, and are the sole cause of putrefaction, the name given to the decomposition of nitrogenous substances, which takes place whenever they are exposed to the atmosphere. The germs are found everywhere in the air, and under proper conditions they increase rapidly by division.

The so-called *fungi* are one stage higher in the vegetable kingdom. They are divided into four classes, of which we may take as types respectively (1) moulds, (2) smuts and mildews, (3) mushrooms and puff-balls, and (4) truffles and ergots.

All fungi are very rapidly reproduced generally by means of spores which are the result of the breaking up of sporangia, or mother cells.

Sometime the process of reproduction is very complex, as in the case of *Puccinia* the mildew of cereals. The so-called resting spores winter on the stems of grasses, and in the spring produce filaments, which enter the leaves of the bererry, and there develop the fungus, known as *Æcidium* berberidis. This in turn produces spores which enter the stomata on the leaves of grasses, and produce in them, and in them only, the mycelium of *Puccinia*.

We may safely say that all plants are liable to the attack of vegetable parasites. When temperature and moisture are favorable to fungoid development, and they rarely escape if they have been weakened in any way. Once seated in their host, they will interrupt its normal growth, and perhaps, cause death.

It is impossible to control the weather, and the only thing that can be done is to take such measures as will promote a healthy growth.

In order to secure this, the soil for any crop should be in proper condition, both physically and chemically; neither too wet, nor too dry; properly underdrained and with a correct exposure.

The soil, too, should contain a sufficient amount of soluble plant food to properly nourish the plant, and should be frequently stirred to prevent evaporation.

The seeds or plants used should be of selected stock and perfectly healthy. They should be planted at such distances as will enable them, to obtain all the sun and air necessary for their proper development. If anyone follows these directions, and a blight of any kind destroys his crop, he can feel that he has done all in his power to enable it to withstand such an attack.

In many cases as in the potato blight and rot, or the smut on corn, rust, etc., nothing more than this can be done, but in certain other cases, particularly when trees and vines are attacked, there are various remedies which we believe are at least beneficial.

As stated above, it is the weakest plants, that are most liable to the attacks of the vegetable parasites, and they are also most injured by them. In some cases this weakness is caused by over-bearing, by cold, by heat, by injuries, but generally it is the result of *improper* food. The virgin soil of Missouri will produce healthy plants, but after it has been cropped for five, ten or fifty years, some of the elements become deficient and unhealthy growth takes place.

Another, and a frequrent cause of weakness, affects plants growing in a very rich soil, or on land which has received an application of a large amount of some nitrogenous fertilizer, as barnyard manure, which will cause a rank succulent growth, and in the case of perennials, prevent the ripenning of the wood, and the cold of the winter will then be of serious injury to the plants.

The so-called *grape mildew*, which in some years injures the grape crop of the country to the amount of hundreds of thousands of dollars, is the work of fungi.

There are two forms of the fungus, known respectively as *Peronospora* and *Uncinula*. They appear at about the same time, the first resembling frost work on the under side of the leaves, while the *Uncinula*, by some considered identical with the European *Oidium Tuckeri*, gives a mealy appearance to both sides of the leaves, and in some cases extends to the berries themselves. One of the best mycologists at the east recommends strewing sulphur over the leaves as a remedy for the attack of the *Uncinula*. The mycelium of *Peronospora*, however, penetrates the leaves, and no external application can destroy it. The only remedy is to furnish such a supply of mineral food as will enable the vine to mature its fruit and also nourish its parasite. The *Peronospora* causes the leaves to drop, but does not attack the berries.

Prof. W. G. Farlow, of Harvard College, the authority mentioned above, is of the opinion that this dropping of the leaves is a good thing for the crop, as it lets in the sunlight and hastens the ripening.

On this point most botanists and horticulturists differ from him, claiming that if the leaves are removed from the vine before the fruit is ripe, the berries will lose in quality, especially in sweetness, and perhaps drop before maturing.

Whenever a vineyard is attacked by mildew, the leaves should be carefully gathered and buried.

The *grape rot*, which has committed such ravages in the Western vineyards, has thus far baffled all the efforts of horticulturists to restrain it. By placing the bunches in small paper sacks so on after the berries have set, the spore swill be prevented from developing, and a crop can be secured.

When the vines are trained upon trellises, if two boards are nailed together at an oblique angle, and fastened to the tops of the posts so as to form a roof over the row, the radiation of heat will be checked and the rot will not appear.

The so-called plum disease, in which the fruit developes into an empty pod, is the work of a fungus known as *Exoascus pruni.*

The black knot, which in some localities has proved so destructive to the plum and cherry, is caused by a parasite called *Sphœria morbosa.* The diseased wood should be cut away, as soon as discovered, at a point at least a foot below the lowest point attacked. The branch should be burned, and the knife or saw used should be carefully cleaned before it is used upon another tree.

The *pear blight* has been terribly destructive to the orchards of the country, but no sure remedy has yet been discovered.

In discussing this disease great confusion often arises from the fact that there are three or four diseases which are known by the general name of pear blight.

One form is the *leaf blight* which attacks pear seedlings, and pear trees growing in exhausted soils. This is generally caused by a fungus growth, but in seasons when the weather is unfavorable to fungoid development, the same result, *i. e.*, the dropping of the leaves and the cessation of growth, is produced by aphides and red spiders.

The *twig blight* attacks the new shoots of the apple and quince, as well as of the pear, and is generally caused by a fungus. The infected branches should be cut off and burned.

The form of blight which is most destructive is known as *frozen sap blight*, and also as *fire blight.* It makes itself manifest during the growing season, and unless it is checked will destroy the tree.

Until recently the cause of the disease has been a matter of theory and speculation, but thanks to the microscope and Prof. Burrill, of Illinois, a flood of light has been poured upon the subject. If a drop of of sap from a diseased tree be examined with a microscope under a magnifying power of 1,000 diameters, it will be found to swarm with *bacteria.*

The conditions which will be likely to cause the development of the bacterial germs are those mentioned as applying to vegetable parasites in general. If the tree makes a late growth and fail to ripen the wood, the alternate freezing and thawing of the unripened tissue during the winter will bring about such a condition of the cells as will invite the development of the germs. The same condition may be produced by the rays of the sun when the trees grow in turf on soil in which one or all of the soluble elements required as food by the plant have been exhausted.

The *scabs and cracks* which disfigure the surface of certain varieties of apples and pears are caused by a fungus which has received the name of *Fusicladium*.

The fact that these fungoid growths only infect trees when of a low vitality, or when the tissues are in an abnormal state, was clearly shown by the chemical and microscopical investigations of the peach yellows carried on by Profs. Goessmann and Maynard, of the Massachusetts Agricultural College. On the light soil of New England the weakness was induced by the special exhaustion of the soil. Our trees are often affected by the same cause, but on our heavier soil we have more to fear from a rank growth induced by the stimulating effect of the decaying vegetable matter in the ground, or from the cessation of growth during the spring, after the leaves develop, caused by the low temperature of the saturated soil. The experiments at Amherst, and the more recent ones of Prof. Penhallow at Houghton Farm, show that the attack of the peach yellows can be prevented, and that a cure can be effected by the application of mineral fertilizers.

The trees first experimented upon are now fifteen years old. When they were taken in hand eight years ago they were badly infected. They were cut back and heavily manured with chemicals. The trees were brought back to a healthy state, and have since produced full crops in favorable seasons.

For all of these diseases the preventive measures above mentioned as to location, drainage, condition of the soil, and health of the trees used, will often be sufficient to ward off attack. The trees should be carefully watched—protected from insects and vermin. The land should be seeded in grass if the trees make too rapid a growth, while if the growth is weak, or the trees show signs of the presence of these parasites, they should receive an application of some mineral fertilizer.

For this purpose a mixture composed of 50 pounds of muriate of potash, and 100 pounds of ground bone, used at the rate of from two to ten pounds per tree, will generally secure a healthy growth.

As the feeding roots run out farther from the trunk than the branches, the circle manured should extend beyond the end of the limbs.

Too much cannot be said as to the value of wood ashes as a manure for all crops. Used either alone or with equal parts of ground bone, they are the best fertilizer that can be obtained, as they furnish, in a soluble form, all of the mineral elements required by a plant.

As in these diseases of plants, so it is with all, and if you keep the plants healthy they will generally escape the attack of parasites, but if you find that they have got them, try to feed both host and tenant.

L. R. TAFT.

DISCUSSION.

L. A. Goodman thought that the pear blight and yellows could not be the same parasite, as they seemed to affect the trees differently.

Rev. Mr. Walker has saved his trees when attacked by pear blight by striking with the face of a hatchet.

Major Ragan has no faith in any cure for pear blight; said there were two kinds, frost blight and fire blight; pears in this climate are a failure; thought that during a whole life time we should be able to find a remedy for this disease, but so far we haven't; thought it was caused by sudden change of temperature.

PRIMITIVE HORTICULTURE AND THE GARDEN OF MODERN TIMES.

BY MRS. C. I. ROBARDS, OF BUTLER.

The garden of my grandmother is none the less sacred to memory because it contained so many old fashioned and unfashionable herbs and flowers. Then grew the rue and tansy and fragrant thyme, the sage and wormwood, and all the other wonderful plants whose uses were only known to matrons of the olden time.

The primrose and violet and the blood red peonies, the many colored hollyhocks and the huge flaunting yellow sunflower, all have pleasant associations because of their hallowed connection with my grandmother's garden.

Who ever had such majestic currant bushes that towered above our heads, laden with their endless supply of green and red fruit, suggestive of pies for good little girls and boys.

Who ever saw such wonderful beets and parsnips and carrots, and such plethoric cabbage, that had never in all their lives associated with white butterflies and disgusting green worms.

Because the roses only bloomed in June, was that any reason why they should not be called perpetual? When they had once bloomed in grandmother's garden they had bloomed for us forever. The red, the white and the yellow alike cast their sweet fragrance over our memories even down into the coldest wintry days.

Another source of happiness that my grandmother obtained from her garden was the good degree of health she enjoyed, by the use of the spade and hoe, thus giving a good appetite and long life to enjoy the results of her own labor.

Long may our memories keep green that we may be permitted to recall grandmother's pleasant home, the dearest spot on earth, to our childish recollections.

But modern horticulture, not content with supplying the wants of the family, reaches out to convert gardens into great fields of vegetables, fruits and flowers.

Greenhouses have been invented and constructed whereby the most tender and beautiful plants, not only of our own, but distant climes, may be kept blooming in midwinter.

By budding and grafting, the horticulturist has prolonged the season of weeks into months, of apples, pears, peaches and many other fruits.

In our youthful days we were content with gathering a few quarts of wild strawberries. Now the eager desire to convert everything into gold has made the strawberry so great an article of commerce that not only cars but trains of cars are daily laden for distant shipment. The remarkable progress and improvement in varieties of fruits and the improved modes of culture are evidence of the progressive spirit of the age.

Even though many new varieties of fruit have been the result of what we may term accident, yet he who fairly tests their merits and publishes them to the world, is no less a benefactor than he who manufactures them by the process of hybridization. While we may not

agree with Darwin in regard to his theory of the evolution of man, yet these principles we believe do apply to plant life.

Thus each new kind of fruit may possess in its germs an improved new species that may develop into a valuable improved variety.

We are the active and honored agents under the control of one who directs us for a wise purpose, and while we have not the ability to make an apple or peach, we may, by His assistance in the introduction of some new fruit, so benefit mankind as to stand before the world in the light of distinguished public benefactors.

Mrs. Parkinson favored the society with a solo.

THE POWER OF HORTICULTURE FOR MAN'S MORAL ELEVATION.

BY DAN CARPENTER, OF CLAY CO.

The moral improvement of society being of primary importance and left to select my own subject, my theme will be "The Influence of Horticulture on Man's Moral Nature."

Irrelevant as it may be to the financial interests of our avocation, it is not to be ignored in its relation to the good of our families and the benefits of society.

We shall soon gather our mantles about us and go hence, leaving our impress on the generation who shall succeed us, and it is of great importance that our influence shall be for the good of mankind, and our occupation properly appreciated for its moral power as well as its wealth-producing capabilities.

The moral improvement of man should be the grand aim of every one, be the occupation in life what it may. Laws are made to restrain evil, to encourage good. The nearer approach men make to the divine the happier is society, and the less need of statutory enactments for the protection of person and property.

The occupation in life has much to do in shaping moral character and elevating men's thoughts to the source of all good.

The law brings us in contact with strife and criminals and leads the profession to look with indifference upon crime, contention and

alienation of friends. The attorney must plead for the success of his client even if justice be defeated.

Medicine brings before its votaries suffering and misery in a thousand forms, and they become inured to the woes of their fellows, prosper in business in proportion as others suffer, and are sometimes led to "glory in human misery."

Commercial life leads to study of character, consideration of supply and demand, speculative gambling, and often to "sharp practices" in order to "turn a penny," or even "beat" a friend.

The mechanical trades varnish defects—make rosewood of poplar—put in time and use many dodges—employer and employed—to get something for nothing.

No matter whether it be great corporations, large firms, or individual enterprises, all use the "tricks of trade," more or less, to reach, by "short cuts," the desired end.

The politician becomes all things to all men in order to secure office.

The trades and professions all to a greater or less degree incline men's thoughts to a based and demoralized desire to evade law, duty and obligation in order to succed in the accumulation of wealth at the risk of moral character, debasement of society, and the loss of eternal happiness.

No reference need be made to the liquor traffic and kindred callings whose destroying, damning influences are seen and felt everywhere, by everyone in all countries, and have been from the day Noah planted a vineyard, made wine, and got drunk, unto the present

Horticulture, on the other hand, has a refining, elevating and purifying influence on men's thoughts, desires and actions.

In the beginning God inaugurated horticulture and placed the first man in the garden to dress it—to prune and train the plants. Horticulture is the only God given and heaven-appointed occupation, except the ministry.

Its author, pure, good and holy, could not otherwise than select an occupation that would tend to elevate, improve and happify his so lately created, intelligent, immortal creatures.

As Adam, before the tempter came, walked in the garden in the enjoyment of holy communion and fellowship with God, so the intelligent horticulturist of to-day, in the pursuit of the God-given occupation, has his thoughts elevated to the great I am, his heart purified by communion with God, and his love to his beneficient Creator increased to a fervency and zeal not inspired by any other industrial occupation.

God did not require him to till the soil planted to grain for *bread:* nor to herd the flock that there might be *meat*, but directed him to dress the garden and eat of the fruits thereof. How happy must have been the first man—the first horticulturist—in his purity and intercourse with his divine companion.

The tempter left the place where "chaos sat enthroned with sable-vested night," and winged his way "through their spacious empire up to light," entered our world, "hanging by a golden chain" in eternal space. Here with lying lips and flattering tongue beguiled them, and they, stretching forth their hands, "ate the fruit of that forbidden tree whose mortal taste brought death into the world and all our woe," with loss of Eden, and ever since, man has had to eat bread by the sweat of his face.

What a change in the natural condition of the world, when the ground brought forth "thorns and thistles and noxious weeds." What a change in man's condition—from dressing the garden and eating the *fruit* thereof, to tilling the soil amid thorns and thistles and eating *bread* by the sweat of his face. From horticultural recreation to agricultural toil and sweat—the latter a necessity, the former still the joy of life.

What sweet thoughts arise, how calm the reflections, how the heart wells up in thanksgiving and praise, as we walk in the garden at evening, delighted with the sweet perfume of a thousand flowers—"alphabet of angels." How grateful when the dew-washed strawberry and sparkling raspberry tempt and satisfy with the riches of their flavor. The heart swells with thanksgiving as the vine yields its rich aromatic fruit to our desires, and as the "Red-cheeked Melocoton" and "Stump-the-World" drop their ambrosial riches to our eager grasp. As we wend our way into the larger domain of the orchard where the aromatic Bartlett, the blushing Flemish and delicious Seckel greet us, our praises raise to God on high. From early Harvest to White Winter Pearmain, every varying flavor adequate to the wants of the most refined epicurean, call our thoughts upward to the beneficent Creator, who has so beautified and adorned the world, filling it with every variety of fruit and flower, pleasant to the eye, refreshing to the olfactories, and agreeable to the taste.

From the snowdrop, buttercup, and crocus, which rear their sweet and delicate heads, it may through the snowy apron winter has let fall on the lap of early spring, through every tint and odor of annuals to the majestic queen of perennials, whose ottar is both the joy and solace of feminine loveliness, we are reminded of Him whose love and compassion are sweeter and more delightsome than the balm of a mil-

lion of flowers. Who in all the world sees so much of God in his avocation as the intelligent votary of horticulture?

In the spring time the garden with its succession of health giving vegetables and the nobility of perfume-laden flowers, the breath of God still upon them; in the summer with its course of small fruits, deliciously inviting, succeeded by the blood-purifying black-berry and the ambrosial fruit of the vineyard; in the autumn the nectar of the peach and pear; in the winter the ever ready staple that never cloys, yielding sweet enjoyment of winter nights, while the bay window or conservatory, even amid arctic snows, hold summer flowers, exhaling sweet perfume—all, all, at even-tide, call us round the family altar, where from the great light of truth we read of His love, and on bended knees offer our devotions to Almighty God, whose tender mercies are over all his works.

In all the seasons the year round, the lover of this vocation is brought into close communion and fellowship with Him who gave man his first occupation and walked in the garden in the cool of the evening, as friend and companion of him who was made a little lower than the angels.

With thoughts ever in such a train and such influences around him, *he must be depraved, indeed*, if he be not elevated in moral character, refined in his tastes, chastened in his language, purified in his thoughts, holy in his affections, thankful in his heart, and full of adoration and praise to Him who is the author of our ennobling avocation.

This was followed by a song, "All hail the power of Jesus' name," after which Major Ragan read the following paper:

ORNAMENTAL.

BY Z. S. RAGAN, OF INDEPENDENCE.

Ornamental is a very comprehensive term and will admit of being applied to the attire of our persons, to architecture, etc. Yet, as applied to horticulture, we may be excused at the present for confining the subject of this paper mainly to the cultivation of a taste for rural improvements. Still the same spirit should prevail in town and city.

A century or two ago, it was the work of half a lifetime for the pioneer to open up a farm to afford a comfortable family support, or to build up a town or city. But the fast age in which we live, through

the influence of genius and money, time and space are virtually annihilated and territories converted into States and deserts, "to blossom as the rose," and towns and cities spring up with a few changes of the moon.

Agriculture and horticulture, the true foundation of all wealth move silently hand in hand in feeding and clothing the million. Horticulture, the flower of agriculture, has become the forerunner of the adornment of both country and city homes. A too common an error is that of ignoring professional talent in architecture and landscape gardening, since every one considers himself an adept in arranging his own residence without having made a study of either. Hence many irreparable blunders which amount to both waste of time and money.

Even those who have had some practical experience in other localities, will find it to be important to consult the tree grower or landscape gardener who has had the means of testing and observing what trees succeed best in certain localities, and may know what and where to plant.

If in architecture, the style, proper material, cost, etc. The ornamental embellishment of our homes not only enhances their value to the owner of the property, but of his country and State and add to the happiness of the family and neighborhood.

If this State society can in any way be instrumental in awakening an interest upon this subject, in connection with fruit culture, it will become a public benefactor, and must be an incentive to persevere in extending and widening its influence. H. W. Sargent, Esq., says, "the love of country is inseperably connected with the *love* of *home*." Whatever leads a man to assemble the comforts and elegancies of life around his habitation, tends to increase local attachments and renders domestic life more delightful, thus not only augmenting his own enjoyment, but strengthening his patriotism, and making him a better citizen. And there is no employment or recreation which affords the mind greater or more permanent satisfaction than that of cultivating the earth or adorning our own property, "God Almighty, and indeed it is the purest of human pleasures," says Lord Bacon. And as the first man was shut out from the *garden*, in the cultivation of which no alloy was mixed with his happiness, the desire to return to it seems to be implanted by nature, more or less strongly in every heart. In landscape gardening the country gentleman of leisure finds a resource of the most agreeable nature, while there is no more rational pleasure than that derived from its practice by him, who "plucks life's roses in his quiet fields." The humble alike find pleasure in the ornamenta-

tion of their door yards and gardens, and flowers and vines bedecking the humble cottage which is doubly ornamented with pictures and ornaments within their means.

Fine collections of pictures and furniture are cut off from the world in the private gallery. "But the sylvan and floral collections,—the groves and gardens which surround the country residences of the man of taste,—are confined by no barriers narrower than the blue heavens above and around them." Mankind are imitative beings, and when one adds anything ornamental, rare or beautiful to his home or surroundings, it creates a desire and stimulates his neighbor to imitate, or if possible, to surpass in the ornamentation of his or her own premises. Thus the taste for the ornamental "gradually, but certainly creeps beyond the nominal boundaries of the estate and re appears in the pot flowers in the window, or the luxuriant blossoming vines which clamber over the porch of the humblest cottage by the wayside."

It would be a matter of interest in a subject of this kind if we were allowed space and time to give some detailed directions for the adornment of country and city homes, in their varied extent adapted to their condition and surroundings, and some hints on landscape gardening, together with the best and more appropriate trees and plants that would most likely succeed and flourish in their several localities, the order of arrangement, etc.

However, this would be too voluminous and the best we can offer or suggest is to attend the meeting, and become members of the local and State Horticultural Society, or confer with or employ a practical landscape gardener as you would an architect if going to build.

The nurseryman, florist or most practical horticulturists from their frequent meetings and discussions will be more likely to know what has and will succeed, and what is likely to prove a failure or not give satisfaction.

We are expecting something at this meeting as to what to plant by R. E. Bailey, Esq., committeeman of Fulton, and another paper by C. W. Murtfeldt, Esq., of Kirkwood.

We cannot close this article without adding further precautionary hints.

Presuming that persons have, through consultation with an architect, erected a comely residence with architectural beauty and modern conveniences. The next thing in order will be to lay out a beautiful lawn. In this we want no random or blunders, but a methodic and careful arrangement of trees to be planted, the description and future development of each tree must be taken into consideration so as to prevent crowding without regularity or symmetry. Since the ancient style

of straight rows has been superseded by clumps and fringes, genius and study are requisite to produce that natural beauty of expression to be recognized by landscape gardening and taste of the present day

The elements of natural beauty should be characterized by simple, easy and flowing lines.

Mr. A. J. Downing says: "He who would create in his pleasure grounds these more delicate shades of expression must become a profound student both of nature and art; he must be able, by his own original powers, to seize the subtle essence, the half disclosed idea involved in the finest parts of nature, and to produce and develop it in his landscape gardening."

Guard well against crowding and filling out at first all vacant spaces. As well as trees you want open spaces of smooth lawn with intertices that afford outward view at such points as most desirable. Avoid all straight, regular set rows of trees, as well as drives and walks. Modern taste follows and improves on nature. Trees are set in clumps and fringes, with occasionally isolated trees to secure natural, easy flowing, graceful, quiet surroundings of nature.

It is no easy matter for a tyro to form a clump of three, four six or eight trees, yet by closely examining examples in our best works on landscaping, and by placing stakes and viewing them from different standpoints, and at the same time contemplating the full development of each tree, you may acquire an agreeable and pleasing arrangement.

In addition to the ornamental, allow me to urge the importance of windbreaks. They may serve as a background or not. One thing is certain, windbreaks are valuable in many ways. If half the money that is spent in building barns was spent in planting windbrakes, it would add beauty and comford and millions in dollars and cents to the State of Missouri. A good windbreak set on every farm of some good, hardy, thrifty evergreens, in a very few years will not only protect from piercing wintry blasts of snow, sleet and rain, but furnish a soft, warm bedding for the stock to lie where they can breath pure air and not be subject to surfeit by crowding and the changes from in and out-door influences. Besides this ever acre of trees set in this way will be a valuable investment to the owner, aside from being a benefactor to the age in which he lives, by the increase of timber which induces rain clouds. Whereas, by denuding our domain of its timber belts, it will in time become a barren desert. Such has been the history of ancient countries.

In 1882 I visited Indiana, where, in my early life, I sold ornamental evergreen trees from my nursery, and found many of those trees were large enough to be sawed into lumber or posts, and were

then worth five dollars per tree for telegraph poles. Add their value for ornament and we find it a profitable investment.

We are well aware that our government has a Department for Foresty, and would not presume to supersede or detract from it any honor, but as horticulturists lend our influence in aiding in the good cause.

Lastly, but not least, windbreaks induce birds to come and live with us both winter and summer, and will be our greatest friends by their daily and timely destruction of the many pests to be contended with by the growers of fruits, grains and vegetables.

In connection with the ornamentation of homes, flowers come in for a full share. In this department the ladies should lead off. To all lovers of flowers we would say, adorn your rooms with them, put them on your tables, send boquets to your friends who have no flowers, or exchange favors with those who have. Do not be afraid to devote a portion of your time in their cultivation.

Women, alike flowers, if confined to the room, become effeminate and weakly. Out door exercise in the sun and air will give vigor, color and health and add to your happiness and prolong life.

To those who possess a lively and cultivated sense of the high beauty of which landscape scenery presents to the eye, but who can also see creation's God in every feature of the prospect. The painter can imitate, the poet describe and the tourist talk with ecstacy of the sublime and beautiful objects which constitute the scene before him; but he can only be said to enjoy them aright whose talents, tastes and affections are consecrated to the glory of Him by whom "all things were made, and without whom was not anything made that was made." When the pencil that traces the rich and animated landscape of mountains, lakes and trees, is guided by a grateful heart as well as by a skillful hand, then the picture becomes no less an acceptable offering to God, than a source of well directed pleasure to the mind of man.

In every wonder he sees the hand that made it—in rivers, fields and forests, the Providence that ministers to the wants of man—in every surrounding object he sees an emblem of his own spiritual condition, himself a stranger and a pilgrim, journeying on through a country of wonders and beauties, alternately investigating, admiring and praising the works of his Maker, and anticipating a holy and happy eternity to be spent in the Paradise of God, where the prospects are ever new, and the landscapes never fade from the sight."

"Oh, for the expanded mind that soars on high,
Ranging afar with Meditation's eye!
That climbs the heights of yonder starry road,
Rising through nature up to nature's God.

"Oh, for a soul to trace a Savior's power,
In each sweet form that decks the blooming flower;
And as we wander such fair scenes among,
To make the Rose of Sharon all our Song."

Z. S. RAGAN.

INDEPENDENCE, MO., June 8, 1885.

Mr. Kidwell presented the following report from Committee on Fruits, after which the society adjourned to meet promptly at nine o'clock in the morning:

BUTLER, Mo., June 10, 1885.

Mr. President, Secretary and Members of Missouri State Horticultural Society:

Your committee to whom was assigned the duty of awarding permiums on fruits and berries, would respectfully report that we examined and awarded the following premiums:

Name of berry.	To whom awarded.	Amount.
STRAWBERRIES.		
Cumb. Triumph, 1st	W. C. Head, Independence	$1 00
" " 2d	D. S. Holman, Springfield	50
Jumbo	Wm. Stephens, Butler	1 00
Chas. Downing	J. C. Evans, Harlem	1 00
Jersey Queen, 1st	J. C. Dickinson, Westport	1 00
" " 2d	D. S. Holman, Springfield	50
Crescent	L. A. Goodman	1 00
Champion	J. C. Dickinson	50
Sharpless	" "	50
Wilson's	" "	50
Monarch	" "	1 00
Golden Defiance	" "	50
Mt. Vernon	" "	50
Longfellow	" "	50

Name of Berry.	To whom awarded.	Amount.	
Currants	J. C. Evans		1 00
Cherry. 1st	J. R. Harriman		1 00
" 2d	J. C. Evans		50
			$12 50
Table boquet	L. A. Goodman	$2 00	
Basket	Mrs. Taggart	2 00	
Floral design	Phil. Peiffer	2 00	
Vase boquet	Mrs. C. I. Robards	2 00	
Hand boquet	Mrs. L. A. Goodman	2 00	10 00
Total			$22 50

While there are no premiums to be awarded on apples, your committee cannot help referring to the very fine display of winter varieties at this season of the year.

Such perfect specimens as the Ben Davis, Wine-sap, Willow Twig, Pearmain, Missouri Pippin, Jonathan, White Winter Pearmain, Pryor Red and many others, over sixty varieties in all, speak of the good work accomplished by the untiring efforts of this society. Your committee have to especially note the new and fine winter apple presented for the first time by Geo. N. Requa, of Butler, Mo.

It will certainly be a great and good acquisition to our already numerous apple family, and it will be the province of this society to see that it has a place in the list of good keepers.

The new plum, Mariana, from Texas, is worthy of a place in our fruit gardens for trial.

Your committee would also note the fine plate of peaches displayed by Mr. Sprague, of Butler, and last, but not least, the floral display, the fine boquets donated by the ladies of Butler and Bates county, are worthy of our highest praise, and speak volumes for them.

J. W. KIDWELL,
JACOB FAITH,
Committee.

Meeting adjourned.

VINEYARDS.

JUNE 11TH—MORNING EXERCISES.

L. A. Goodman read a letter from a man in St. Joe, wishing to sell the society a secret for preventing grape rot.

A committee to investigate the subject of grape rot was moved and carried.

Capt. Henry asked the best grapes for family use.

More's Early and Worden were recommended.

Mr. Stark, of Pike county, stated, with him the Delaware did not do well unless upon high, dry land.

Mr. Carpenter thought them best for the table use; fertilizes them from droppings from the hennery; has had success with treatment.

Mr. Scott has not had success with grapes. The Concord, if trained high, does fairly well.

Major Ragan said his Delawares did well until about two years ago; finds his vines this year attacked by a small, green worm, something new to him.

SMALL FRUIT.

Mr. Faith made the following report:

HOW TO GROW BERRIES.

BY JACOB FAITH, MONTEVALLO.

If farmers knew how little science and work it requires to grow strawberries and raspberries, they would not do without these delicious and wholesome fruits and the comfort it gives to the human family. There is no fruit more welcome than the strawberry. It is the earliest that comes to our table, and it adapts itself to more climates and soils and is a surer crop than any other small fruit. It comes into bearing the first and second year, and nearly every land and lot owner wants fruit. Ground rich enough for potatoes and cabbage will do. Set

plants in April, May, June, October, November and December. I prefer spring planting, as we get a full crop next year, and fall setting requires more work the first winter in the way of mulching. Spring planting will do without mulching. I prefer the matted row system. For garden culture set plants eight to twelve inches in row, rows two feet apart. For field culture, rows three and a half feet to four apart. Mark out with a cord or small plow. Have the rows straight. If the plants are wilted soak in water, or if the ground is dry, pour one pint of water to a plant. If your hand is not strong enough, or many are to be set out, use a dibble or trowel to make a hole six to eight inches deep and three to four inches wide to admit the roots to spread out fan shape. If roots are too long, cut off one-third or more. Set plants a trifle below the crown or deeper than they are set in their beds—press dirt about the roots.

As soon as weeds make their appearance, or before, plow with a cultivator with hoes set low. Then level the ground with hoe or rake, and pull the runners to the middle of the row. They will soon form a matted row, and occupy the ground instead of weeds. In this way run cultivator a little further from plants every time you cultivate. Allow rows to get eighteen to twenty four inches wide, and all runners or plants over that distance destroy with a rolling cutter. If rows are too short for horse cultivator, do this work with hand cultivator or hoe. The more cultivation the better the crop, like potatoes. Some strawberry growers run these beds only two or three years, and then plow them up and set new beds. I have been very successful in renewing my old strawberry beds. As soon as the berries are picked, by plowing or cutting rows down to six or eight inches wide, fasten a rolling cutter to plow. Then cut all tops off, till the six or eight inch rows look as if nothing was there. Then in about eight days manure with barnyard manure or any well rotted material. Let a great deal of manure fall in the furrow next to the row. Then plow and work ground back to the row and level with a hoe or garden rake. Mulch late in the fall when the ground freezes, one to two inches thick, according to the material we use. Any material that has no seed in will do, and will shade or hide the plants. The germ of the fruit buds is formed in the fall, therefore the great importance of preventing heaving of the soil. To do this, sudden freezings and thawings of the surface must be guarded against and prevented. This is done by merely scattering enough mulch over the surface to shade it. I prefer coarse stable manure, and have used stock yard manure. The winter rains and snows will carry all the strength into the ground, leaving a fine mulch for spring. In spring loosen up this

mulch, or rake it between the rows in the paths. I have grown strawberries after the first year's cultivation by only mulching two feet, thick enough to smother plants and weeds, and left the other two feet unmulched, and cut the weeds off with a mowing scythe. For three or four years had tolerable good crops, but do not understand me to advocate this lazy or slovenly way. Captain Jack, Crescent Seedling and Crystal City will stand most neglect.

I grow over thirty varieties of strawberries. I would like to give a description of their size, quality, hardiness, etc., but time and space in your columns will not admit. I will name varieties that succeed best on my soil in Southwest Missouri, commencing with the earliest, Early Washington, Crystal City, Cinderella, Crescent Seedling, Chas. Downing, Wilson's Albany, Miner's Prolific, Captain Jack, Manchester, Big Bob, Cumberland Triumph, Jucunda, Sharpless, Windsor Chief and Glendale. Remember those marked in catalogues with an (H) are perfect blossoms, or hermaphrodite, and those marked with a (P) are imperfect blossoms, pistillates, the former producing full crops by themselves, while the latter require every fifth or sixth row of any of the former sorts planted among them as a fertilizer.

Raspberries, a delicious fruit, follow strawberries. Before late strawberries are gone, early raspberries are ripe. This fruit is very valuable for drying, and when berries are picked they are ready for the evaporator like an apple that is peeled and cored. Raspberries are delicious for the table, jelly and canning, and can be grown after the first year with less work than corn for ten to twelve years without renewing the bed by cultivating and manuring, and much like strawberries adapted to almost all climates and soils. Set plants like strawberries. Set two to three feet in the row, and six to eight feet apart. The first and second years plant between the rows potatoes, beans, cabbage, etc., and cultivate first year like strawberries and potatoes, and when canes are about eighteen inches high, cut back to eight or twelve inches. That will cause them to throw out branches. Cut them off again. Second year let canes grow two to three feet high, according to the strength of canes and branches, fifteen to twenty-four inches if plants are wanted from the Black-caps. These are grown from the tip of the new growth in August and September. As soon as the tips are nearly bare of leaves and present a snakish, dark purple color, put them into the ground one or three inches, and in a few weeks they will form a fine matted plant, and can be transplanted by cutting off the parent cane four to six inches above the root. If this layering is neglected, they will make some plants. All red, of the Antwerp family are increased by suckers or root cuttings, like blackberries.

The red are delicious for the table, jelly, canning, preserving, etc., but, like blackberries, not profitable for drying, as they will evaporate too much. Set plants in row one to two feet, and rows six feet apart. After first year keep rows cut down to ten and to fifteen inches wide. Top when about three feet high. The red will do without topping or cutting back. But the Black-cap and large sorts of blackberries will not do. I have been very successful in growing strawberries and Black-cap raspberries in the same row, by setting one to three strawberry plants between the raspberry plants all about the same time. Have had the first and second year a full crop of strawberries, and have not lessened my raspberry crop, but it requires more manure. If raspberries are topped right, they are not much in the way of picking strawberries. Shall plant two acres this way next spring.

Raspberries—Black-cap succeed best for me. Tyler, Hopkins, Centennial, Mammoth Cluster, Gregg, and of the red, Brandywine, Thwack, Turner, Herstine.

Blackberries—Wilson's Early, Kittatinny, Snyder and Taylor's Prolific. Have some newer varieties that may supersede some of the kinds, but are not sufficiently tested yet. I market my berries in Nevada, at ten cents to twenty-five cents a quart. I pay one to two cents a quart for picking. They pick fifty to one hundred quarts a day. I pay every night. Some of the pickers appear to be as rich as millionaires. I employ mostly girls. I would rather oversee fifty women than twenty boys. The best sorts of berries can be grown for one cent a quart, and picked for two cents, making three cents a quart. Who will do without this wholesome fruit?

The following paper was prepared by S. Miller:

BLUFFTON, Mo., June 5, 1885.

MR. GOODMAN: As chairman of the committee on small fruits, I fear my report will not be a very flattering one.

A hail-storm on the 25th of May following a drought of three weeks gives the strawberry crop a poor show, although we still have a fair crop of some varieties.

Cherries, a slim crop, except one Elton tree has a full load. Strawberries are a very ordinary crop, except Crescent, Glendale and a new one, Miller's No. 18, which has an enormous crop. Nigh's Superb, Mrs. Garfield, Piper, Old Ironclad and Wilson are not worth their room here. Howell's Prolific and Walter will also be discarded.

Hart's Minnesota has done better than any of the others that came out at that time.

Of the newer ones, Black Giant is a farce. Ray's Prolific, promising, so is Prince of Berries. Daniel Boone, Grand Duke, Triple Crown are passable. Sucker State a failure, all the popular varieties are about alike. Jumbo, latest of all from Purdy, is simply Cumberland Triumph, and nothing else with me. Crawford's Cornelia promises to be very valuable and late. His No. 6 is the largest berry on my ground and of excellent quality. These are two that will likely be the coming berries. That Miller's No. 18 is no seedling of mine, but was sent to me by Geo. L. Miller, of Butler, Ohio, and is without exceptance one of the most promising of all the new ones. Immensely productive, large size, good quality and pretty firm. It has a slight Hautbois flavor, once so popular in England.

Raspberries got pretty well cut with the hail, yet we will get perhaps half a crop.

Blackberries I have only Snyder and Triumph left, they show for a fair crop, although * * * the latter were injured by the winter.

Grapes look well considering the severe winter and the hail recently. All the tender varieties that were laid down look well. The rest, nothing in the shape of fruit.

Plums, of which I only have Wild Goose, Louisa, Lombard and Damson bearing, have a moderate crop on them. But press of work, has not given me time to smoke them or apply the remedies for the curculio, and I may lose most of them. I cannot be with you and if I could, could not take anything along to make a display. It would be pleasant to meet the fraternity but can't do so. Wishing you all a good time of it,

I am, yours truly,

SAMUEL MILLER

REPORT ON SMALL FRUITS.

BY W. M. HOPKINS, KANSAS CITY.

L. A. Goodman, Secretary Missouri State Horticultural Society:

I send my report as committee on small fruits for this section of the State.

Strawberries went through the winter in good condition, bloomed heavily. Many berries of some varieties were killed by severe frosts about the 10th of May, the *Sharpless* being the most injured with me. My crop of berries now picking is the poorest in many seasons, but somebody has raised berries, from the glut in this Kansas City market at present. I am now selling at lower figures than I ever sold since I have been in the business. The market is completely demoralized. I think commission men here have contributed no little in bringing about this state of affairs, and to their sorrow, too. I learn they have dumped hundreds of crates into the Missouri river the past week. They have injured the grower elsewhere, themselves, and the grower here. I hope they will see their folly in the future. I am often asked the best strawberry to plant. This is a very hard question to answer. If I were asked what not to plant, I could answer more correctly. So far as my experience goes I would not plant Wilson, Downing, Kentucky, Glendale, Minor's Prolific, Phelps or Warren. All these have been popular varieties, but have all played out with me. I think well of the Sharpless, Manchester, Finch's Prolific, Mount Vernon and James Vick. Many of the newer varieties not yet tested by me may prove valuable.

Raspberries.—The Black Caps will not make more than about one-half crop. Reds, the same. Of the Blacks, the Hopkins is the least hurt; this is the first time it has ever been injured by winter-killing before. The Cuthbert is killed to the ground with me, and Thwack nearly as bad.

Blackberries—Snyder and Taylor, sound, do not know how they are fruiting.

My strawberries are not worth showing. I am ashamed of them.

KANSAS CITY, June 8, 1885.

The following letter was read:

LEAVENWORTH, KANSAS, June 2, 1885.

L. A. Goodman, Secretary Missouri State Horticultural Society:

DEAR SIR: Your circular stating the time of holding your State meeting received. It would afford me much pleasure in meeting with you, but we are in midst of our strawberry picking, and have to attend to it. You ask if I can give "something for your summer meeting." I cannot do very much in that line, but as I am in the strawberries, will say a few words upon that subject that should be of interest to every strawberry grower.

I planted some strawberry seeds in Feb., 1884, in pots in the house. In April I set them out in the open ground and gave them no special care or cultivation. Hoed them twice, and then pulled up the weeds as they appeared afterwards. They generally grew very well for such small seedling plants, and many made runners freely. I let them grow without restraint, and they set runners as best they could. I gave them no winter protection whatever, as I wished to test their hardiness.

These seedlings are now all fruiting more or less for the first time. Nine-tenths of them are worthless, but some show great promise. One in particular I will mention, as all persons interested in strawberry growing should see it.

This plant made a very strong and large stool, and then sent out runners in every direction that covers a piece of ground five feet by ten. The mother plant has now seventeen fruiting stocks from eight to twelve inches high, and have on them 158 perfect berries, which will make, when ripe, more than a quart.

The runners from it have all set fruit, and the estimate made of them by all who have seen them, to be a bushel of fruit when ripe. These berries are all perfect, of large size, fine quality and handsome color.

This estimate in hill culture will make them yield over 43,000 quarts; in matted rows, four inches apart, 56,000 quarts; in neglected hap-hazzard, as here, 27,000 quarts per acre. This is a big statement, but can be corroborated by good men or any person who comes to see it.

It is producing more from the mother plant than fifty plants of either Mrs. Garfield, Atlantic, Jumbo, Daisy, Daniel Boone, Indiana, Old Iron Clad, Longfellow, Warren, Big Bob, Jersey Queen, Manchester, Miner's Prolific, Kentucky, Glendale, Bidwell, Wilson, Mt. Vernon and Sharpless on my grounds.

I send with this what the Leavenworth *Times* says upon it:

"Dr. J. Stayman has on his farm a cluster of original seedling strawberries which have been out only a year, and the tendrils have spread so that the vines now cover a space about five by ten feet of ground around the original plant. The latter gives promise of yielding about a quart of fine berries, while the "patch" growh from it will yield nearly a half bushel. This growth is a subject of wonder among the horticulturists in the neighborhood."

This is correct except it should have been one bushel instead of a half bushel, which is perhaps an oversight.

J. STAYMAN.

REPORT OF LIONBERGER & GUTMANN.

NEW FLORENCE, Mo., June 9, 1885.

L. A. Goodman:

We intended to send some berries to your meeting, but are afraid that we could not get them there in good enough condition. We will give you a short report on them: Our finest and best are Cumberland and Jersey Queen; next comes C. Jack and James Vick. Piper is also fine, but the fruit is too dark. Old Iron Clad promised first rate up to the last of May, but it all went to nothing; not a perfect berry could be found. Manchester is gaining favor with us, the fruit is very fine. Ida is worthless; fruit is too small and too acid. Crystal City is not much of a berry. Big Bob does poorly. Daisy Miller had some fine fruit, but must wait another season before saying much about it. Crescent, Sharpless, Glendale and Downing did not have a fair trial yet.

Respectfully,

LIONBERGER & GUTMANN.

REPORT ON SMALL FRUIT.

BY JOHN S. DRUMONDES, NEW FLORENCE, MO.

Strawberries—I only had a few varieties in fruit this spring. Of these I found Cumberland, Triumph, Iron Clad and Captain Jack the best, but Crystal City did very poor with me, and Piper did very poor. Cumberland ripened first, and of good quality. If I can get the plants early enough I am going to set out a large plantation in August.

Raspberries—I have the following sorts: Cuthbert, Turner, Thwack, Gregg, Shaffer's Colossal, Scarlet Gem, Caroline and Lost Rubies. Shaffer's Colossal is of fine quality and good for home use. Gregg I think a great deal of. I will have to try them further before I can express my opinion.

Blackberries—I have the Kittatinny, which is the best with me. I set them out this spring, and they will have a few berries.

Currants—Fay's Prolific, Big Cherry and White Grape. They have not fruited yet.

Gooseberries—I have the Houghton's Seedling. It is the only variety we have in fruit.

DISCUSSION.

Mr. Faith plants raspberries in rows eight feet apart; Snyder, the coming blackberry; manure every other year.

Capt. Hynes, referring to remarks of Mr. Faith, thought it as bad to swindle agents as for them to swindle you; realized $158 from one-fourth acre of Crescent; Charles Downing and Glendale also excellent; thought they had better flavored berries in his section.

Mr. Thompson thought that noted fruit growers should not grow worthless fruit even to sell to agents, as many honest planters are misled by knowing that the fruit is grown by successful growers; spoke in strong terms against misrepresenting anything for the sake of making money; we should patronize our home men.

Mr. Faith endorsed the above, excused any and all of his short comings on the grounds of his being a Dutchman.

Major Ragan cited the case of a neighbor who planted an acre of berries; kept them in hills, mulched heavily; kept off runners and worked thoroughly, and by this process lost his crop. Question: "Will it do to work in the spring?"

Mr. Roberts thought spring working would not do.

Mr. Faith endorsed the above; cultivate after berries are picked and cultivate late.

Committee on Obituary made the following report:

RESOLUTIONS.

Officers and Members of the Missouri State Horticultural Society:

Your committee to whom is assigned the obituary notice of deceased members, present the following report:

WHEREAS, Through the Providence of God, our friend, brother and co-laborer, Dr. A. W. McPherson, of Springfield, Mo., a good man, af-

fectionate in his family, respected by his fellow-citizens, faithful to his God, in the church of his choice, an original member of the horticultural society of Missouri, always one of its most active and zealous members, both as a private member and as an officer, has gone to his eternal rest; therefore, be it

Resolved, By this society now in semi-annual session at Butler, Mo., that through his death the society has lost a valuable counselor and an efficient worker, and the horticultural interests of the whole country have suffered a serious loss.

Resolved, That we tender our heartfelt sympathy to the bereaved family and relatives.

Resolved, That a copy of these resolutions be forwarded to his stricken family; that they also be spread upon the records of the society.

Respectfully submitted by your committee,

D. S. HOLMAN,
AVA E. PAGE,
H. B. FRANCIS.

Meeting adjourned until half past one.

AFTERNOON SESSION.

The President being absent, the house was called to order by the Secretary and *Mr. Carpenter* tooked the chair.

WHAT ORNAMENTALS TO PLANT.

BY R. E. BAILEY.

READ BY MR. PAGE.

Mr. Robt. E. Bailey of Fulton, Mo., in a paper on the above subject read before the semi-anuual meeting of the Missouri Horticultural Society, held in June, says:

In order to succeed in planting ornamental trees or shrubs, several questions must be answered with a more or less positive "yes:"

1. Is the proposed tree or plant hardy and adapted to the climate?
2. Is it suited to the soil of the grounds of the planter?
3. Is it suited to the size of the lot?
4. Has it sufficient merit in beauty or novelty to make it desirable in the locality where planted?

Many mistakes are made on the first point named. We in Missouri, at least in my part of the great State, have an almost arctic winter and a tropical summer, sometimes accompanied by severe drought. Some plants will stand the cold of winter but succumb to the heat of summer; so that the introduction of trees from Siberia or other cold countries is not a sure indication of their ability to stand our entire season. Many ornamental trees, especially evergreens, died in this vicinity in the extreme hot and dry summer of 1881. The Norway Spruce and the White Pine furnished a large number of victims.

The last two winters were unusually severe, the mercury marking 30° below zero in many places. So far as hardiness to stand extreme cold is concerned, we may safely plant anything which has passed without harm through these two trying seasons. Our native forest trees have, of course, stood the test; and for them I wish to make a plea, especially for the elm and ash. The famous botanist, Mr. Chaux, pronounced the white elm the most magnificent vegetable production of the temperate zone. It is an interesting study, to note the wonderful difference in the habits of growth of specimens of the elm. Some are almost as erect as the Lombardy poplar; others have pendulous branches, rivaling the weeping willow. The variety known among nurserymen as *Fulva Pendula* is very desirable for its luxurian growth and elegant drooping habit. Its branches first shoot upwards and then bend in graceful curves towards the earth.

The white ash seems not to meet with the consideration its merits deserve. I have in mind an ash of great beauty, which stood in the original forest, a small sapling, when the ground was cleared for the pioneer's dwelling. It was left in the yard and was beheaded at sixteen or eighteen feet high. It has grown into a tree with a trunk two feet thick, with an immense head, the upper branches erect, the lower pendulous, all radiating from the center, forming a most beautiful globular head. Its shade is the family's favorite lounging place in the summer, and in the fall its coloring is almost as fine as that of the hard maple.

Wier's Cut-leaved Maple is another tree of surpassing merits. Its deeply cut or lobed leaf, its combination of upright and of long, drooping, willow-like shoots make a picture of wonderful airy grace

and beauty. I think it is also free from the tendency to split down at the forks so objectionable in the common maple.

In striking contrast with the light and feathery appearance of this maple is the Catalpa Speciosa, with its huge, rigid looking branches, and its large, deep green foliage. It is not adapted to small grounds.

The Salisburia or Maiden-hair tree, a native of Japan, has proved hardy in this vicinity, and is a very desirable novelty, being so widely different from any other well-known tree. Its leaf is unique, resembling that of the Maiden-hair fern.

The European Larch stands the cold well enough, but may fail when it comes to the test of the hottest and driest summers, unless in a favorable location and well cared for. Its soft, feathery, evergreen-like foliage is very fine. It is well worthy of more extensive trial. When larger and deeper rooted, it will be likely to stand better than when young.

Among evergreens I would name the Scotch Pine and the Siberian Arbor Vitæ as two varieties that seem to endure more vicissitudes of climate and season than any other I am acquainted with. Many dead White Pines may now be seen here. The cause of their death I know not.

The Norway Spruce is a great favorite with nurserymen and planters; but for some reason specimens of large size are very rare.

The Austrian Pine promises to be hardy with us. It has fine dark-green foliage, and a picturesque roughness, which unfits it for planting near the dwelling, but, viewed from a distance, it has a good effect.

Of course there are many other good, hardy and worthy trees besides those I have named, but this list will suffice for the present. From personal experience I know they succeed in this part of the State.

Among shrubs I will name only one, the large Panicle Flowered Hydrangea. If there is a member of this Society, or a reader of this article, who has not this shrub, let him procure one next season. It is perfectly hardy and in every way desirable.

All the trees named will, I think, fill the conditions as to hardiness and merit. They will also grow in any soil of medium fertility, unless it is wet and stagnant.

So much has been said, written and printed about care in digging and planting trees, that anything more on the subject would seem altogether unnecessary; yet a little observation will convince any intelligent person that more failures occur from bad work in this respect than from all other causes combined. In my town each recurring spring may be seen wagon-loads of trees, ten to fifteen feet in length,

grubbed up from the ground, with roots from four to eight inches in length. These trees are planted on the streets or lots in holes barely large enough to contain their stumps of roots. The sod is replaced around them. They make a feeble attempt to grow, but when the ground gets dry and hot, not one in a hundred survives.

Let planters have their trees dug with long roots, plant them in large holes, compactly filled with good, mellow soil, and keep a space of several feet around each tree well mulched or frequently stirred, and success is almost assured.

DISCUSSION.

Major Ragan, after complimenting the paper read, wish to add to the list of desirable trees the Yellow Linn.

Mr. Spears asked if White Ash succeeds upon high land.

Sec. Goodman stated it was quite successfully grown about Kansas City. Protested against the Soft Maple.

Mr. Carpenter asked regarding the Tulip Poplar or Tulip Tree?

Col. Evans said that with him they appeared to be quite hardy.

REPORT ON ENTOMOLOGY.

BY FRANK HOLSINGER, OF ROSEDALE, KANSAS.

READ BY GEO. E. ROSE.

By request I will attempt a few remarks upon the curculio and gougers which are so destructive to our stone fruits, and are at present periling our apples. So numerous have they become that it is impossible to secure a good specimen of plum without careful watching on the part of the grower.

Until recently the plum curculio *conotrachelus newuphar* (Herbet) was considered the most destructive to our plum. It has other rivals now of prominent importance. In fact, the gouger, from my standpoint, can discount it in destructiveness.

So well acquainted are our orchardists with the habits and character of these insects that we hesitate in again coming to the front with what, to some at least, has become commonplace.

The curculio is a small, grayish insect, about one-fifth of an inch in length, having rough wing covers. When magnified, two distinct humps can be seen on each wing case near the middle. Behind these is a band of yellow ochre color, with some whiteish marks. The snout is rather short. The female lays her eggs in the green fruit as soon as formed, and until the stone becomes hardened, the period of operation extending over four or five weeks. In attacking the fruit it alights upon the plum, and with its jaws, which are in the end of its snout, it makes an incission through the skin of the fruit, then runs its snout obliquely under the skin to the depth of one-sixteenth of an inch, moving it backward and forward until a sufficient cavity is formed to receive the egg. She now turns around and deposits the egg in the orifice, then turns, and with her snout pushes the egg to the end of the passage. Her next move is to cut a crescent-shaped slit just above the cavity containing the egg deposited, and then press the flesh of the fruit down upon the cavity. This operation is doubtless to prevent the development of the fruit that would otherwise take place at this point and possibly drawn out the larva before being able to take care of itself. About five minutes are occupied in the deposit of each egg. Some estimate that the curculio has the capability of laying at least one hundred eggs.

The egg is of an oblong oval form, of a pearly white color, and may be seen with the naked eye. Lift the cover with the point of a knife, and you will see it if not already hatched. Three or four days is about the time taken for them to hatch.

The young larva is a soft footless grub, with a horny head. It feeds at once upon the fruit, growing as it channels its way to the stone, around which it feeds until about one-third of an inch in lenth, or until grown, which it takes some three or four weeks to accomplish.

The irritation caused by the insect to the plum causes it to fall to the ground usually before the larva is full grown. When it has fully matured, it leaves the fruit and enters the ground, where it changes to the chrysolis state, and in three weeks more transforms into a beetle, and makes its way to the surface and is free.

The insect is single brooded and hibernates in secluded places. During very warm days the insect takes wing readily. But usually in the morning and evening they are dull and stupid, and owing to this

fact can be easily captured. They are found upon most stone fruit, and the cherry is often attacked by them. The cherry often remains hanging until fully ripened, and thus the presence of the insect may be overlooked.

In the apple and pear they are also found, but the egg seldom hatches.

They are a native of this country, and during the past have fed npon our wild plums.

Remedies—The curculio, when suddenly alarmed, folds its legs close to its body, folding its snout under its body, and falls to the ground feigning death. Owing to this pecularity they can easily be captured by spreading a cloth upon the ground and slightly jarring the tree. They fall upon the cloth and may be readily seen and picked up. I use a wide mouthed bottle with a glass stopper to receive them, as crushing between thum and finger becomes painful when they are very plentiful. In capturing the insects, take several strips of muslin large enough to span the tree; sew up one-half the length of the center strip, and tack each edge of your cloth to light strips of wood; now pass your cloth under the tree with the tree in the center, spreading it out so that the cloth will be under two branches; then jar the tree with the ball of the foot (no danger of injury to the tree if care is used); be active, as the insects soon leave off feigning death and take to wing. To guard your orchards you should begin making your captures as soon as the trees are in blossom. I have never yet been too soon for them. When the fruit is far advanced they take their departure to other pastures. Frequently the apple is made to feel their attention.

There are many remedies given to guard against the curculo, but none so efficient or simple as the cloth. All others are unsatisfactory in some particulars.

The Gouger.—What I have said on the curculio will apply pretty generally to the gouger.

This beetle is larger than the curculio, with smooth wing covers. The snout is longer than the thorax and projects downward, but cannot be folded under the breast as in the plum curculio. It makes its appearance about the same time in the spring as the curculio.

Instead of making a crescent-shaped slit in the fruit, it bores a round hole. It is also an American insect, having lived formerly on wild plums. It is single-brooded and passes the winter in beetle state. It feeds on fruits of all kinds, although it has a preference for stone fruits.

With its snout it drills a hole such as might be made with a hot needle, the hole being round and surrounded by a black margin.

The grub, when hatced, burrows its way to the stone, and if this be not already hardened, passes on to the seed where it transforms into a beetle, which, when matured, eats its way through the flesh to the side where it escapes.

If, however, the seed is too firm it passes into the ground, where it changes ito a beetle.

The gouger, when feeding, makes many incisions, causing a hard, knotty and woody place in the fruit. Fruit thus attacked does not fall as those injured by the codling moth and curculio.

This insect can be captured the same as the plum curculio.

So numerous have they become that I think on my plantions at least nine-tenths of the damage done the plums is the work of the gouger.

A word on the apple curculio: Will say at this writing that they are unusually busy, and I fear the total destruction of all my Ben Davis. I enclose specimens attacked.

The apples affected do not fall, and when frequently bored are entirely useless. This curculio, like the others, can be captured by jarring them down upon cloths.

Respectfully,
F. HOLSINGER.

The following letter was read by the Secretary:

NEW FLORENCE, May 28, 1885.

L. A. Goodman, Westport, Mo.:

DEAR SIR: Enclosed I send you the paper for your meeting. You will find it in two parts—a few words on new apples and a report on my grounds. I am not as good a horticultural writer as I would like to be, and you will therefore have to excuse me. I was born and raised in Switzerland, and did not come to this country until I was grown, and for that reason did not go to school any here. I intended to say a few words on flowers, but I will leave that part to persons who are better posted. However, I will say that of course flowers are not altogether neglected at my place. I had a fine display of tulips this spring. My flower beds are now planted in collections of geraniums, dahlias, verbenas, petunas, both single and double, gladiolus, tuberoses, roses, etc.

For some time we have noticed in Gutmann's ground little apple trees to wither and die a few at a time, both in nursery and orchard. By investigating it always proved that the mischief was done by some

kind of a borer of a very large size. The stems of the trees were always hollow, a mere shell. It was also found that the worm would work upwards, but we could never get any of the worms until recently one was captured. After we took up the tree, which was just dying, the worm was noticed descending in the ground as fast as possible, but was captured about six inches under ground. He was about three-fourths of an inch in diameter and from three to four inches long, a regular monster and a stranger to us. He was nearly white with black head. I send you by mail a small section of the dead tree that he had worked in. One end will show how completely it was cut off by the worm; the fact is, the tree fell down as soon as a little ground was removed. These worms or borers have done a good deal of damage on Gutmann's grounds. Now we would lke to know how this enemy could be kept in check. The specimen I send you is the largest tree that has yet been affected.

Hoping that you will all have a profitable and pleasant meeting at Butler, I remain

Yours, most respectfully,
F. LIONBERGER.

Also the following:

CARTHAGE, Mo., May 31, 1885.

L. A. Goodman, Westport, Mo.:

DEAR SIR: Yours with circulars came to hand last night. We filled out blank together before we noticed there were two blanks. It is rather hard to get the total per cent. of apples.

Mr. Wakefield's strawberries yield at the rate 8,800 quarts per acre; mixed Crescent and Wilson Albany might have been nearly double that if the bed had been in proper condition.

The wheat crop has been greatly damaged by an insect I can best describe by calling it the Hessian fly. It mostly avoids manured ground and seeks the poorer land. So we see that the fruit growers are not the only ones who have to fight "God's great army," the insect world.

Mr. Sperry, of Carthage, showed me a worm that is devouring his black caps, berries and leaves. The worm is of dark color, light colored stripe along the side; length, about one and one-eighth inch long. I suggested that he put small bundles of poisoned grass and cabbage leaves about under his bushes. It does its work in the night.

I have known a straw-colored worm to go up apple trees at night and kill some trees outright by removing every bud. I have killed three and four dozen of them at a time under each apple tree. It seems to me that showering trees with poison is the most effectual way, but I have made hog and horse pasture of my fruit orchards, and fear the effect of poison on the grass.

I doubt the profit of hogs in the orchards. The general use of poison will surely be followed by accidents, but what else can we do ?

So long as we walk contrary to the "weightier matters of the law" we must fight "the great armies" God sends among us and eat our bread and fruit in the sweat of our face. "Because thou hast hearkened to voice of thy wife," etc. You know how it reads.

A word to the wise, etc.—Fools won't be converted, though you bray them in a mortar.

Regretting my inability to be with you, etc., I remain

Yours,

L. C. AMSDEN.

DISCUSSION.

Mr. Hynes spoke of such a worm as described in the paper being found in rotten roots of trees.

H. Spear called attention to a twig borer.

Prof. Taft thought these and similar twig borers would not be apt to become numerous.

Report of Committee onn Secretary's Report was presented by Mr. Holman and adopted.

Moved that remaining speeches be limited to five minutes; adopted.

By motion the report of the Committee on Report was reconsidered; the question relating to appropriating fifty dollars for books for the society discussed, and after being struck from the report, the report was adopted.

REPORT OF COMMITTEE ON SECRETARY'S REPORT.

BUTLER, Mo., June 11, 1885.

Officers and Members Missouri Horticultural Society:

Your committee, to whom was referred your secretary's semi-annual report, respectfully report that we have carefully considered the report and most heartily endorse the same, and commend to the society and the public. We wish to express our pleasure at the advancement of Missouri horticulture as evinced by your secretary's report. Specially rejoice in your success before and in competition with the world at New Orleans, and we feel permitted to place this success to the credit of persistent and praiseworthy efforts of this society, largely made by the secretary, president and the few best workers. We rejoice also at the outlook so favorable to large possibilities for the future. We recommend,

1st. That the secretary be authorized to have bound the unbound reports of '83-4, and that the number for the present year be increased to 2,000 and all be bound.

2d. That an appropriation of fifty dollars be made for an addition to the society's library.

3d. That necessary binders for the papers taken and used by the society be procured.

4th. We commend to our members the secretary's suggestion in reference to reduced rates on horticultural papers, which he proposes to obtain for all who may wish them.

We concur also in his suggestion in reference to the entomological service, and we propose that an appropriation be asked of the State Board of Agriculture of $100, for the purpose, and now ask the appointment of a committee to procure the appropriation at once.

We concur with the secretary in reference to exhibitions at Grand Rapids, Mich., and that he be authorized to make the exhibition, and that he make the usual call upon the members of the society to assist in getting up additional specimens.

The financial part of said report we ask to be referred to the finance committee.

Your committee do most earnestly concur with your secretary in a call for increase of a working membership. It ought, in a State like Missouri, to be 500 to 1,000, and we suggest that all members and all

local societies do this work of soliciting an increase of membership in and from their respective localities.

We further ask, respectfully, that every live member of this society see that his locality has an organized society auxiliary to this. Every county in this State ought to have a local horticultural society for the development of their county's horticultural interest, and as an aid to the State society.

We are pleased with suggestions in reference to horticultural education in our public or common schools, and hope to see something in that direction as soon as practicable.

Before closing our report, we desire to express our approbation and thanks upon the efficient, faithful, untiring labors of the secretary of this society, and devotion to the cause of Missouri horticulture.

Respectfully submitted.

D. S. HOLMAN,
Z. S. RAGAN,
DAN CARPENTER,
Committee.

BIRDS IN HORTICULTURE.

BY CLARKE IRVINE, OF OREGON, HOLT COUNTY, MO.

Mr. Clarke Irvine in an address before the semi-annual meeting of the Missouri Horticultural Society, thus spoke of birds as related to horticulture:

While I write the birds are wild with joy. The glorious cardinal red, who has been with us since February, cries: "What cheer? What what, what?"—his everlasting question in fair weather. The moment the air becomes heavy and damp he changes his note which sounds as though he were attempting to decline the Latin pronoun *quivis*. The wrens are warbling, robins fairly bursting their throats with song. All nature is vocal with the notes of our song birds. One day of the free, glad harmony of these uncaged birds is worth a year of all the per-

formances of the poor pining captives. For their music alone we might well prize these denizens of the air and trees. But when we consider their importance to agriculture of all kinds, it becomes worth our while to study carefully their nature, habits, wants, etc. Owing to business cares just at this time, I had concluded not to write, but fearing lest no one else might do so, and knowing that one or two important subjects require attention in connection with them, I will make the effort. Referring to what was said in the paper read at the St. Joseph meeting of our society about the Jays, several differ from my views, declaring they do more harm than good. If it can be shown that the Jays are such voracious, irreclaimable cannibals of their kind, I say let them go. But I persistently deny that they are useless. Charged with living exclusively on flesh, grain and fruit, I ask how do they subsist during the long fall, winter and spring months while they are so busy among the trees? They are destroying millions of eggs of moths and insects of various kinds. They are with us all the time, whereas nearly all other birds are here but a few months, four or five at most. I insist also that the Carolina mocking-bird, called cat-bird from one note he makes, is one of the most useful of all his kind. He is especially the great enemy of the tent-caterpillar, which is often a destroying pest over thousands of acres. Those who make a specialty of raising certain fruits become enraged at the ravages of this bird, especially among the cherry trees. He is very fond of the little sour cherry and "red Astrachan" apple. Instead of destroying the bird it would be better to devote a small space to the fruit he likes so well. It will then be no difficult matter to keep him away from you valuable fruit. For two or three weeks this bird is very fond of fruit.

I will confine the remainder of my remarks to the Cardinal Grossbeak and English Sparrow for special reasons. This Cardinal is the glory and wonder of every orchard and house-yard where he makes his home. He begins his melodious song in February and continues it more or less till late in the fall. From February till July, in fine weather, he sings the day long. I do not know of any great benefit derived from this bird save the delight he gives to the ear and eye. He loves grain, corn espeaially, but out of the cage he seems to consume but little. Several of them make their home in my orchard and yard and in surrounding orchards. In winter I sometimes hang out a few ears of corn in the trees for them, near the house. Yet they do not consume half a dozen ears there from February till May. I particularly mention these birds because they are the objects of an incessant warefare by people who seek them to cage, and for their wings and feathers. I verily believe they will be

exterminated unless an end be put to this. The favorite native haunt of this bird is in the great timber of the Missouri bottoms. 'Tis there their enemies find them. Large trees are filled with traps and thousands are caught. Of course this is in violation of the law. There is a miserable, idle, vagabond, cunning class of people who do no earthly good the year long; ignorant and slothful, they become half-civilized and naturally imitate the barbarian in all their methods of making enough to buy whisky and tobacco—their seeming sole earthly necessities. They appear to have been born in their garments, which, through long acquaintance with grease, have become unsusceptible of wear by friction and are everlasting. A wild hog (how they despise stock laws), a fish or a bird supplies their meat, a hoe cake or even parched corn answers for bread. But for their absolute need of whisky and tobacco the birds might be safe. Between the eastern dealers and these bird hunters are the middle men, as usual, who purchase the little prisoners, their wings and feathers. Some means should be taken to enforce the law against these depredators. The number of wings and birds shipped east is very large.

Some years ago some one introduced the English Sparrow into an eastern city park for the purpose of killing off certain worms that infested the trees there. It was soon noticed that they did not touch the worms but were ever down on the streets, among the horses' feet, like little chickens, and thence to the house tops. Very little was thought about it, but occasionally one could see a joke in the papers about the worms and sparrows. As time passed, some seven years, it was observed that the birds had spread over into the larger towns of the Eastern States, thence into those of Ohio and Indiana. About seven years ago they were abundant in Quincy, Ills. Two years latter they were at St. Joseph and Kansas City. I remember of thinking then, "it was fortunate that these miraculously increasing birds confined themselves to towns and avoided the country." It was said that they drove all other birds away. Five years ago in some Central Ohio towns, where, on account of their beautiful parks and walks and gardens, many song birds congregated, I found these foreigners had monopolized every spot they wished, and I missed the whilom songs of boyhood's days. Inquiry elicited the fact that these little birds had driven the others off. Two years ago, the first pair ever observed in Holt county, so far as I can learn, came to some of the railway stations, the broad overhanging roofs of these buildings favoring them, and perhaps the telegraph wires directing them. In the spring of '84 they were seen in our court house park, a place well set out in varieties of forest trees. The roof of the

court house was evidently their nesting-place. As so many birds visit there, no one noticed them, until they were seen fighting and driving off, far out of sight, the robins and other birds. They were unusually bold in the presence of passers-by. As soon as it was known what they were, they were fired upon. From that moment no one could get near a sparrow there no matter how busily these little birds were shrieking, as soon as any one even looked at them, off they disappeared. A pair visited a martin box in my yard, and for the first time in nineteen years I missed the delightful chattering and "polly put the kettle on" of those birds. This year again they came and were killed, but now I find a pair is hovering about, waking me of mornings with their screeks, but disappearing as soon as looked at. They are nesting in trees, barns and other places. Like some foul pestilence, they have come to stay, and it is now certain that they will spread over the whole land. They breed several times per year, it is said, and soon vast swarms develop from a single pair. It now is for us to consider what will be the result. Not long ago a scientific gentleman, writing to some association in Europe, declared that "the introduction of the English sparrow into the United States will prove to be a national calamity." Whoever did the work of introducing was foolhardy. A monument of mud should be erected to his memory. But we are to blame for our apathy. Time was when their extermination would have been a light work, but now it will require a general uprising and continual effort to even keep them down. The least familiarity with the peasant life of Europe, with its ballads, songs, proverbs and literature, must have assured the person who introduced these winged rats of the danger. There they have ever been a nuisance, but owing to dense populations they are more easily kept down, being eatable where meat is so dear. In addition to driving away other birds they foul the roofs and make cistern water unfit for use. The cruelty of this bird is known from the immortal nursery song, "Who killed Cock Robin?" Who of all birds, beasts or men? "I," said the sparrow. None but him. That strange genius Borrow, that prince of all travellers who ever tried to write a book of travels, in his most interesting of all books, "The Bible in Spain," gives us a hint. He quotes a Spanish peasant as singing:

"May the Lord deliver us from evil birds three.
From all sparrows and friars and curates that be;
For the sparrows eat up all the corn that we sow;
The friars drink down all the wine that we grow;
The curates have all our fair dames at their nod:
From these three evil curses, O spare us Lord God."

"A flock of sparrows will soon consume a sixty-acre field of wheat," is often said in Europe. They have no song, their only cry is an eldritch screech incessant and complaining. From the rapid disappearance of all other birds before them I suspect they pick out their eyes, eat their eggs and young. In a few years they will be equal to a constant visitation of locusts if one may judge from appearances.

Cases of extreme deprivation have been imagined, of universal wreck and ruin where silence and death reign alone. The poet beginning his narrative: "I had a dream" he cries, then to himself whispers—"It was not all a dream;" and describing a horrow of great darkness, he was the one to fitly describe what, beyond doubt, will result when all our timber is cut off and none but these winged pests live as birds save here and there perhaps a few vultures. The earth would be no longer fruitful, and surely man could not live as he has lived. Our race would become weak and incapable of grand, united effort, no matter how energetic might be a few of the number. This weakness would increase and the causes of it would increase, at least up to a certain point. There is one more fact connected with this, then I am done. This sparrow does not care for woods. He prefers house tops, martin boxes, eaves, and, if driven thence, betakes himself reluctantly to trees closest to hand. He is by no means a forest ranger. The decreasing area of forest affects him favorably. The great misfortune that is marching with swift and accelerated pace upon us, the timber famine, will only extend his area, and of course exterminate all of our most beautiful birds. How near is this timber dearth upon us? Some who are authorities declare we destroy over twenty thousand acres of timber per day, or over eight million acres per year; and in five years an area equal to all Missouri were every acre densely timbered. Another high authority declares we are in error about there being so much timber in Canada; she has really no more than will supply her own people when they come to settle her endless plains. How soon a tree can be felled! How long it takes to grow it large enough to be worth felling! Were we all to start in at planting several acres each per year, still the dearth must come; we have waited too late. It is disgusting to hear the insane simplicities uttered about this question. "We will all grow timber." Pray how long does it take a tree to grow?

"Substitutes are invented;" yes, but new ways of destroying timber are discovered faster than substitutes. However one thing is certain—we must very soon try how to do without lumber for awhile. As this timber question is connected with the birds, "the trees, home of birds," says Virgil, a few suggestions are pertinent. It seems to me that, as a speculation, timber growing surpasses all others. There is

not any risk about it; interest on the investment comes very soon, and the profits must become enormous. While men jump at lottery tickets, railways, mines and other enterprises, it needs only that some parties set a conspicuous example. There are hundreds of young men who have capital to invest. I am told that the heads of great houses in Europe, on the birth of a younger son or daughter, plant a 20 or 40 acre tract in good timber. By the time twenty-one years have elapsed this has grown to be a fortune and is the dower of the child. Land is yet very cheap here, and States pay a premium of two or three dollars per acre per year to timber growers. In five years the thinnings will be a paying crop, and finally a fortune. A company formed to cultivate in timber, for say 25 years, a certain number of acres per member, could not but realize in time enormously, besides a yearly revenue after a few years. But a thousand of such companies could not overdo the business. Nothing so useful as this has been undertaken on a large scale. Kansas has been having an arbor day for twenty years, so has Nebraska; but all they have done can be consumed now in about twelve days, even had the trees grown for forty years. Only let a few companies be formed, let the press discuss the subject, and the thing will become fashionable. The probability is that in twenty years from this time every acre of good timber will be worth five hundred dollars for the timber alone. It will not cost over thirty dollars to purchase and plant and care for an acre in timber the first three years, in some parts of the country.

LA GRANGE, Mo., May 20, 1885.

L. A. Goodman, Secretary, Westport, Mo.:

DEAR SIR: I am in receipt of your card informing me of my being a member of the ornithology committee and asking a report for the June meeting. As the meeting comes at a time when I am busy with berries, I shall not likely be able to meet with you, but wish all possible success to the efforts and a pleasant meeting generally.

I am unable to make a report, or to write on the subject of ornithology that will stand a criticism scientifically, but can only speak of the birds from my own observations.

With the first approach of spring comes the blue bird and the robin, and as the season advances the numerous bird families are with us, all, like the human family, hunting and working for something to eat and to build homes and provide for their little ones. I invite nearly all the birds by protecting them; offer them free shelter and homes in my trees and shrubs, and encourage them by gentle and kind treat-

ment to feel (as I hope they do) that they are always welcome and at home here.

In the spring of 1884 I plowed up an old field that had been in sod for some fifteen years and found the ground full of cut-worms. I planted the field to watermelons, and as the plants appeared above the ground, the cut worms commenced to destroy them, but our birds went to the rescue. Early in the morning and late in the afternoon, the blue birds, robins, blackbirds, and various other birds would appear on the ground in large numbers, and when a worm appeared in sight of their keen eyes, he was carried away and destroyed, and the plants were saved without an effort on our part to destroy the worms. The crop of melons was large and fine, and the birds took none of them for their services in the success of the crop. This spring we planted the same ground to strawberries, and while setting the plants found some of the worms still on the ground; but the birds were there, too, and now when cultivating or hoeing the plants, the birds work with us all day long, seemingly trying to aid us in return for our kindness to them; they help us make our plants and fruits, and we are willing to allow them to take their share of all the fruits on the place. It is true, they may damage and destroy some fruit for us, but as they come long before the fruits are ripe, we feel they must *save* for us much more than they take for themselves. It is better that the destruction is by birds rather than by insects.

I find most birds do not eat strawberries, only on unfavorable, cold, wet seasons, when worms and insects are scarce. Sometimes the cat birds, meadow larks and robins, and some other kinds of birds take a few berries, but it don't amount to much, as they usually pick a berry and carry it off from the field and eat it or feed it to their young before picking another. I think blackbirds eat no strawberries nor fruits of any kind; neither does the dove nor martin, yet they all eat insects. I believe the martin to be a great moth catcher, but whether codling moth or not, I cannot say. The wax bird or cherry bird (sometimes called cedar birds), which visit a cherry tree in large flocks—each trying to see how many cherries he can taste of—are, some seasons, quite bad on strawberry patches, should probably be killed. I sometimes kill them, as they don't appear to happen around us until about the time cherries are ripe. I don't call them friends, neither do I take kindly to the little grape birds

I find the blue jay and bee martin to be rank feeders on cut worms, grubs, May beetles, etc., and though many class them as detrimental to fruits, I number them in our bird family and call them our friends also.

That many or all of our birds may destroy insects that would be of some benefit to us I do not doubt, but if all birds were destroyed, I believe we would soon have to abandon raising a great deal of fruit we now raise in abundance; hence, I shall continue to protect the birds, both because I believe them serviceacle to us and for their ornamental and musical benefit to us, to see and hear the happy birds singing in the trees and air around us—to say nothing of their beautiful songs at daylight, is sufficient compeusation for all taken from us, even if they rendered no other services.

Truly yours,

WM. H. THOMAS.

DISCUSSION.

Major Ragan favored the planting of wind-breaks and the encouraging birds to build therein.

Mr. Faith spoke in favor ot the birds although they take his first strawberries.

Mr. Skinner stated that the English sparrows were in Butler three years ago, but were not here now; believed in destroying the cats in order to save the birds.

Rev. Pierce cited an instance where trees were planted especially for the birds in order to save the other fruit.

Mr. Spear asked regarding the jay; classed him with the hawk, an enemy to man.

Capt. Hynes also wages war upon the jay while friendly to others, especially the wren.

Mr. Kidwell protested against the destruction of the jay and cat bird. They destroy the cut worms, taking those in preference to the corn or berries.

Secretary Goodman destroys the jay, not to preserve the fruit, but because they prey upon other birds which are much more useful to man.

Mr. Skinner favorable to all birds except the butcher bird and sparrow hawk.

Major Ragan thought the greatest bird enemy to man would prove to be the English sparrow.

Mr. Kidwell thought that there is no cause to fear the English sparrow; when they need destroying Yankee genius would invent the proper trap.

For lack of time a number of papers were read only by title, and are printed in the report, as follows:

THE RELATION OF THE FRUIT GROWN TO THE COMMISSION MERCHANT.

BY S. N. COX, ST. JOSEPH, MO.

The relations of producer to consumer, as well as those of buyer to seller, while somewhat antagonistic in character, are yet helpful and necessary to each other. Supply and demand furnish the basis on which our commerce rests; whether it be foreign or domestic, or as between individuals or communities.

When both parties to an exchange of products are brought together so that a mutual understanding can be had, there accrues to each a benefit, in that the one has received a reasonable consideration for what he has offered for sale, while the other has obtained what in his estimation is of equal value. But this primitive sort of exchange is no longer practicable or desirable. With increased facilities for transportation, come new opportunities for the disposal of such products as in the ordinary course of trade are only adapted for immediate use. This is especially true of both fruit and vegetables. To this advantage of a wider market there is one drawback, the necessity that exists for the grower to frequently forward his products to a market where he cannot in person attend to their disposal. This necessitates their being placed with other parties, who will dispose of them to the best advantage for his benefit. This is not always an easy matter. The commission merchant has his own interests to look after and guard, and these are sometimes at variance with those of the consignor. Yet, if the fruit-grower will carefully inquire as to the integrity, as well as the mercantile standing of those to whom he consigns his fruit, he can safely trust their judgment in its disposal. In order that the best results may be obtained for the grower, it is necessary that he should take even *more* care in the preparation of his fruit for market than if he was to accompany it himself. Nothing contributes so much to the sale of fruit, especielly when offered on an over-crowded market, as an attractive appearance of both package and contents.

It frequently happens that consignments of fruit reach their destination to find the supply greater than the demand. This cannot be avoided. The only thing is to trust to the honor and business qualifi-

cations of the consignee, and await the result. If this state of things continues for any length of time, it will be necessary to look elsewhere for a market. Fair dealing on the part of growers and commission men is the only way in which both parties in interest can reap an advantage sufficient to justify a continuance of the relation. Let each insist that the other shall fulfil honestly and thoroughly his part of the contract, and there will be no conflict of interest, but both will be gainers thereby.

SOME OF OUR NEEDS AND DIFFICULTIES.

BY J. W. TURNER, MEADVILLE, MO.

There is a long list of varieties of the different fruits, and in order to succeed it is important that the planter plant varieties suited to his soil and surroundings.

I have labored for years with thrifty growing but unproductive varieties, and I know how discouraging it is, and how energizing it is to have their place taken by productive kinds. It is the belief of the writer that this is one of the greatest obstacles in the way of successful fruit growing.

Every nursery salesman knows that nineteen out of twenty of our farmers do not even know what varieties of apples to plant; the making of their selection is left entirely to the agent, except so many Ben Davis.

Somehow the belief has penetrated the public cranium that it (the Ben Davis) is exempt from Eden's curse (so is every other worthless thing, apparently,); and while nurserymen are striving to supply the enormous demand for it they are vainly wishing that the people would find out that our "Missouri Pippin" is its equal in hardiness, and that our "Grimes' Golden" and "Lawver" are not far behind. We may wish that people knew that the "Snyder" blackberry is absolutely hardy and productive; but we are left to wonder from the present outlook whether it will ever be generally known.

A few, through toil and experiments and mistakes, learn something about horticulture; and in the hour of their victory over difficulties they are called hence; their knowledge goes with them; their sons and successors follow and repeat all their blunders; and thus it goes, world without end. And so there is so little real progress made that the bravest are sometimes almost discouraged.

It is hoped, Mr. Secretary, your suggestion in regard to a library for our State society will be seconded by every member of the society. But that is not enough by far. If we fail to reach the farmers as a class we fail totally. Is there a better way than through a county society? I can think of none better; and what a good and grand work it could and must do if it is ever done at all.

The whole business of fruit growing among the masses is rotten to putrefaction and "smells to heaven." If the salt has not lost all its savor, let it be speedily applied in the shape of a county society composed of men full of faith and good works whom the planters can look to for information and guidance. For the sake of our indivual pocketbooks wake up to this matter; let us not supinely fold our hands and say it is nothing to me.

Don't we remember awhile back when that Russian apple man was around—how he sold thousands of dollars' worth in our county? Even some of the leading farmers bought largely and of course everybody followed their good (?) example; and now not a stump is left for all that outlay.

Let no one flatter himself that it cannot be done again; and moreover, it is only a question of time when it will be done again. If we question the men who were taken in by these swindlers, we get the answer: I did not much want anything, but he kept on until I got tired of him and I bought to get rid of him." A poor excuse; for he forgets all his life long to be as kind to a respectable agent. Why should people be forever robbed of their money by these irresponsible men who, if they furnish what they pretend, it is an experiment to the man who buys? His hopes are disappointed. The thing has been repeated until many good men believe the fates have conspired against them and they cannot trust themselves to plant anything but something gotten up by an extraordinary method of propagation or possibly Ben Davis apple. These parties are always game for swindlers.

I believe it is within the reach of the county societies to remove all this evil. We want varieties suited to the various soils all over our State.

Each county can find them for itself. It seems entirely practica-

ble for each to test varieties in different localities, and if means are lacking for that purpose, every patriotic citizen will lend a helping hand.

TWO GOOD FOREST TREES.

BY G. SEGESSEMAN.

It is justly lamented that the wealth that lies in our forests is rapidly diminishing, and that thereby also the climate is severely affected. Not only is the area growing smaller and smaller; but the remaining is also impoverished, the best timber being cut out while invalids and useless trees are left to occupy the ground and rob the others of their share of ground. One acre of cultivated and well cared for forest trees would be worth more than ten acres of the kind we see commonly all around. But it is useless to expect that planting and cultivating timber will take place before it can be shown that there is any profit in it for the planter himself.

Among others there are especially two kinds of trees that promise a pecuniary remuneration, just as well as if the land had been cropped with wheat and corn all the while. These are the black walnut and the catalpa. The use of the black walnut tree is well known; also that it is slowly disappearing in the old forests while the demand is increasing, prices in the world's market having attained a very high rate. To plant them the ground ought to be deeply plowed and prepared as if for corn, and the nuts set as soon as they drop from the tree same distance as corn in the hill, one or two nuts in one hill. Or the rows be made six or seven feet distant and the nuts three feet distant in the row. After planting the land is to be leveled by harrowing. This and the following freezing will cover the track more or less till spring time so that the squirrels, the worst enemy, may not so easily find them as when only planted in the spring, when the want of food causes these animals to dig them out one and all. After some years they need thinning out, when two points are to be observed, viz.: that the best

specimens are left to remain, and that among these an equal distance ought to be maintained as much as possible. The result will be straight, valuable stems which may be cut finally in say, twenty-five years after planting.

The use of the catalpa is many-fold, the best timber to withstand moisture; it is good for posts, stakes, sills, railroad ties, barrels, shingles, etc.; as cabinetmakers' material, it competes with walnut; as an ornamental tree in lawns and alleys, it is highly appreciated. If planted in proper distances along a line where fences are needed, it serves as living posts. All these merits are multiplied by the quick growth in which Teas catalpa excels even the Western or C. speciosa, one year old seedlings beating the latter by several inches, attaining a height of two to four feet. The seed being very small must be sown in a nursery, slightly covered, and in some way care must be taken that the surface be prevented from parching lest the germ may not break through. The spring following they may be transplanted definitely, the stem cut off to the ground. Distance and culture the first two years the same as with walnuts.

AMAZONIA, Mo., June 1, 1885.

A letter from M. H. Street, St. Library, Neb.

In a circular from your worthy secretary, he says: "We hope no one will feel the least delicate in bringing or sending essays and papers on any subject of interest to the society." Ah, of interest, how few of us feel we are able to write such an article. He also calls for our experience. Mine is limited, but I will give it:

As I expected, vines and bushes were badly killed. Snyder B. B. killed from a few buds at the ends of the canes down to the ground. Mammoth Cluster and Gregg raspberry killed about the same; Turner and Cuthbert stood the best of all, and are at date, May 25th, loaded with buds. Strawberry vines suffered badly. Downing seems to have almost entirely succumbed to the cold; Crescent is ahead and lively, filling up with bloom and bud, but alas, I fear to no purpose, as the Downings are dead, and the Wilsons and Captain Jacks are so slow about blossoming; the Crescents will not be fertilized. What can I use for a fertilizer for them in place of Chas. Downing?

The common gray cut worm made sad havoc with the crowns of plants in early spring, killing thousands of them, our patch being within ten rods of the house (and no fences) We invited the hens down there, and they would run up and down the patch diving here and there, and now as soon as they are out of mornings they make for the patch and seem to catch a great deal

of something, nor do we see so many cut worms. When the hens show an inclination to scratch the mulch we drive them of, and before berry time (if we have any) will keep them off altogether. I had thought of sowing air-slacked lime over the plants, but was afraid to risk it till some one gave their experience with its use. I would ask if any of the members have ever tried it? In regard to the plants winter killing, I think soil, climate, etc., the cause, as follows: Soil, loose, sandy loam, so loose that unless mulched the hard winds carry a man's field off in clouds, and from the middle of Oct. to the first or middle of April, we have no rain, and the snow blows off down to the mulch, consequently what little snow that thaws does not keep the ground wet, and our intense cold (from 24 to 34 degrees below zero) dry freezes them to death. I lost about a dozen fall-set grape vines from the same cause, I feel pretty sure, for I watered them good when I set them, and as soon as the ground froze covered them some with earth and some with coarse manure, but they were dry and hard this spring. There are more insects, worms, etc., to the square acre here in Nebraska than any other place I saw, and anyone undertaking fruit raising must make up their minds to do or die. Even our forest trees are beset by the striped cotton-wood bug, box elder worm, rose bugs, caterpillars, etc. By the way, last winter I spread ashes from wood, cobs and cornstalks over a small plat of plants, and they were the deadest lot of all. Was it the ashes that killed them?

When we get down in Missouri, which we hope to do either this fall or next, then we will attend and listen to the experience of older and wiser ones.

Yours respectfully,

M. H. STREET.

REPORT ON SMALL FRUITS.

BY W. H. THOMAS.

LaGrange, Mo., June 8, 1885.

L. A. Goodman, Esq.

Dear Sir: In answer to your request for a paper on small fruits from Northeast Missouri, I have to say that this section of the State pays but little attention to growing small fruits, hence but little can be said by us. The past winter was very severe on the blackberries of the tender varieties, such as Lawton, Kittatinny, etc., but the Snyder came through all right, and is now full of blossoms, but few of that variety has been planted as yet, so of course our crop of blackberries for this season will be very light. The Black Cap raspberries were also injured by cold weather to some extent, so our crop of them will also be a little short. The red varieties appear to be uninjured, but very few of them, however, are grown here. But of the strawberry crop a more favorable report may be made, except as to prices, for we are now right in the heavy part of the picking. The Wilson was badly damaged by the freeze about a month ago, and the Sharpless and Chas. Downing are almost a total failure, but the Crescent, the boss of berries, is uninjured, and, oh, my! what quantities of large fine berries they are turning off, and all for the small sum of "one dollar a bottle" —case—need I say, well, not quite so bad as that yet, for some are selling for $2.00 per case.

We grow the Crescent, Wilson, Capt. Jack, Sucker State and Sharpless, and are trying a few others, but shall discard Sharpless for same reason we had to give up Downing—too tender to stand spring frosts. I always plant in the spring as early as possible after plants are large enough to take up. In planting a Crescent patch I plant two rows of Crescent, then one row of Wilson, then two rows Crescent, then one of Sucker State or Capt. Jack, and so on till all are planted. The Wilson being an early bloomer is ready to fertilize. The first bloom of the Crescent, the Capt. Jack or Sucker State both being late bloomers are ready to take up where the Wilson leaves off, thus fertilizing all the blooms on the Crescent, unless during unfavorable, cold, rainy weather

at blooming time, then much of the pollen falls to the ground, and the Crescent failing to receive its full share imperfect berries or none at all are formed.

Many writers say plant every fifth row with a good, strong, perfect blooming variety, with the Crescent, and they will be properly fertilized. That may do to write as theory, and may do to practice, provided the season is just right, and the perfect bloomer keeps right along with the Crescent's blooming season, but I have failed to find such a plant, and experience has taught me it is not safe to plant that way or depend on one variety alone to aid the Crescent.

I planted the Sucker State for the first time last spring, and now pronounce it the most robust, best rooted, largest crowned plant I have ever seen. (I have none to sell). I am taking a little fruit from them this season, they are later and larger than Wilson, and I think produce about the same; are not as firm as Wilson, but would sell for a Wilson anywhere, they look so much like them. I expect to plant them quite largely next spring; they grow and multiply nearly equal to the Crescent; bloom late; a perfect bloomer, and berries ripen late; I think they are excellent to go with the Crescent. My plan of setting the plants is to mark off the ground one way same as for corn, then one man takes up the plants and straightens out the roots nicely, while another takes the planter (an instrument or tool similar to a cooper's adz, except the blade is straight and the hammer end of wood), and with his right hand sends the blade (say two inches wide) into the ground about four to six inches at an angle of about 45°, while with his left hand he places the plant down side the blade at the same time removing the blade and turning the tool so as to fetch a good stroke on the ground with the hammer end down near the plant, and the plant is firmly set, few fail to live, and the work is thus well, cheaply and rapidly done; one good hand will set as fast as another will take them up. I never allow plants to fruit same season they are planted.

Can't say any more this time—too busy with berries. 71 cases today and threatening rain. I think my last letter to you was probably addressed Weston.

LaGrange, Mo., June 23, 1885.

L. A. Goodman, Esq. Secretary:

Dear Sir: I wish to make a correction of my statement about the Sucker State; when I wrote it was just getting ripe, and I thought it looked very much like the Wilson. It is not near as firm as the Wilson but averages larger in size, and very much resembles the Cumberland Triumph in looks; quality not good; otherwise I stand fully up

to all I said for it, on the limited trial I have had a chance to make of it; by another season I hope to know more fully its qualities. Strawberries all gone; season very unsatisfactory as to prices and quantity. Raspberries just commencing; crop of them is very light.

Truly, etc.,

W. H. THOMAS.

SPRINGFIELD, MO., June 1, 1885.

Mr. L. A. Goodman, Secretary Missouri Horticultural Society:

DEAR SIR: As one of the Committe on Flowers, I beg to submit the following:

The season is at least a month later than usual; our annual roses are now in full bloom, and they are usually gone by "Decoration day." We had frost, snow and ice the first week in May, but it had no perceptible effect on even the tender plants, like heliotropes, etc., except to retard their growth a little. Following the old rule of bedding out tender plants when the fruit trees were in bloom, ours were all planted out, but we did not lose anything. Far greater attention is paid to the care of lawns and gardens than ever before, and our nurserymen report a great demand for plants, especially roses, geraniums, pansies and verbenas, they estimate their sales at double the amount of last year, and at least $300.00 have been sent from Springfield for roses alone to Qunesfullen, St. Joseph, Miller & Hunt, Dingee & Conard, and others. (This was ascertained from the postmaster). I notice a peculiar little red burr on the roses (bushes) I have never seen before; it looks something like a strawberry; cannot ascertain what it is. It seems to be a fine season for flowers, if it is late.

MRS. WADE BURDEN.

FLOWERING SHRUBS.

BY J. A. DURKES.

In accordance with your request, dear Secretary, to write something that would be of interest to those who would attend this meeting, what better subject could we present at this season than that of flowers?

The shrub, whether planted for ornamental or floral purposes on the grounds, fills a place at all times attractive and though it were but an uncared for straggling bush, in some part of the spring or summer when it may be covered with bloom the most obdurate and critical in their taste would find a charm in—

"Each floral bell that swingeth,
Spreading its perfume on the passing air."

Especially are shrubs desirable to the general planter. They are hardy, need but little care and are easily propagated; most can be grown from cuttings, by layers, by dividing, by side-shoots and root cutting. We said they would grow with little labor, but their response to those little things we call high cultivation will be seen in the size, richness and abundance of bloom, as well as the luxuriance and lustre of the foliage.

Of the mode of training and culture, their useful adaptations in ornamental planting is not our purpose now to speak, but to note some of the most desirable, with their habits, that will give a succession of bloom from early spring till summer late.

While the snow is still lingering on the northern slopes, the Daphne ushers in the floral reign of spring, and before a leaflet appears, its branches are

"Well attired and thick beset
With blushing wreaths investing every spray."

The golden bells of the Forsythia, half hidden amid the deep green foliage, at this season the more attractive, is a pretty sight; unfortunately, this is only half-hardy, and needs protection.

The excellence of the Juneberry cannot be praised too highly. its white flowers covering the tree in April, and becoming very ornamental in fall by the purplish red hue of its leaves.

The Japan Quince, too, is a desirable shrub on account of its hardihood and early habit of bloom; the appearance of its flowers are very brilliant, and the poet has spoken of it in this strain:

"Wreathed in deep crimson buds—the fairy fires
That gleam and glow amid the wintry scenes,
Lighting their ruddy beacons at the sun."

To melt away the snow, as the days pass on and lengthen, the fragrance of the Golden Currant fills the air, the little Almond, pink and white, enliven the scene, while their more stately sister, the Flowering Plum, vies with them in the greater delicacy of her colors.

That old favorite, the Lilac, we cannot pass by; for ages it has been a plant for poetical inspiration. May comes and the floral crown receives many beautiful additions.

The pretty Tartarian, or upright Honeysuckle, the Weigelia and several varieties of Spirea are in bloom, and the Snowball too, tall

"And throwing up her silver globes—
Light as the foamy surf
The wind severs from the broken waves."

This is one of the most beautiful of all ornamental shrubs, and receives a place in every plantation.

The Rose Acacia, though a rambling shrub, always was a favorite with us.

The Philadelphus are all hardy, giving abundance of bloom.

Of course every one must have the Queen of flowers, the Rose, to reign over their little floral kingdom. The Deutzia, too—who does not admire it?—outstretching its branches, laden with white blossoms

"Half-hidden 'mid its foliage green."

Other varieties of the Spirea now come into bloom.

The Sorreltree becomes very desirable and the more attractive from the length of its blooming season, being from July to September.

The Altheas gladden the later summer with their various colors.

For a late bloomer the Stuartia must win its way into every collection; this shrub is not so well known yet as it should be.

Many of the intervals of the blooming can be filled by a selection of climbers, Honeysuckles, Wistarias, Clematis and others.

The hardy, Perpetual Roses, too, go far in this respect.

The secretary called the attention to the offer of $1,000 by the American Garden for the best new variety of strawberry, best raspberry, best grape, best gooseberry, best blackberry, best new fruit, best new potato, best new vegetable, best new flowering shrub.

The secretary then read the following liberal offer made by E. H. Libby, Greenfield, Mass., editor of American Garden:

THE AMERICAN GARDEN PRIZES OF $1,000 FOR NEW FRUITS, FLOWERS AND VEGETABLES.

For the promotion of horticulture, the American Garden offers the following prizes of $100 each, or silver plate of equal value. No vari-

eties now upon the market can compete. Plants or seeds are to be sent to the committees for growing in their own grounds for trial, under restrictions not to be propagated or sold. The prizes are to be awarded to the originators :

a. The varieties put in competition are to be shown at three or more State, National, or other equally important exhibitions, in 1885 and in 1886, under the rules of the societies where exhibited. The awards will be made by committees—chosen from among members of the American Pomological Society for fruits, American Horticultural Society for vegetables, Society of American Florists for flowering plants—in the fall of 1886, or at such times as the committees shall decide that the conditions have been met.

1. For the best grape which shall combine territorial adaptability with superior shipping and table qualities. A vine with the current year's growth, a portion of the previous year's growth, with all fruit and foliage growing thereon intact, and at least six bunches of grapes shown separately, to be exhibited as above (*a*). $100 or plate.

2. For the best strawberry which shall combine territorial adaptability with superior shipping and table qualities. A plate of not less than fifty berries, and three plants with all roots, foliage and fruit intact, to be exhibited as above (*a*). $100 or plate.

3. For the best raspberry which shall combine hardiness, productiveness and superior shipping and table qualities. Same conditions as for 2. To be exhibited as above (*a*). $100 or plate.

4. For the best gooseberry which shall combine large size, productiveness and freedom from mildew. Same conditions as for 2. To be exhibited as above (*a*). $100 or plate.

5. For the best blackberry which shall combine large size, good quality, hardiness and productiveness. Conditions as for 2. To be exhibited as above (*a*.) $100 or plate.

6. For the best new fruit, (a new species required) to thrive north of Virginia and Kansas. To be exhibited as above (*a*). $100 or plate.

7. For the best new potato which shall combine superior quality, productiveness, and freedom from disease. One peck to be exhibited as above (*a*). $100 or plate.

8. For the best new vegetable, other than potato (either a new variety or species), table and shipping qualities, and profitableness of culture to be considered. To thrive north of Virginia and Kansas. To be exhibited as above (*a*). $100 or plate.

9. For the best new flowering shrub, which shall be hardy in the Northern States east of the Rocky Mountains. To be exhibited as above (*a*). $100 or plate.

10. For the best new herbaceous perennial flowering plant, which shall be hardy in the Northern States east of the Rocky Mountains. To be exhibited as above (*a*). $100 or plate.

We shall make no claims or conditions whatsoever that would influence the naming or disposition of the prize-winning varieties.

The competition is open to North America.

The names of the committees will be announced as soon as the lists can be completed.

The above conditions will not be modified, except, possibly, to simplify them.

We invite suggestions, to the end of making the above offers as useful as possible.

Parties intending to compete are requested to inform the undersigned, for record.

Reports of judges on any new fruits, flowers, or vegetables at any exhibition in America are solicited.

(Signed) E. H. LIBBY.

GREENFIELD, MASS., May 1, 1885.

Committee on final resolutions submitted the following report:

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. President:

The committee appointed to draft final resolutions beg leave to offer the following:

Resolved, That the thanks of this society are due for the use of the Presbyterian church, in which we held our meeting, and especially to the ladies of Butler for the gorgeous and beautiful decoration with such a fine array and beautiful display of rare blooming pot plants, together with a profusion of cut flowers, boquets, designs and festoons, and for their interest and regular attendance during the meeting.

Resolved, further, That our thanks are due the Bates County Horticultural Society and to the citizens of Butler and of the county for their courteous, hospitable entertainment and untiring efforts to render our stay and meeting pleasant.

Resolved, further, That we are pleased to be honored by so many reporters of the press, and also especially to Prof. Rose for his promptness in reporting the full proceedings of this society.

Resolved, That the thanks of the society are due the Missouri Pacific, Chicago & Rock Island, the C. & A., Wabash, and Kansas City & Memphis railroads for reduced rates over each of their different lines.

Respectfully submitted,

Z. S. RAGAN,
E. F. HYNES.

REPORT OF TREASURER.

RECEIPTS.	
Balance last report	$75 00
March 30, 1885, Deficiency Bill (printing)	450 00
May 17, 1885, Deficiency Bill (New Orleans)	500 00
State appropriation	750 00
Membership	82 00
Total	$1,857 00
EXPENDITURES.	
April 6, 1885, warrant No. 34, printing report	$395 84
May 20, 1885, warrant No. 36, printing (balance)	32 80
May 20, 1885, warrants Nos. 37, 38, 39, 40 and 41, expenses at World's Fair	484 00
Jan. 1, 1885, warrant No. 42, expenses winter meeting	117 00
March 1, 1885, warrant No. 43, expenses Jeff. City, postage, etc	77 35
April 1, 1885, warrant No. 44, expenses on report, express	101 80
May 1, 1885, warrant No. 45, binding report	218 78
June 1, 1885, warrant No. 46, postage on reports	62 30
June 1, 1885, warrant No. 47, six months salary Secretary	250 00
June 1, 1885, Tresurer's expenses	32 10
Total	$1,772 47
Leaving balance	83 53
Total	$1,857 00

J. C. EVANS, Treasurer.

Referred to Finance Committee, examined and approved.

D. N. THOMPSON,
A. AMBROSE,
Committee.

Before adjournment President Evans extended an invitation to the members and their friends to meet at Duncan's Hall at 8 P. M. to enjoy a strawberry festival.

The invitation was heartily seconded by Mr. Thompson in behalf of Butler and vicinity.

Sec. Goodman made a few appropriate remarks relating to associations and friendships formed in these associations.

Mr. King, editor of the *Western Chronicle*, by request, presented the merits of his paper.

Also the merits of the *Live Stock Record* were presented by its editor, H. E. Heath.

By motion, the ministers of Butler and their wives were made honorary members of the society for the coming year.

The society was then favored with a beautiful song, "Weary Gleaner."

After a permanent benediction by Bro. Walker, the society adjourned until next December to meet at time and place selected by the proper officers.

REPORT

OF THE

MISSOURI VALLEY HORTICULTURAL SOCIETY.

BY G. W. HOPKINS, ESQ.,

WITH SOME OF THE PAPERS READ DURING THE YEAR.

Mr. President and Members of the Missouri State Horticultural Society:

I herewith submit a brief report from the Missouri Valley Horticultural Society:

Since my last report to your meeting at St. Joseph, we have passed through one of the most severe winters I have ever experienced in this State. This has been followed up by a very cold, wet, backward spring, which has left its telling effect upon every kind of fruit.

Thousands of apple trees which were loaded with bloom and gave promise of a bountiful crop, are now covered with a rich green foliage, but minus their fruit.

Peach trees have not only failed to bloom, but many are dead and many are so badly injured as to make but a sickly effort in the formation of foliage.

Raspberries that have heretofore been considered iron-clad, have had to succumb.

Cherries that gave promise of an unusual large crop, have continued to drop until we can hardly expect half a crop.

Plums are almost a failure.

Strawberries, while passing through the winter uninjured, and setting a heavy crop, when the picking time arrives are found to be below the usual average size, and deficient in quantity.

Many varieties which were never known to rust before are now badly affected.

While the outlook for the horticulturist is not the most flattering in this section of the country, let us not despair, but remember the promise which is found in the good book that seed time and harvest shall always come.

The winter meetings of the society were held in Kansas City at the office of Vineyard & Wilkinson, with the exception of the April meeting, which was held at the court-house.

Owing to the absence of many of the members attending the World's Fair at New Orleans, and the extreme cold weather, some of the meetings were not very largely attended. However, there were always enough members who braved the storms to form a quorum for the transaction of business. To this promptness which has characterized the members of the society in attending the monthly meetings, may in a large degree be attributed the success which has crowned the efforts of the organization.

The display of apples up to the May meeting was unusually fine, and the society awarded premiums liberally.

The Society has made an arrangement with the Western Chronicle, a monthly paper published in Kansas City, by which a complete report of the proceedings of the Society, together with all essays and papers will be published in each number. By this means the experience and observation of the members will be widely disseminated throughout the surrounding country.

The May meeting was held at the home of Jesse Ray, east of the city. It commenced to rain early in the morning, and continued at intervals throughout the day. The members began to drop in about eleven o'clock, and continued to come until quite a crowd had collected.

Mr. Ray had made preparations for a large crowd, and such huge dishes of ham, chicken, cake, pies, etc., we only see at the summer meetings of the Society. Several ladies were present, and the members enjoyed a good time, socially, until the hour arrived for business.

The Society is largely indebted to the ladies for the success of the summer meetings.

They know just how to tempt the appetite and supply the wants of the inner man.

It is said if you "touch a man's pocket, you touch his heart."

But I am one who believes that the shortest route to a man's heart is reached through his stomach.

After dinner the meeting was called to order by Vice-President Goodman. Our worthy President, Col. Evans, having recently committed *matrimony*, failed to show up.

This is the first time he was ever known to stay away on account of weather, especially at the summer meetings, when he knew the ladies would be present.

After spending some time in discussing the horticultural outlook and listening to a very valuable paper on the sacking of grapes, the Society adjourned to meet at the home of Judge Cravens on the third Saturday in June.

The following is a list of officers and members of the Society for 1885:

OFFICERS.

President—J. C. Evans. Vice-President—L. A. Goodman.
Secretary—G. W. Hopkins. Treasurer—G. F. Espenlaub.

MEMBERS.

F. Holsinger.
Major Z. S. Ragan.
William Lewis.
J. C. Blair.
S. D. Gregg.
Eugene Lindsay.
Zatter Todd.
J. W. Williamson.
Harvey Hughes.
James A. Bayles.
Isaac Orwick.
J. C. Dickerson.
R. S. Brown.
A. C. Threlkeld.
F. E. Robinson.
W. A. Gosnell.
Carl Shroeder.
T. McKinley.
W. G. Gano.
J. A Durkes.
J. W. Kidwell.
H. Kretchmar.
W. M. Hopkins.
J. K. Lantsenhiser.
Dan. Carpenter.
James Fisher.
C. E. Kern.
S. W. Saulsbury.
Major H. A. White.
Jesse Ray.
C. B. Warren.
John Howell.
T. L. Hogue.
William Kaufman.
S. S. Hogue.
M. B. Newman.

HONORARY MEMBERS.

J. D. King.
Professor Rose.
John K. Cravens.
William Vineyard.
Mr. Wilkinson.

LIFE MEMBER.

G. S. Parks.

All ladies who attend the meetings are considered as honorary members.

In conclusion, I desire to say that I regret that it will not be possible for me to attend your meeting, and to indulge the hope that you will have a very pleasant and interesting meeting, and that horticultural interests will be greatly benefited by your coming together.

Respectfully,

G. W. HOPKINS,
Secretary M. V. H. S.

Following are some of the papers read during the year at the monthly meetings:

VEGETABLLES.

BY C. E. KERN, WESTPORT.

Mr. Kern presented the following report:

Mr. President:

At the request of the chairman of the Committee on Vegetables, I herewith present to this society a very brief report for the past month.

The weather, with the exception of too much rainfall, which retarded proper cultivation at the time it was needed the most, has been all that could be desired for the perfection of vegetables. Prices have been, with a few exceptions, very fair, with a good demand. From my observations I am led to infer that there are not so many

farmers engaged in the attempt to farm and garden at the same time this year as there were last; the result is almost invariably disastrous to them, as it is almost an impossibility to conduct a farm and a market garden at the same time. They succeed usually in demoralizing prices, thereby making market gardening unpopular.

The cabbage worm, that has been so troublesome in the past years, is now commencing its work of destruction to the cabbage again. The several methods advocated before this society for their extermination can be used at the present time to the greatest advantage to the producer.

The earth flea, which was so destructive in May, is still with us, but is not doing much damage, as vegetation is so rank this month it is almost impossible for them to do much injury at the present time. Tomatoes that are maturing are rotting to some extent, caused by excessive moisture. All other vegetables that were properly cultivated are doing as well, if not better, than they have done for some years.

Mr. Kern uses pyrethum to destroy the cabbage worm. Mixes with flour, three parts of flour, one part pyrethum. Applies with garden bellows.

Major Gano referred to a case where road dust was used with good success. Ice water, quick lime, bran and other remedies were offered.

Mr. Durkees added sifted ashes to the list.

ENTOMOLOGY.

Major Frank Holsinger, chairman of the committee, offered the following report:

PHYLOXERIA.

The grape has been suffering some time with a minute insect known as phyloxeria. During the last few years much attention has been given it, in hopes of saving our grapes from its ravages. So great has been the destruction of the vineyards in France and Italy that it has been considered a national calamity. These governments have appointed special committees to investigate and report, and large rewards

are offered for a remedy that will eradicate them. Other countries in Europe have been visited by them.

Phyloxeria is purely an American invention, and one in which we take very little pride. It doutless was carried to France from the United States. Our American vines seem to resist it more than the foreign vines. Until recently the Pacific Slope was exempt, but they are there now, and promise to do great damage to the vines, as they are largely of European origin.

The insect of two forms—those of the leaf produce greenish red or yellow galls, of various shapes and sizes. The other form is that upon the root, which is by far the more destructive. The first appear upon the rootlets, causing swellings. As the insects increase they pass to the larger roots, soon the plants are so badly injured as to be useless or die from their attack. The first notice we have of this insect is by Dr. Fitch, in 1854, in the "Transactions of New York State Agricultural Society." Early in June there appears upon the leaves small globular cupshaped galls. Upon opening these globes you will find from one to four of these greenish red or possibly yellow lice with many very minute eggs of about the same color. Sometimes these galls become over-populated, and they pass out and soon form new galls. Frequently as many as four or five hundred eggs may be found in a single gall. There are many generations of them in a season, and as the leaves become old and less suculent, they leave their cells, wander off, enter the ground and feed upon the roots, where they subsist upon the young rootlets, which soon become diseased and die.

As soon as the plant is exhausted they pass off through the ground in search of other food, which they soon find amid the interlacing of adjoining plants. They remain in the ground torpid all winter, and from their color—brown—are hard to discover. It is only the females that have wings and can fly, and in this way migrate to other fields at remote distances. As to remedies, there has as yet little been done to check them. Bi-sulphide of carbon is said to be most efficient, being very offensive and volatile it permeates the soil to a considerable distance and kills the insects without injury to the vine. Great care should be taken to handle this substance, as it is very inflamable and explosive. Holes are made about the plant and the substance is placed therein. As myriads of them are known to crawl over the ground in August and September, quick lime sprinkled over the ground is an efficient remedy. Few insects as yet are found to prey upon them.

Major Ragan objected to saddling upon America the origin of Phyloxeria; thought it came from France.

Major Holsinger stoutly maintained the position taken in his paper.

NEW VARIETIES OF GRAPES.

Mr. Espenlaub read the following essay:

The subject, "New Varieties of Grapes," has, I fear, been assigned to the wrong person, as I have not invested much in the new high-priced kinds, knowing that often the much lauded and high-priced prove inferior to old standard kinds which can be bought for a nickel each. I invested three years ago in some Prentiss and after expending much time and patience I find it mildews every summer so that it never ripens any wood to endure our winters, some of the plants gave up entirely, others are only just alive, and I fear I will never succeed in raising a Prentiss grape.

I have succeeded but little better with Adirondac, Baccus, Brighton, Walter, Senasqua, Agawam, Louisiana and Triumph.

Most of the Rogers Hybrids are going the same road. The only kind of others is the Goethe, and it also was killed to the ground last winter, though it is worth covering in winter.

Of all new kinds very few promise better than those that have the Concord for one of their parents; they all have the advantage of being hardy enough to endure our winters, though very severe they have proved to be of late; they also suffer little or none from mildew as they all have the thick leathery foliage on the Concord.

The next most promising class are those that have originated from the almost worthless variety, the Taylor Bullit. They are mostly seedlings of the Elvira. These also are very hardy and healthy, and most of them very prolific; they are most all white grapes. Perhaps one of the most promising of these is Noah, it is very prolific, fair in size in bunch and berry and of very good quality. There are some very good seedlings of the Clinton, these also possess great hardihood, generally have compact bunches, with rather small berries and are black, and rank more as wine than table grapes.

The following essay was presented by L. A. Goodman:

GROWTH OF PLANTS.

How plants grow, that is, how is this life growth produced, has been the study of scientists for ages. What this life principle is, how

it is formed, what brings it to life, what it is, is unknown. Sun and water brings life out of a dry seed if the germ is not killed. Heat and moisture seem to say to all seeds, "Come, show yourself," and at once they start into activity.

Did you ever see the live oats? Take some of them, wet them in warm water, and in a few moments, holding them in the warm hand, they will begin to show life. The workings and twistings, the legs throwing themselves out this way and that until they finally turn clear over and over They will go again and again. Keep them damp and warm and they keep at work as if endowed with life.

What is this life, we know not. How does it show itself no one can tell. Where does the vegetable end and the animal begin, is a question hard to answer.

The swelling of the life germ produces a motion imperceptible to us, but just as positive as is the motion in the animal, and that when growth begins this motion begins. Scientists call this first principle of growth or life in the plant, protoplasm. This is only observable by the aid of the most powerful microscope, and is the lowest form of life, just as an atom is the lowest form of matter.

Protoplasm is the life, then, of all growth, and what seems stranger than all, this life is of itself capable of motion, and in the vegetable cells it is the life principle. It is also capable of subdivision and that of itself, so that growth is formed by this division of this life growth, and that continuously forming the life of the cells of the plants and thus the growth is continually forming.

Stranger still is it that this protoplasm is the life principle in the lower forms of animals, and even of man himself, and stranger than all seems to be the fact that there is no power of the microscope so great as to be able to separate this life so as to be able to distinguish it. Take this life principle and no one is able to tell what shall proceed from it—vegetable, bird or man. Animal life, even to that of man, seems to be exactly the same as that of vegetable life. Protoplasm is the germ of all life, and in all the vegetable life this is the life principle—this is the growth or cause of growth.

Some of the lower animal life is like the vegetable—can be dried up and kept so for years, and as soon as heat and moisture are applied they seem to start into life just as the germ of the seed does.

Heat and moisture seem to bring this protoplasm to life, and from its own power of motion and of division we have the growth of the animal as well as the vegetable kingdom.

In all vegetable growfh we have the cell formation plainly seen, and this protoplasm is the life in the center of the cells. These cells

consist of the cell wall or membrane and its contents. The cell wall is a thin partition of dead matter called cellulose. This cellulose has the same constitution, as starch, oxygen, carbon and hydrogen. It is white, tough, elastic and fibrous. You can see it in the skeleton of the leaves, so often visible on trees where all the cells have been eaten off.

It is the frame work of all plants. In the first stages of life the cell consists entirely of cellulose, but as plants grow the walls become encrusted with resins and coloring matter. This forms the food of herbivorous animals. This cell wall contains, while young, this viscid fluid, like itself, protoplasm. As plants grow, or rather as this protoplasm divides, plants do grow, and we see the elongation of the roots, branches and leaves. When the woody matter forms, the fluid evaporates and leaves a cavity filled with air. This is seen plainly in the bark of trees, the pith and in the old wood.

This protoplasm clings to the cell walls as the cells grow, so as to line it, and the interior of this space is filled with cell sap. This protoplasm still later forms a thin film, and a nucleus is formed and strings of protoplasm form across the cell cavity from this nucleus. This in young cells divides into halves, a wall of cellulose forms, and thus new cells are formed. These take place so rapidly as to be almost without number. These cells are only about 1–300 to 1–1000 of an inch, so that a cubic inch contains from 25,000,000 to 100,000,000 of cells. Thus, when you see a plant growing one or two inches per day you can imagine the immense number of these divisions and cell formations per day.

Prof. Gray states in his botany that a century plant throwing up its flower stalk, six inches per day, formed every day twenty thousand million cells, a number beyond our comprehension.

In the green parts of plants the protoplasm undergoes a change, by which a part of it is broken up into granules, which contain a green coloring matter called chlorophyl, and these granules are very numerous in the surface cell of plants, and the color of the leaves seen through the thin cell walls. Similar granules, but of different colors, are seen in the flowers. What forms this color out of water and soil is a query.

This chlorophyl under the action of the sunlight separates the carbonic acid of the air and gives out oxygen to the air and carbon to the plant.

Starch is formed by the carbon combining the oxygen and hydrogen of water. This chlorophyl is only formed by sunlight, for if it is withdrawn the blanching process appears.

The plant seems to have the power to change the starch, mucilage, sugar and plant fabric, one into the other as it may need. So that one

time a plant may have an abundance of one, and at a future time of another of these substances. So that although these substances are nearly alike in chemical composition, and are in all plants, yet one will lay up stores of sugar, starch or plant fabric as the case may be. We see this especially in Indian corn and the potato. This principal makes each variety of plant valuable in its own place and is the medicinal properties of plants, the oils secreted, the coffee its valuable properties, castor oil bean, tea, Peruvian bark, &c.

Now, then, this power of changing can only be done in the young state, and we can have a lesson from this on our fruit trees.

In the first place, then, all flowers are simply changed leaves, and if these can be changed by any means in our power, then we have it in our hands to get fruit buds. Now, few fruit growers and nurserymen but what know that if we cut a ring out of the bark of the tree in time in the spring the growth of buds will change into fruit buds, but that if it is done too late it will do no good. This power to change is visible in all plants as soon as the life of the tree or plant is threatened then it changes its growth into fruit and seeds. But the opposite is also true. Let a plant be injured after the forming of the buds or during winter and they may be so injured that the buds will just open but never set a bit of fruit; or it may be so injured that not one of the buds will bloom, or they may be injured so they will not even form wood growth.

All fruits, therefore, that form their fruit buds the previous year and lie dormant can easily be told when injured or can be easily seen as they form their buds, and can be made to change the growth buds into fruit buds if taken in time. But all fruits and nuts which form their fruit on the growth of the year can not be so easily seen in its effects and they seem to be under different laws.

For instance, the grape has two sets of buds, but late in the season no one supposes that it could change its growth into fruit bearing. Nor the peach. If the buds for fruit are killed the tree has no power to transform its growth buds into fruit buds, and yet the tree has this power at the time of its early growth in the season. But in the walnut chestnut and hickory the bloom buds are formed on the present year's growth and the change can not be so easily seen. In the raspberry blackberry and grape we find this same principle of growth, the young shoots from the last year's stem bringing the fruit. Now, if the cane is injured by the winter, or the buds are killed, then the growth, although it may set fruit (if not injured too badly), will never ripen them, and oftentimes it will not even bloom, although it may make a good growth. In fact it is simply this, the fruit buds being a modified leaf, if injured, will return to its primitive form—leaf growth.

The tree's structure is the bark. First the liber or fibrous bark, that is, their inner bark. Second, the green bark, which contains he same matter as the leaves, and is covered during the year with. Third, a corky layer, which is the same as the cork now in use. Fourth, the epidermis or skin which covers the whole. The whole of the growth is made from this inner bark. Next to it comes the sap-wood, the growing part of a tree, and a layer is put on every year on the outer side under the bark. Then the heart-wood which has changed color and has little to do with the life of the tree.

The living parts of a tree are: First, the rootlets, at one extremity; second, the buds and leaves of the season on the other; and, third, the newest wood and the newest bark of the body. The new growth between the wood and bark is called the cambrian layer, and is so tender that the least effort will raise the bark. But this is all composed of cells, so young that it looks like mucilage, but the cells forming so rapidly by division that a person becomes bewildered.

The leaves consist of the woody parts (ribs), and cellular part, these cells being filled with the chlorophyl (that is, the green of the leaves). The upper part close and glossy to shed the rain, the lower part porus and open for the work of the tree, the breathing apparatus.

The trees and plants are, as before intimated, using up the carbonic acid and giving out ogygen, while animals are using ogygen and exhaling the carbonic acid. Thus the growth of the plants are a medium by which such matters are kept evenly balanced. What this life is, just how it does its work, why it will take from the same soil the same particles and produce the apple, or the peach, or the grape, or the strawberry, we can not tell, no more than we can tell why the same grass will produce the hair on the horse, the wool on the sheep and the feathers on the goose. And this problem will never be solved why this same life principle, protoplasm, which we can not tell whether it will produce apple, peach, grape, strawberry, horse, sheep or goose, will if under the proper conditions do so. God only knows these things, and His goodness and wisdom rules them all.

The paper lead to a spirited discussion relative to the changing of growth buds to fruit buds by girdling or otherwise injuring the tree.

REPORT OF BATES COUNTY HORTICULTURAL SOCIETY.

BY HENRY SPEER, SECRETARY, BUTLER, MO.

WITH SOME OF THE PAPERS READ.

BUTLER, Mo., June 9, 1885.

L. A. Goodman, Secretary State Horticultural Society:

DEAR SIR: I take pleasure in reporting to you that our society is in a reasonably prosperous condition. Owing to the severe winter and bad state of the roads some of our winter meetings failed, but we have had some good meetings and have had interesting papers and discussions on the following subjects in the last six months:

Paper on "Round Headed Borer," by J. B. Innis.

Paper on "Social Influence of Our Horticultural Societies," by J. W. Hall.

Paper on "Raising Vegetables for Home Use," by Henry Speer.

Paper on "How to Have Strawberries for the Family," by C. I. Robards.

Paper on "The Codling Moth," by J. B. Innis.

Paper on "The Raspberry—Its Cultivation," by E. P. Henry.

Our members number forty-five, about half of them being good, active members. The society promises to be useful in the future. We hold summer meetings around among the members pic-nic style, and have a good time.

THE SOCIAL INFLUENCE OF OUR HORTICULTURAL MEETINGS.

BY J. W. HALL.

"Man cannot live by bread alone," was the saying of One who understood the many sides of human nature, and that each side needed to be ministered unto. Now, in all the hurry and rush of life—the buying and selling, the getting and losing—there is an unseen quantity which is not sufficiently estimated or often considered in making up life.

The exhibitions, county and State fairs, coming once a year, suggests the benefits of fellowship among horticulturists. This is aided through the influence of the frequent meetings of the minor societies; the love which every true horticulturist has for his labors; the pleasure which he takes all alone in looking at his fine fruit, by his long continued patience, perseverance and skill have been raised; the profit received by all careful and thoughtful co laborers in this noble work; the excitement incident to competition—all these are good things and have their place in the success of the business.

There is one thing that I wish to speak of, that, perhaps, has not been noticed in the light that it deserves: that is, the kindly and neighborly fellowship enjoyed by all at these monthly, semi pic nic, social and business meetings du ing the past summer.

There is a practical side to this, one in my way of thinking of sufficient importance, if rightly estimated, to insure the continuance of these meetings, if there were no other considerations. This fellowship brings out the finer feelings. Whatever has been said in sharp controversy in expressing our different views and ideas in regard to the subject matter before us, all is laid aside. The gentle, the kind, the noble part comes to crown the man, and when, after a few hours of seeing each other, receiving the warm grasp of the hand as an expression of sincere frindship and congratulations, we separate, and as we wend our ways homeward, we feel that it was good for us that we were there.

Then there is, as we have intimated, a necessity for such fellowship. The wear and tear of life to an average busy American is really

awful. If there can be a few times in the course of the year something which, for a few days, that will draw the jaded mind from the regular routine of every day duties, it would save ten years to life. Yet the nature of this something is decisive. What can be a better antidote (smooth and easy to take) than the exhibition of a large and choice collection of beautiful ripe fruits? The collection made by this society at our last monthly meeting for the World's Exposition at New Orleans was added to and somewhat improved before it was sent away. The few who saw it viewed it with mingled wonder and pleasure and surprise.

THE CURRANT IN SOUTHWEST MISSOURI.

BY HENRY SPEARS.

In preparing a short paper for this meeting, I have chosen as my subject my boyhood friend, the much neglected fruit, the currant; a fruit that is worthy of more attention than it has received in this part of Missouri in the past; a fruit that is easily raised if its nature and wants are studied; a fruit that will occupy, if necessary, an out-of-the-way corner where the space will not be missed; a fruit that makes an excellent pie or sauce when green, and when ripe, eaten with sugar and cream, it is no mean desert; and for jelly, in my estimation, it has no equal. What can excel in color, consistency and flavor well made currant jelly? If the fruit has been found that excels it for this purpose, I for one have not yet seen it. The pleasant acid of the currant, ripening as it does, in the hotest part of the summer, is cooling and healthy, and comes at a very opportune season.

Then I say, raise currants; raise plenty of them; let the children have all the ripe ones they want; and if the chickens and birds should get a few of them it will do them no harm. But hold on, says one; currants wont grow in Southwest Missouri. That is just what they told me about timothy and clover when I first came to Bates county. But to-day we have as fine meadows and pastures as they have anywhere;

and a visit to the garden or small fruit patch of any one who has really tried to raise currants will convince the most skeptical that currants can be raised even in Southwest Missouri. I do not know that they could be raised profitably for market in this climate and on our soil. I have not tried it and know of no one who has, and do not recommend it; but every farmer and fruit grower should raise a variety for home use. The best soil for the currant is a rather heavy moist soil with a northern exposure. I don't think it would succeed on sandy soil with southern exposure. A little protection from the sun and southwest wind, such as would be given by a fence or even a stone wall, would be beneficial, but not absolutely necessary, cultivation and mulching being the prime factors of success in its cultivation. I have not experimented with any of the new varieties, and do not know whether they are much improvement on the old Red Dutch or not, it being all that I have tried to any extent.

The currant worm has not put in his appearance as yet with me, and I have not heard of it in the county. The worst trouble is the long, hot summer, as it sheds its leaves early; but this difficulty can be overcome by heavy mulching.

HOW TO FURNISH THE FAMILY WITH AN ABUNDANT SUPPLY OF STRAWBERRIES THROUGH THE SEASON.

BY C. I. ROBARDS, BUTLER.

The rapid strides of progress that we are making in commercial intercourse and the improvements over the old ways and old things are astonishing to every one who stops long enough in this flying age to consider the results of man's inventive genius.

Thus by the shortness of time, by which widely distant latitudes are brought to yield up their treasures, together with the increased facilities for transportation in good order, we are given the privilege of enjoying the daily use of fresh strawberries at least four months in the

year. But this is our peculiar day and time, and if we faithfully perform our duties as horticulturists we are here not only to enjoy these privileges, but to test for the people and for ourselves every new fruit that may seem to offer any new points of merit. It will not do for us to believe that we have reached perfection in anything.

In the strawberry we are to consider improvement with reference to productiveness, size, flavor, and adaptability to latitude.

In my opinion soil has less to do with the varying results of the strawberry, except as to time of ripening, than with any other crop. In other words, I believe the strawberry to be a plant of so easy culture that whether the land be wet or dry, sand or heavy clay, all difficulties in the way of successful cultivation of this crop may be overcome by judicious and proper cultivation in the growing season.

The great difficulty in the way of general planting of this crop seems to be in an exaggerated estimate of the amount of labor requisite to success.

Many men when urged to provide themselves with strawberry plants, to afford a fresh supply of this delicious fruit for their families, have answered, "Oh, I haven't time to fool with those things." But these same men will carefully pale in a large family garden at an expense of fifty or one hundred dollars, manure it sufficiently for a hundred dollar crop of small fruits, and after having planted it to cabbage, tomatoes, and potatoes, gather from it in the course of the season ten to fifteen dollars' worth of vegetables.

This they do not call fooling. We would not say one word against growing a reasonable amount of vegetables for the use of the family, but if we can grow delicious fresh fruits for our wives and little ones to bring smiles to their faces and color to their cheeks, and yet can raise in the same enclosure, with very little more labor, all the vegetables we need, why by all means let us have both and be happy. God made all these things for our good. Let us not despise any good gift. But we started with a proposition to inform how to have fresh strawberries in abundant supply through the season.

If the plants are near the preparation of the ground is the first thing to be considered. Now, I have no doubt that right here is where many people have been deterred from taking the first step.

Many people seem to have an impression that either some peculiar soil or some peculiar condition of preparation is required. I repeat, that in my opinion any soil and any condition of soil will do to plant in, so that it is in as goodorder as would be required for a crop of corn.

As to enriching it, all that may be done, with good results in the fall after the cultivation of the crop, is over for the season; but give good cultivation through the season to insure a good crop the next year after planting. For family supply procure three hundred plants of Crescent Seedling, fifty plants of Sharpless, one hundred plants of Mount Vernon, fifty plants of Manchester. Plant two rows of Crescents, eighteen inches by two feet apart, then one row of either of the others at the same distance for garden culture.

Keep all runners off during the season, and after the growing season is over in the fall—say about the first of December—cover all the ground and plants sufficiently to hide them from sight with a coating of hay or straw. Prairie hay or wheat straw are the best materials for mulch.

While I would recommend the four above named well-tried varieties for this latitude for all purposes, I wish to notice a few other varieties of great promise that have been recently brought into notice. The Phelps or old Ironclad presents some remarkable points of merit. It seems to be very early, very large, as the young fruit now indicates, but its most distinguishing feature thus far indicated, is its great promise of productiveness. On plants set only late in the spring of 1884 I counted 110 berries and blossoms set on a single plant, Park Beauty, set also late in the spring of 1884 is very full of fruit. I am testing on my trial grounds at Butler also the Daniel Boone, Jersey Queen, Hart's Minnesota, Cornelia, Jumbo, and many new sorts. The Jumbo indicates a very large fruit.

These new sorts, however, we hope to be able to report more fully in regard to at the time of our next regular meeting.

Plant strawberries; plant hardy, productive and well-tried sorts; give reasonable, common sense cultivation, and you will have fruit in abundance as long as your neighbors and have the sweet pleasure of enjoying the fruits of your own labor.

REPORT OF GREENE COUNTY HORTICULTURAL SOCIETY.

BY D. S. HOLMAN, SPRINGFIELD.

ALSO SOME OF THE PAPERS READ DURING THE YEAR.

SPRINGFIELD, Mo., June 8th, 1885.

Officers and Members Missouri State Horticultural Society:

We offer the following brief report from the Greene County Horticultural Society, more from a disposition to obey the rule than to tell the little we have done.

Our society since your annual meeting has made, we think, some progress, but is working slowly. We really find that it is less difficult to start a new society than revive an old one. There is a good horticultural element in our county. The number of practical men who gather the fruits of our labors is large, but the societies constant monthly work is done by a few, as I presume is the case in most cases of similar work.

The membership has still increased slowly, until our number is about forty.

We have our business meetings monthly, and election of officers in December for the ensuing year.

Horticulture in our portion of the State is becoming every year more interesting, the field for society work seems steadily widening, and we hope to do what we can.

We are happy to report the pleasure of an occasional visit by your secretary and others of this society, and hope to have such pleasure often repeated.

Upon a statement last winter by your secretary, that the State society ought to have 500 members, our county society proposed to be one of fifty to make it so by ten new members. We will do all we promised and more.

We have been pleased and greatly profited by the work and reports of your society, and by circulating these reports we find workers drawn into both ours and the State society.

If to be auxiliary to a society like yours means to be fostered in our horticultural purposes and aided in our efforts at work by kind official visits to our society with the privilege and duty on our part to reciprocate as far as able, we feel honored to be recognized and will do what we can.

SHADE AND ORNAMENTAL TREES.

BY M. J. ROUNDTREE, SPRINGFIELD, MO.

The subject of shade and ornamental trees is one of great interest and is attracting the attention of all classes, especially the owners of homes, large or small, to a greater extent than ever before. The home (unless it is a new one) that is not ornamented with at least a few shade and ornamental trees is exceptional, and the owner of such home is generally set down as altogether deficient in taste and in those finer characteristics which should be found in all heads of families. A home (if such it could be called), which is entirely destitute of trees, shrubs and flowers, notwithstanding it may boast of a fine mansion and be complete in all of its appointments so far as buildings are concerned, yet the entire absence of shade and ornamental trees, shrubs and flowers would render such place bleak and cheerless in the extreme, and the occupants of such a home, no odds how well provided for, could never feel that just and well merited pride in and true love for it as they would for the same home or even a cheaper one which was tastfully ornamented with a select collection of the finest shade trees, etc. But the principal object of this essay is to refer to and enumerate a few of the many varieties of shade and ornamental trees that can be grown in this locality with perfect safety and full assurance of the highest results, so far as beauty, utility and great longevity is concerned. And as most planters desire to plant at least a fair percentage of their shade trees so as to make quick growth, and secure shade at the earliest time possible, I would recommend the white or soft maple as one of the most desirable for this purpose. And this rapid growing tree, if properly cut back at the proper intervals, can be formed into

one of the most beautiful of trees; and it is especially adapted to streets and avenues as it can be made to grow with great uniformity on almost any kind of soil. But it attains its greatest luxuriousness and beauty on rich, loamy damp soil.

The American white ash is one of our very finest shade trees and is becoming so popular that it now stands almost in the front as a shade tree. It is now being planted largely in parks and on streets and boulevards, and no American tree presents a finer form or greater beauty of dark glossy green foliage than does this almost invaluable tree. And when it is remembered that the ash is one of our most rapid growers and valuable timber trees, we can scarcely say too much in its praise. The sugar maple is so well known and is so universally admired that it is scarcely worth while to give it more than a passing notice. But whilst it is a great favorite with the writer of this essay, I deem it my duty to call attention to some objections to it. It is a very slow growing tree in the nursery, and consequently cannot be put upon the market at as low figures as many other trees. When transplanted it grows very slowly for two or more years. When planted in rows, as for instance on streets, it is nearly impossible to maintain that perfect uniformity so much to be desired and so easily obtained in other varieties; and lastly, it has a tendency to hold a large portion of its dry and unsightly leaves in winter, and after it passes twenty-five or thirty years of age it becomes scraggy and open and requires considerable special treatment to keep it in good form.

The American white elm is one of our most desirable shade trees and will maintain its symmetry and beauty for a greater number of years perhaps than any other American tree that is easily transplanted. But notwithstanding this variety of the elm is found growing from Wisconsin to the Gulf, it is not as healthy or hardy here as many other of our indigenous trees, but it is comparatively safe to plant it here, and it will no doubt maintain its popularity as an especial favorite with the lovers of fine trees. The box alder is a rapid growing tree of fine form, and is perfectly healthy and hardy, and should have a conspicuous place in all lawns and parks and also in all door yards where the space is large enough to admit of a variety of trees. The American Linden is a fine tree, and well grown specimens present a grand and tropical appearance. It is somewhat difficult to propagate from seeds and is subject to be preyed upon by caterpillars, and is objectionable merely on this account.

The Calalpa Speciosa, where a fast growing tree is desired for purposes of shade, probably has no superior. Its rapid growth is most

remarkable and (owing to its large leaves) produces a dense shade. It also possesses the rare merit of producing wood that for durability is surpassed by no other tree, not even by the Mulberry. It is especially good for fence posts and is now being manufactured into very fine furniture. There are several varieties of this tree, but so far the Speciosa seems to be preferred, perhaps from the fact that it grows more rapidly and is generally straighter than any of the other varieties. The Norway Maple in some of its varieties is, where the soil and other conditions are suitable, a most beautiful tree, even surpassing, in the estimation of many, the sugar or hard maple. But it is an open question with us as to whether it will succeed here and attain that great beauty which characterizes it in certain localities east and north of us. It seems to do exceptionally well in St. Louis and can be seen in great beauty in Tower Grove and other parks in that city. But whether it will do so well on grounds not thoroughly underdrained is a question which so far has not been fully answered.

There are many varieties of the birch, some of which deserve a place in all cases where it is desirable to plant a large collection of trees. The white cut leaved birch will always attract the attention wherever it is found. It is a tree of rare beauty and symmetry, and has other peculiarities which will always attract the attention and admiration of those who are truly lovers of the beautiful. The Alanthus and Sycamore are not desirable trees on localities where finer trees can be grown. But in many large cities it has been ascertained that these trees can be successfully grown where all of the more desirable varieties fail. These are among the few varieties which can survive the deleterious influences of coal smoke and other poisonous gases which accumulate in large cities.

But are we to be left without the cheering presence of green trees and shrubs in winter? Must we pass through that cold and cheerless season with nothing to relieve the stale monotany which characterizes the winters in this latitude? The answer is plain and can be anticipated by you all. We have in this country a large number of evergreens, embracing nearly every conceivable form and color. In addition to our native varieties we have many kinds introduced from foreign lands, most of which do well with us. Of the evergreens in general use, those which give the greatest satisfaction are as follows: Norway Spruce, American White Spruce, Balsam Fir, Hemlock Spruce and White Pine. The English, Sweedish and Irish Junipers are all fine and reliable and are indispensable, when the finest effects are desired. For certain special purposes the Scotch and Austrian pines are indispensable. The most common and fatal mistake made in the

grouping of evergreens is in planting too many of them in front yards, and in planting them too close to one another.

A few fine specimens well cared for grown at great distances apart, produce a much finer effect than where they are crowded as we often see them in front yards. The greater number of them should be planted well back to the rear of the yard or lawn, and it is of the greatest importance to have the lower growing varieties in the front, and the taller ones in the extreme back ground, and they should in almost all cases stand very much thicker in the back ground than in the front. This rule is just as applicable to deciduous trees as to evergreens, except where it is desirable to have a thick shade. There should in all spacious grounds be planted fine specimen trees, more for ornament than for shade alone. Ornament should be the prime object, and shade the incident. Evergreens should in nearly all cases be planted in spring or early summer. Deciduous trees of most kinds should, if possible, be planted in the autumn or early winter in soft damp weather.

There are many other worthy and beautiful trees which are hardy and well adapted to the lawn, the street, the park and the boulevard, and which all, or most of them, are indigenous to our soil and latitude. But even a passing notice of them would enlarge this essay into proportions too great for the object in view and for the occasion for which it is written. It is sometimes desirable for special purposes to secure and plant trees which do not grow to large dimensions. There are many small narrow door yards which would look better with those semi-dwarf trees than with larger ones. Conspicuous among these is the Horse Chestnut, the Chincapin, the Service or Sarvice and the Sassafras; also the Cornus or Dogwood, the American Wild Crab and certain specimens of the Hawthorn.

But all those grand and beautiful trees above enumerated are deciduous, and when winter comes and breathes upon them its frigid and icy breath, the beautiful foliage that rejoiced and fluttered in the soft summer breezes, and trembled and pulsated as it were in sympathy and harmony, and perfect rythm and unison, with that beautiful anthem of nature which has been flowing in sweet and uninterrupted numbers, since the dawn of creation.

The foliage once so beautiful withers and dies, and drifts and scatters, and falls to mother earth, and forms a protection to the tender herbs and roots which would otherwise perish. Thus the death of the leaves subserve to protect and perpetuate vegetable life. And thus we see the unerring working, of an unerring providence. The funeral dirge of summer comes to us with an appalling plaintive wail as it

shrieks and howls and finally dies away in the distance in stifled and muffled moanings and sobbings. But like all of nature's methods and moods these apparent cruelties and revenges in nature carry with them compensations and blessings in disguise. After a period of torpid and tranquil hybernation and rest, the soft, balmy, vernal breath of spring breathes new life, and the great world of deciduous trees, plants and shrubs again become as of yore, clothed and bedecked, and garnished in indescribable beauty.

I cannot close this essay without adverting to what seems to be a general conclusion with the average tree planter. A large number of planters plant their trees in holes just large enough to hold the roots when closely compressed together, and express great dissatisfaction if the trees so planted, do not grow well. The truth is, trees of all kinds should be planted in holes in a much larger area than the diameter of the roots. And while it is true that trees often grow without cultivation or mulching, it is nevertheless true that thorough cultivation and mulching will amply repay the planter many times over for the time and expense of such work.

The writer of this essay is not so egotistical as to attempt a description of that most marvelous effect which is produced by the everchanging and many-hued colorings and tints which take place in the autumn foliage of many of our deciduous trees. The finest painter would not presume to attempt a description of them. And when these thousand and one tints are blended into one gorgeous effect in the landscape, the effect can be felt, but surely never has nor never can be fully described. The beautiful halo which glorifies the landscape can never be reproduced upon canvas. The fine sentiment that these grand and beautiful scenes inspire in the cultured and esthetic mind, can never be voiced by human lips. The poetic inspiration which comes involuntarily to the human soul amid these transcendent scenes, can never be written. And hence, to the true lover of the beautiful in nature there must forever remain conceptions and inspirations which cannot be articulated or written in any language.

President and Members of the Greene County Horticultural Society:

In compliance with your request, I beg leave to submit the following essay upon the culture, storage and preservation of the potato.

The nativity of the potato, Solanoceæ Tuberosum, is upon mountains, but little below the snow line, and in such a locality its season of growth is short, just sufficient for the seeds to mature sufficiently to germanate, and the tubers, after undergoing the changes necessary in

their long winter rest, to sprout, on the disappearance of the snow and the return of the congenial rays of the sun.

The potato is a pernenial. Its tops or stems and fibrous or feeding roots die at the close of the season, after having provided underground stems or branches stocked with buds to renew the growth of the plant the next season, by one or more buds sprouting and sending up stems bearing foliage and down fibrous roots—this new growth sends out some branches underground, which, in the course of the season, thicken at their end as they receive a stock of nourishment prepared by this year's foliage and become new tubers to live over winter and make the next year's growth. These tubers are commonly supposed to be roots, but they are not; their eyes are buds, and the little scales behind them answer to leaves, while roots bear neither buds nor leaves. The fibrous or feeding roots, which grow from these subterranean branches are very different in appearance from underground stems. Now, it is evident that anything that tends to diminish the amount of nutriment stored in the tubers, or to deteriorate its quality, will have a deleterious effect upon its future growth, and if this store is diminished year by year in quality and quantity, so will the entire plant grow more feeble.

If the plant was moved nearer to the snow-line, so that its season of growth should be so short, that it could not mature seeds, nor lay by a sufficient store of nutriment in its tubers to send up stout, vigorous and healthful stalks, it would grow more feeble, until it would finally become extinct. I will state, in order to make this article as plain as possible, that the potato will, under favorable circumstances, become indigenous to some portions of the Northern States and Territories, where the snow falls early before the ground freezes and lays on all winter.

Now, if instead of moving the potato up, or farther north, which would be equivalent, if we move it south, until the seasons are much longer than is necessary for its growth and maturity, as is the case here, instead of being checked in its growth by frost at its proper stage of growth, and its tubers stored, without exposure to heat and light beneath their winter blanket of snow, as soon as the tubers mature the feeding or fibrous roots, having performed their functions, give way or die off, and the tops and foliage endeavor and do live for a time by drawing sustenance from the store of nourishment laid by in the tubers for the next year's growth, thereby deteriorating the quality of its store of nutriment, both for food and for sending up vigorous shoots and branches and foliage; and thus being weakened, cannot store its bountiful supply of nutriment as it would under more con-

genial circumstances, and thus it deteroriates year by year until our best varieties become in a few years well nigh worthless.

Cultivators have been endeavoring to keep up varieties by frequently ordering seed tubers from the North, which is entirely unnessary, as we can grow better and more productive seed tubers in this climate than can be procured at the North, and all that is necessary to produce tubers, stored with the greatest amount of nutriment for sending up a stout and healthy plant, is to anticipate its natural season of growth and habits; and we may commence with any run-down stock of any desirable variety we may have on hands by planting early varieties, early and in good ground, and give good culture, and when the tubers grow to a size and condition that we term mature, and before the fibrous or feeding roots and stems and foliage commence to die and draw away the nutriment stored in the tubers for future use of the plant in its next season's growth, take up the tubers and select as many as is desirable to raise a sufficiency of seed tubers for next spring planting, and spread them in the sun to wilt three or four days, (and store the balance of the crop as to directions hereafter given). This drying and wilting process changes the composition of their juices and sap by absorbtion of light and heat, and other elements from the atmosphere similar to that they undergo during their nine months nest in their native home under their snow covering, and are ready for another season's growth, and may be planted the 5th or 6th day at most after digging, just as though it was spring again, in good, well prepared ground, cut or not just as you prefer. I prefer whole tubers. If cut, they should be cut say twenty-four hours before planting, so that the cut surfaces may dry and heal somewhat before planting. It is very beneficial to roll in plaster or dry ashes when fresh cut. Give good culture, as for the early crop, and in the fall the growth of tops will be checked about the right time by jack-frost. Late varieties that require too long a season to secure two crops may be held over until the 10th to last of June, so that they may have just sufficient time to mature by frost. Harvest as soon after frost as possible, and whatever method of harvesting may be adopted, it is absolutely necessary to use some method to keep the tubers from exposure to sunlight and heat, which gives them a disposition to sprout at a low temperature during winter. Gather up as fast as dug out, and put in moist gunny bags or anything that will exclude the light and heat, and prevent wilting, until they are put into their winter quarters, which should be perfectly dark and sufficiently moist to prevent wilting. If they sprout before spring, it is evident that they have been exposed too much to

light and heat. Now we are prepared with a stock of seed tubers to commence raising potatoes right.

As to soil, I think it unnecessary to say much, as soils are as diverse as opinions of men, and some may disagree with me and be more correct than I. Each one must use such as he has, and any good corn land, if properly enriched, will produce a good crop of potatoes. I think a sandy loam is best. Plow as early in spring as possible, at least twice for early varieties, and for late varieties plow the ground and smooth with a harrow about each fortnight until 10th to last of June, and mark both ways 2½ by 2½ feet, with a marker so constructed as to mark several rows at a time, and then run a narrow shovel plow in the mark both ways and pretty deep, and if it is desirable to obtain the greatest yield for the seed planted, cut to single eyes, and if it is desired to secure the greatest yield for the land, plant medium and large tubers, whole. Drop one eye or tuber in a hill, and cover two or three inches deep.

Take up the seed tubers from their winter quarters a week or ten days before planting, and spread them in the sun, or some open, airy place, to dry and wilt, and absorb the elements from the atmosphere that puts them in a condition to sprout more readily and evenly. If they are not dried and wilted, some tubers will be a week or two later sprouting than others. Cutting should be done at least twenty-four hours before planting, and if rolled in plaster or dry ashes, they adhere to the moist cut surfaces, and assist in drying and healing them, and act as fertilizers to the young plants. A tablespoon full of any of the artificial fertilizers, or a shovel of compost in each hill is very beneficial, and to realize the best result it is necessary to give the best of

CULTURE.

Before the plants are fairly up, drop a handful of ashes on the hills and harrow both ways, which may injure a few plants, but will be very beneficial in mellowing the soil and destroying weeds that are germinating. When the plants are fairly up, cultivate with a narrow shovel plow run deep and near the plants both ways, and follow with a hand hoe to destroy weeds left in the hills; and in about ten days more cultivate with a double shovel pretty deep, but not so near the plants as before. And all subsequent culture should be shallow and as often as is necessary to keep the surface thoroughly pulverized, followed with the hand hoe each time to destroy any weeds that may have escaped the cultivator, until the tubers commence forming. A clean and well pulverized surface is as good if not the best mulch for all sorts of grow-

ing plants. Go over occasionally and pull out or otherwise destroy any weeds that have escaped. It is not uncommon to obtain with good culture five or more pounds per hill, and one acre planted 2½x2½ contains about 6,876 hills, and five pounds per hill gives 34,380 pounds, or 687 bushels per acre, which may be easily obtained by planting seed raised and stored according to previous instructions.

HARVESTING.

Early varieties, to have the tubers keep and retain their highest degree of perfection, and stored with the greatest amount of rich and wholesome nutriment for human food and for the future use of the plant, some directions have already been given; and to secure such results it is necessary to closely observe several requisites, viz.: First, harvesting just at the right time or before the feeding or fibrous roots commence to die and the tops to draw away the nourishment stored in the tubers. Second, keep the tubers from drying and wilting from exposure to light and heat, by gathering them up as fast as dug and putting them in a dark and moist place. It is the prevalent custom in harvesting to leave the tubers in the field a day or so to cure, and to spread early varieties if dug early in an open and airy place, exposed to light and heat to keep them from rotting—just the thing to rot them.

When the tubers are exposed to the light and heat (unnatural elements as nature puts them under ground in a dark, cool and moist soil), they absorb elements from the atmosphere very rapidly, which changes their composition and renders them unpalatable and unhealthful, and therefore unfit for human food, and the drying and wilting process that they undergo in this exposure puts them in a condition to sprout at a very low temperature. We often see potatoes carried many miles to market in bulk in open wagons with no care even to shield them from the hot rays of the sun, and see them exposed for sale spread upon store floors and in open baskets, boxes and barrels on the sidewalks, and frequently in the sun; and in this exposed condition their nutritive juices are evaporated and foreign elements are absorbed until they become somewhat of the consistency of the foliage and stems of the plant in proportion to the amount of exposure. There may be people who would relish potato tops for greens, but I think they are few and greens would have to be scarce. Late varieties require the same care with regard to exposure as early varieties. And here, allow me to again call your attention to the importance of selecting a sufficient amount of the early varieties as soon as dug to plant after three or four days' drying and wilting, to

raise seed for the next spring; and in no case plant those of the first crop if second crop can be procured. The first crop of early varieties should be put upon the market at once, or if it is desirable to hold them over for winter or spring use they may be kept free from sprouts, and in excellent condition by treating according to previous directions and the following, with regard to

STORAGE AND PRESERVATION.

I have already given some ideas, and it only remains to give some instructions with regard to the construction of suitable apartments for storage, which should be somewhat after the order of cool storage for fruit, only the temperature should never be permitted to fall below freezing. A good storage apartment for the potato can be constructed by digging a pit eight or ten feet wide and eight feet deep and as long as desirable, which wall up and turn an arch of brick or stone with four inch square flues for ventilation through the arch about six feet apart and high enough to extend a foot or so above the surface after the soil that was dug out of the pit is returned over the arch. There should be two doors so as to entirely exclude the light when passing in and out. Such an appartment would range from 35 to 45 degrees. If early varieties are harvested at the proper time, according to previous directions for first crop, early and late varieties and second crop early at their proper time, and immediately stored in such an apartment, without exposure to any drying or wilting process, all of their palatable and nutritive qualities will be retained and preserved in their very highest degree of perfection. In localities where water is liable to rise in an unerground cellar, a good one may be constructed above ground by building double frost-proof walls of brick or stone with the roof packed with some non-conducting material, or chaff as sawdust; and if such a storage should prove too dry so as to cause the tubers to wilt, they may be kept in good condition by covering them with damp straw, forest leaves or some such material and by sprinkling occasionally, just sufficiently to keep them moist; but water should not by any means be allowed to stand in the bins or barrels in which potatoes are stored. Sufficient drainage should be provided to carry off all superfluous moisture.

By observing these requisites, potatoes may be raised in the Southern States as successfully as here or at the north, only they at the south should plant early varieties as early as the season will permit and hold over a supply of the first crop in cool, moist storage to prevent rotting, and then plant the second crop just in time to mature by frost,

and plant late varieties so as to secure two crops, same as we in the Middle States do early varieties. The only reason that the potato is not cultivated and appreciated as much at the south as at the north is because they are so dried and wilted by exposure to light and heat that they become unfit for food very soon after harvesting.

To raise new varieties from seeds, gather the seed balls that grow on the tops of the plants about the time that the tubers mature and lay them away in a cool, shady place to dry, and when sufficiently dry do up in papers and label. If it is desirable to obtain a cross between any two varieties, plant the two desired varieties in alternate rows or in alternate hills in the same row. Some varieties produce seeds freely while others do not produce them at all; so if it is desirable to obtain a cross of a variety that does not produce seeds it may be planted in close proximity to one that is known to produce them so that the productive flowers may be fertilized with polen from the flowers from the sterile variety.

Early in the spring put the dried seed balls into lukewarm water and soak until they become sufficiently soft to crush and wash the seed out. The best seeds will sink to the bottom; collect the seeds and sow early in a hot bed or in shallow boxes or on a warm border in the garden same as tomatoes. They germinate readily and resemble small tomato plants. Prepare a rich bed seven feet wide and as long as desirable and mark both ways one foot apart, and when the plants are one to two inches high, transplant one plant in each hill at the point where the marks cross. Give thorough culture by frequently raking and otherwise pulverizing the soil, shallow near the plants and deeper farther back or between the rows. Do not allow a weed to grow on the bed, as one weed may rob and cause the finest variety on the bed to appear inferior when dug. Make a plat of the bad and designate each hill by a number. Note in a memorandum anything remarkable during the season of growth concerning any or each number, such as thrift, weakness heighth, time of flowering, color of flowers, etc. The time of flowering indicates their season, whether early, medium or late. As the tops show signs of maturity in any one or more plants, dig the tubers and lable with their corresponding numbers and store in a cool, damp and dark place. There will be as many varieties as plants, and all colors and shapes.

Compare the record with regard to the numbers and select the most desirable and promising for further trial and discard the others. It will require three years to bring them to perfection. It is not desira-

ble to disseminate any new variety unless it possesses some decided superiority over any known variety of its season.

Very respectfully,

W. C. FREEMAN.

BROOKLINE STATION, MO.

REPORT OF VERNON COUNTY HORTICTLTURAL SOCIETY.

BY DR. E. R. MOREROD, SECRETARY, SCHELL CITY.

AT HOME, NEAR SCHELL CITY, MO., June 9, 1885.

L. A. Goodman, Secretary State Horticultural Society, Butler, Mo.:

ESTEEMED FRIEND: Enclose you this morning a communication which I intended to have brought with myself to your meeting, but the long continued rains have made the pressure of farm work so great that I can ill spare the time. I do not know what title to give it, as I, like the old ambitious hen spreading out her wings in order to gather all the possible chickens within reach, so I have struck out for ideas to slap into my budget. I have another communication partially finished, and if I can I shall try and get to you by mail before the close of the session. This, the future of the fruit industry of Southwest Missouri. Have no especial report to make. Mr. Shepley has the figures for prospects for fruit. Hoping you will have a good time generally,

Yours,

E. R. MOREROD.

In the issue of the Lamar *Democrat* of the date of April 23, 1885, I find the following paragraph:

"P. C. Carr was in Lamar on Saturday, and he says the peaches are not all killed on his place. He says that his last fall setting out of fruit trees from the Ft. Scott nurserys are badly damaged, any many of them winter-killed. He says he will deal with Fink & Son at home hereafter."

It is not my purpose in bringing this paragraph to the notice of this society to disparage Fink & Son, or to praise the Ft. Scott nursery, or to make any invidious comparison, for so far as I know both are good nurseries, both are deserving of public patronage, and endeavor to furnish first-class stock to their customers, but whilst nurserymen are sometimes deserving of blame, and the ubiquitous tree agents very often, in their anxiety to be considered sharp failed to bear in mind the story of George Washington and his little hatchet, and ye little cherry tree, and that it was forbidding in the decaloge to misrepresent matters. And sometimes the fault lies with the purchaser, as there is a most lamentable ignorance with many how to set out trees properly, and if not properly set out, might as well not be done, for it is a sheer loss of time, money and labor. I am liberally inclined and disposed to give praise where it is due and to lay the blame at the right door.

I am satisfied in this case that Mr. Carr, in attributing his ill success to the stock from the nursery, has jumped to the wrong conclusions in the matter, as my experience has been similar to his in the past season, and I know that it was not the inferiority or bad condition of the stock furnished by other nurseries than that of Ft. Scott, but due to the intense severity of the past winter, and possibly, too, Mr. Carr in setout his fruit trees, may not have taken particular pains to press the dirt carefully around the stem and roots of his trees from bottom to top, for tree planting is a nice job if done properly, and care and pains to do it well must be taken, if one desirous to realize success for trees cannot be hogged in or banged in, and suffered to earn their own living as one might say and turn out a success, but as I have said before, particular pains must be taken to set them properly, and they will continue to need care and attention as long as they exist, and their existence will depend much on the manner and measure of care and attention they will receive. It is my opinion that trees are oftener set in a slip-shod way instead of being set out properly, and if the result is not encouraging, then our friends, the nurserymen, and those abused tree agents, catch thunder, and become the recipient of the ill-natured blessing of the unfortunate novice.

In the course of this communication as I endeavor to illustrate my reasons for believing that Mr. Carr has taken hold of the wrong sow by the ears. I may throw out suggestions that may be of benefit to the young tree planter as well as others, and if I can set one or two on the right track I shall be amply repaid in writing up this long communication.

I stated that my experience was similar to Mr. Carr's, and will now proceed to state the facts. Last fall I obtained nursery stock

from the other nursery there—that of the Ft. Scott, or Mr. Fink & Son nursery—consisting of peach, apricot and apple trees that I know came in good, sound condition and well packed. There was not twenty-four hours delay in setting out those that were set. The peaches and apricots were all set out in the orchard and about half of the apple trees, and the planting job had to lay over Sunday, and by Monday morning the weather became so inclement that the other half of the apple trees had to remain healed in all winter. The setting out of trees in orchard was done in my absence, but under my particular instructions, and may have been badly or well done, but the healing in was done under my immediate supervision. In healing the trees were planted strung out in deep trenches, standing up, and with the dirt thrown up pretty well around them, particular pains taken to fill the instertices between the trees with fine dirt so as to have the roots thoroughly protected from the air or cold, with the dirt well pressed and packed. The men employed on the job thought I was taking unnecessary pains, but if I had taken any less pains and precautions I believe I would have lost fully nine-tenths of my trees, for all my peaches set out in the orchard died or were so badly damaged that they had to be cut back almost to the ground. Over two-thirds died. The apricots were a trifle less damaged than the peach trees, and over one-third of my apple trees set out in the orchard died and the rest more or less damaged, whilst a very slight per cent. of my apple trees healed in were damaged. The extra care taken to throw up the dirt and to have it well pressed, packed and set in deep trench aided to protect and save the trees healed in: also common sense and observation would teach us that those trees set out in the orchard were isolated and did not receive the same protection in the dirt in being up in a mound around them, and their recent transplanting had in great measure cut off their supply of stimulus and nourishment, for the organs of nutrition did not have time to appropriate the food around them, hence they were not in a condition to sustain the excess of cold and had to succumb, and, too, there was another factor not generally recognized that tended to preserve the trees healed in from the effects of the cold. It is this: When trees are healed in thickly or bunched closely together they will heat, and in a very mild winter as we have had in years past in Southwest Missouri, this alone will kill them as effectually as in the intense cold. Strawberries left too long in close packages is a very good illustration in proof of this also. There undoubtedly are evidences of the fact in the unnatural warmth that is perceptible to the sense of touch amongst the the roots, as in the case of sweet potatoes undergoing a sweat, but not to so great an extent;

but this phenomena can be witnessed in very mild winters as we have had in former years in this section. Another proof demonstrative of this fact is in the formation of numerous slender rootlets and long, tender fibrels, which in mild winters often grow a foot long or more. Those I healed in last fall formed such from four to six inches long, notwithstanding the severity of the weather the whole winter long. Whilst speaking of this, I confess I have never sought to know whether the trees set out isolated in the orchard ever form these rootlets during the winter, but presume they do to a small extent, and more as the winters are mild.

When it is necessary to heal out trees I take care to string them out in trenches deep enough to set them two or three inches lower than they stood in the nursery, and avoid leaving them long in packages as they come from the nursery, and if the weather at the time is warm for the season I only throw a light coating of earth. As the weather becomes colder I throw more dirt pretty well in and around them, and take care to pack and press the dirt firmly around them; also take pains to fill the insterstices between them with fine dirt, so their roots are well protected from air and cold. I prefer standing the trees in trenches to laying them down obliquely, as many do, for the reason of having the roots in the trenches. They are better protected from the cold, nor are the roots so liable to become exposed by the dirt being washed away sometimes by heavy rains, and, too, I have taken up an idea that when the trees are thus laying in contact with the ground for over one-half or two-thirds of their length, that portion of the bark thus in contact with the ground becomes somewhat tender and is apt to crack in the hot days of spring.

As I have said before tree planting is a nice job and requires pains to make it successful. First, the ground should be well prepared by deep ploughing or what is better, run through with a subsoil plough; if this cannot be done then more labor should be bestowed in making the holes large and deep. The site should be naturally or artificially well drained.

An eastern slope is generally preferred, but a north slope will tend to prevent the early blooming of your trees, thereby save your fruit from injury by late frosts. As to whether spring or fall planting is preferable there is a great variety of opinion; now I have done both, also at all times all along the winter when our winters were milder in the southwest than in the past two winters, and I could not see any appreciable difference. In planting small fruits, however, fall planting is preferable, as those planted in the fall will be more apt to bear a full crop the next season. Wether it makes as much difference in the bear-

ing of large fruit trees I cannot say, but think that the care and attention to feed your trees will make more essential difference than having planted in fall or spring.

The main point to observe, however, in planting in the fall, winter or spring is that the ground should be in favorable condition, drier than wet, say friable, easily crushed between the hands in fine particles, and the weather not too cold to freeze. Sometimes it is difficult from the weather being on the extreme to observe this in full, but we should endeavor to get it as near as possible in the state mentioned above.

In very dry weather and the ground is parched it is best to grout your trees thoroughly before planting by rolling the roots in large tubs of water in which mud or earth has been dissolved, or in a muddy hole in the ground filled with water; avoid using your water too cold. From well or spring let it be tempered by slight exposure to a warm sun or by hot water from the kitchen stove. While I am at this I may as well say do not water flowers, vegetables or plants with cold water fresh from wells and spring, but the best way is to draw the water in the morning and place it in barrels or tubs and let it have the benefit of the warm sunshine during the day and use it late in the evening. This grouting gives the roots a muddy plaster that furnishes moisture for the roots' use better than the mere washing. The holes should be dug large enough in width to allow the roots to be spread out in their natural position, not bent back upon themselves, and deep enough to allow four or five inches loose soil below the roots which can be filled in with fine soil before setting the trees, and this will tend to give little rootlets and tender fibres a fair start to gather nourishment from the soil instead of spending their innate force in penetrating the hard ground. It is astonishing how far the little rootlets will push themselves through the hard ground or squeeze themselves down through the narrow crevices of the rocks in search of food.

In order to learn we must observe dame nature, for she often points the way in no unmistakable language, so that he who runs may read. The top dirt should be all lain to one side and the bottom dirt to another side, and the top dirt should be thrown in first, not in great spades full of hard clods that might pass for dornicks or bowlders, nor in great swailing of loblollies of stiff mud as if a man was burying a stinking dead horse and wanted to get the job done in the shortest possible space of time in order to ease his olfactories, but the dirt should be made as fine as possible by being chopped up with a spade, or what is still better, crushed finely between the hands. Now right here permit me to say that if a man is too much of a dude to use his hands in this job he has no business there and had better get out of the way and

set himself up for a perambulating tailor or clothier sign board or pose as a fancy barber pole; now I dwell on this part of the programme so strongly for the reason that there is a natural perversity to do this in the wrong way than to do it in the right way for ninety and nine cases out of a hundred who have not been brought up in their youth or taught especially will use their spades like they would use a catapult and wallop as big lumps of dirt as they can hoist against the trees, knocking them out of line and fill the hole in an uninidignified manner, and care should be taken if you have a pig-headed assistant who is as obstinate and as wise in his own conceit and thinks the old man is a crank and takes sly occassions to hasten the job by keeping up his old habits, just bounce him right then and there.

Care should be taken to fill the interstices between the roots and rootlets with fine dirt if possible so as to leave no vacant space around the roots or the stem, and care, too, should be taken to press down the dirt with the foot firmly all the way up as the hole is being filled up and well pressed all around afterwards. This pressing and packing of the soil around the roots and stem of plants and trees is the great secret of the success of many, and Mr. Douglass of Waukegan, I understand, whose experience has been great with evergreens, deems the lack of this one precaution as the sole cause of over one-half of the failures in making evergreens grow; he recommends pressing, even a ramming down of the dirt, so as to not injure or bruise the bark or roots. Ladies will find it very beneficial in setting out plants in the garden or potting house plants thus to press firmly and deftly with their fingers even the most delicate plants, and gardeners in setting out tender tomatoes, cabbage and sweet potato plants will find it pays to do so.

The tree should be planted or set in the ground just as deep as it was grown in the nursery and no deeper, and if planted deeper will retard the growth of the tree very much. The bottom dirt should come in last as it is exposed to the action of light heat, air, moisture, sunshine and frosts, it will soon become as rich as the top soil thrown in below, thus giving the young tree every opportunity to draw food and sustenance from the soil within its reach.

I am convinced that on our wide prairies where the winds have full sweep, it will pay the orchardist to set out wind-breaks of quick growing forest trees, not only on the north side of the orchards, but on the south and west as well, as often in our winters at least in years past the warm southwest wind comes with a warm breath and forces our trees into premature bloom, and thus are nipped by late frosts. I have noticed more than one season the fact, that when our fruits were partially killed that they were less injured on the northeast side, and

most fruit was seen on that side. I first noticed in seventy or seventy-one this fact, as I took a tour of observation over our county, in order to make a report to our State Board of Agriculture, and at the same time first noticed that orchards that were protected on the south by broad belts of timber and left exposed to the north, were less injured by the frost than those lying on the south side of timber; for the same reason on account of our southwest wind, the trees in being set out should lean slightly towards the southwest, and the lowest limb should be left on that side if possible, so as to protect the stem from the scorching effects of our hot summer sun, and for the same reason the most of our trees should be headed low.

It will also pay a handsome return, in my judgment, to stake our trees when young, in orchards on prairies, for the continual twirling and whirling by the winds of our trees and the wabbling about, beating the earth back from the stem over half an inch or more, and leaving a vacant space for five or six inches down, tend to retard the growth and deforms the trees, also renders them more liable to be injured by severe frost.

Too it is as necessary to trim the broken or bruised roots when planting, as to trim branches and limbs in same plight above ground. The trees should be planted as soon as possible, they are received from the nursery if the weather or condition of the soil will permit, or else properly healed in.

In bringing nursery stock from station or depot home the roots should be well protected from the sun or frost, nor should the roots be suffered to lay in the sun any length of time after removal from packages. If the roots are frozen on the way home from depot, they should be at once placed standing (all covered) with water, and often this will save them upon the same principle as the application of snow or cold water to a frozen human limb.

The planting of trees should not be delayed too long after leafing time, as it is generally a hard matter to make trees grow after leaves have put out, and there are a few, perhaps, that are exceptions.

As to the amount of limbs to be trimmed off before planting, there is a difference of opinion. I think the proper proportion that the total amount of roots should slightly be in excess of the limbs. Peach trees require more pruning, for that, as a rule, is too prone to make superfluous wood. I have observed that in setting out of shade trees on our streets and parks and yards, as a rule they have little or no roots, and scarcely any vestige of limbs, everything slashed off as if they were mimicking a bobtail pony—a mere stick, as it were, stuck in the ground

and the consequence a dead tree or a sickly one and no shade, and probably the attempt to create refreshing shade is given over as a bad job. One in pruning must bear in mind that the limbs and leaves are in a manner the lungs of the trees, and in their growth absorb plant food from the atmosphere as well as the roots from mother earth, nor should any substance be applied to the stem or branches that will make them impervious to air or water, for that closes the pores of the bark and causes as much injury to the tree as closing the pores of the human skin, nor in a rash moment daub your trees with coal or gas tar, for wherever applied it will kill the bark down to the stem, and acts on the bark like a blistering plaster on human skin, only worse, for it never heals up; neither should pine tar be applied unless well mixed with soap to keep it from sticking. Nor listen to syren song of fertilizing trees with stone coal ashes, for I tried that once, seeing a flaming advertisement going around the papers of their great fertilizing power, and they killed some twenty-five fine budded peach trees for which I paid my friend, the nurseryman, fifty cents apiece, and have learned that others have enjoyed similar experiences in acquiring the knowledge of that one fact, that coal ashes will fertilize trees out of existence.

Lastly, he who would be successful in fruit raising must ever be on the alert to make all the best possible use of his power of observation. He must be ready for any emergency; too, he must bear in mind that eternal vigilance is the price of liberty, and eternal vigalance all manner of insect depredations, climatic changes that wrecks his hopes in the price of horticultural success. He, too, must be imbued with a love and zeal for fruit culture that is born of a faith almost akin in depth and ferver to the reverence for Deity, whilst the many fluctuations and changes, accompanied with serious drawbacks that tend to moderate his ardor or to check his enthusiasm in the pursuit he loves so well, yet he derives more genuine heartfelt satisfaction in eliminating from the soil of mother earth by his own good will and industry the choicest blessing of all God's great beneficences, luscious fruits, for the benefit of himself and his fellow-men, than the sordid miser in adding heaps of his golden hoards, and verily I believe as firmly as anyone can that our old friend Hopkins, of Kansas City, and Jacob Faith, of Montevallo, enjoy more heartfelt, soul-stirring satisfaction from their berry patches than W. H. Vanderbilt does from all his ill gotten millions, for indeed there is an indescribable pleasure and gratification in successful fruit culture that money cannot buy and none can know unless they have undergone its purifying sensation.

28TH ANNUAL WINTER MEETING

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

HELD AT WARRENSBURG DEC. 9-11, 1885.

The society met on Wednesday morning in the German Evangelical Church, and the forenoon was spent in arranging the fruits and in getting acquainted in accordance with the following programme.

Before the meeting, a telegram of greeting was sent to the Illinois State Society in session at Centralia.

CIRCULAR.

It is the desire of the officers of the society that this meeting be the best one ever held in the State, and every member is earnestly requested to be present if it be possible. It depends upon you whether the work so well begun the last two years, continue; if so, you must, perhaps, make some sacrifice and help it along.

Our great State needs only to have its fruit men do their part, and our fruits will show for themselves; come, then, prepared for a part in the programme and the discussions. Give your experince; successes or failures are alike valuable. Papers on any subject of interest to the fruit growers are desired. Because your name does not appear on the programme is no reason for your silence. Every one is urgently invited to take part in the deliberations.

A "Question Box" will be upon the Secretary's table, where any question may be put. Or they may be sent to the Secretary previous

to the meeting. Any fruit (name not known) may be sent to the Secretary and it will be identified if possible at the meeting. Many varieties of apples all through our State need identification.

The condition of our orchards is a matter of much interest and reports are requested; also a list of fruits that have succeeded best the past year.

The secretaries of the County Societies will report their success and their needs. Counties where there are no societies will be reported by the members.

A premium of $1.00 will be given for the best plate of each and every apple considered worthy. Also one of $3, $2 and $1 for the best new apple. The new apples of our State are numerous and valuable, they are attracting attention, and all such are desired for exhibition. We hope that something worthy of general introduction may yet be found in our State.

The society will be entertained by the citizens of Warrensburg, and your only expense will be the railroad ticket; so make it you business to come, it is certainly your duy. In fact you cannot afford to miss this meeting. Let every Horticultural society send a delegate or two.

If all who can attend will notify the Secretary, previous to the meeting, it will save much trouble and time at the meeting, for they can then be assigned to their places at once.

L. A. GOODMAN, Secretary, Westport. J. C. EVANS, President, Harlem.

PROGRAMME.

WEDNESDAY MORNING.

The forenoon will be spent in arranging fruits and reception of members.

Appointment of committees: On Obituary; on Membership; on Finance; on Fruit Exhibits; on Final Resolutions.

WEDNESDAY, 2 P. M.

1. Welcome Address.
2. Response.
3. Annual Address of the President.
4. Report of the Committee on Orchards by W. G. Gano, Parkville, D. S. Holman, Springfield; Chas. Patterson, Kirksville.

5. "Best Six varieties of Apples for Profit and Best Twelve Varieties for Family," by E. P. Henry, Butler.

6. "Some of the Newer Varieties of Apples, and Their Value for Propagation," by F. Lionberger, New Florence.

WEDNESDAY, 7 P. M.

7. "Care, Cultivation, and Pruning the Apple Orchard," by N. F. Murray, Oregon.

8. "Effects of the Winter on our Orchards, and What Can be Done to Help Them," by T. W. Gaunt, Maryville.

9. "Parasitic Fungi," by Prof. S. M. Tracy, Columbia.

10. "Pears—Location, Treatment and Best Varieties for Planting," by J. A. Durkes, Weston.

11. "Forestry," by Prof. M. G. Kern, St. Louis.

12. Reports from counties.

THURSDAY, 9 A. M.

13. Report of Committee on Vineyards, by G. E. Meisner, Bushburg; Jacob Rommel, Morrison; C. Teubner, Lexington.

14. "What New Light Have We on the Grape Question," by Jacob Madinger, St. Joseph.

15. Report of Committee on Small Fruits, by S. Miller, Bluffton; W. M. Hopkins, Springfield; Jacob Faith, Montevallo.

16. "Best Three Varieties of Strawberries, Raspberries, Blackberries—and Why?" by P. Ames, Carthage.

17. Reports from J. W. Freeman, Brookline, and Z. T. Russell, Carthage, on Varieties of Small Fruits.

18. Reports of Horticultural Societies.

19. Question Box.

THURSDAY, 2 P. M.

20. Report of Committee on Stone Fruits, by D. F. Emry, Carthage; E. F. Hynes, West Plains; Jacob Madinger, St. Joseph.

21. Report of Committee on Vegetables, by Prof. J. W. Sanborn, Columbia; F. H. King, Montevallo; J. N. Menifee, Oregon.

22. "The Fruit Business from a Commission Man's Stand Point," by E. T. Hollister, St. Louis.

23. "The Nurseryman's Duty to His Patrons," by C. H. Fink, Lamar.

24. "The Yellows, the Rust, the Mildew," by B. F. Galloway, Columbia.

25. Reports of Horticultural Societies.
26. Question Box.

THURSDAY, 7 P. M.

27. Report of Committee on Flowers, by R. S. Brown, Kansas City; Henry Michel, St. Louis; Mrs. Wade Burden, Springfield.
28. Report on Ornamentals, by Z. S. Ragan, Independence; C. W. Murtfeldt, Kirkwood; R. E. Bailey, Fulton.
29. "Language of Flowers," by Mrs. Dr. A. Goslin, Oregon.
30. "The Work of To-day," by Mrs. C. I. Robards, Butler.
31. "The Green House Work," by Prof. L. R. Taft, Columbia.
32. Question Box.

FRIDAY, 9 A. M.

33. Report of Secretary.
34. Report of Treasurer.
35. Election of Officers.
36. Miscellaneous Business.
37. Report of Committee on Entomology, by Dr. A. Goslin, Oregon; H. Sheply, Nevada; Miss M. Murtfeldt, Kirkwood.
38. Report of Committee on Botany, by Prof. S. M. Tracy, Columbia; G. C. Broadhead, Pleasant Hill; Dan Carpenter, Barry.
39. Report of Committee on Nomenclature, by T. W. Gaunt, Maryville; J. B. Wild, Sarcoxie; F. F. Fine, Springfield.
40. A Paper, by Prof. Wm. Trelease, St. Louis.
41. Reports of counties.

FRIDAY, 2 P. M.

42. Report on New Fruits, by J. C. Blair, Kansas City; A. H. Gilkerson, Warrensburg; H. T. Kelsey, St. Joseph.
43. Report on Ornithology, by Clarke Irvine, Oregon; A. W. St. John, Carthage; W. H. Thomas, La Grange.
44. "Making Horticultural Displays," by J. B. Wild, Sarcoxie.
45. "Lessons Learned in Horticulture During the Past Year," by Dan Carpenter, Barry.
46. Selecting Places for Next Annual Meeting and June Meeting.
47. Last Words.
48. Adjournment.

RAILROAD RATES.

The Missouri Pacific and leased lines, the Chicago & Alton, the Wabash, the Chicago & Rock Island, the Kansas City, Springfield & Memphis, the Hannibal & St. Joseph, Kansas City, St. Joseph & Council Bluffs Railroads will kindly give return certificates through the Secretary, at the meeting, so you can get the return ticket at one-third fare. Pay full fare in coming to the meeting. But in buying your ticket over the Missouri Pacific railroads be sure to get a convention receipt from your ticket agent, when you purchase your ticket, or you cannot get your return at one-third fare.

MISSOURI STATE HORTICULTURAL SOCIETY.

WEDNESDAY, 2 P. M.

Meeting called to order by President Evans.

The meeting opened by singing, and prayer was offered by the Rev. J. A. Lord, after which the welcome address was given by Henry Neill, who in a few chosen remarks gave the Society a hearty welcome to the city of Warrensburg.

The response was made by C. W. Murtfeldt thanking them for this very cordial welcome. We come here to help ourselves, and hope to help you in this great work of horticulture.

A letter was read from the President of the Normal School, inviting the Society to visit them.

WARRENSBURG, Mo., Dec. 8, 1885.

To the President Missouri Horticultural Society:

DEAR SIR: In behalf of the Board of Regents and Faculty, I take pleasure in extending a cordial invitation to your Society to visit this institution in a body at some time during your present session.

Our school convenes for work at 8:10, central time, each morning, and the most favorable time to see all, is at 8:15. We shall therefore be glad to have your Society visit us at that hour at any time during

your stay in our city. I also extend a cordial invitation to members to visit us at pleasure during any hour of the day.

Respectfully,

GEO. L. OSBORNE,

President of Faculty.

Moved by C. W. Murtfeldt, that the Society proceed in a body to the school.

A telegram was read from the Illinois State Society, sending greeting to our Society session, and a response returned.

CENTRALIA, ILL., Dec. 9, 1885.

To the State Horticultural Society of Missouri, in session, Warrensburg, Mo.:

BRETHREN: The State Horticultural Society of Illinois sends fraternal greetings. Hoping your meeting may be both pleasant and profitable, and that your deliberations when given to the world, will add much to horticultural knowledge.

JNO. M. PEARSON,

President.

REPORT ON ORCHARDS.

BY D. S. HOLMAN, SPRINGFIELD, MO.

Officers and Members Missouri Horticultural Society:

As one of your committee I will report of orchards in Southwest Missouri, and more particularly of Greene and adjacent counties, but little changed since last report to this society. In tree or wood they were not materially damaged by last winter's cold, and the present year being one of more than usual moisture, they have made a very satisfactory growth and have ripened the new wood very finely, and all things now look favorable for a good fruit crop in 1886.

Our orchard yield this year was considerable, but not satisfactory. Early, or at the usual season, our apple orchards gave us such show of bloom as filled us with hope, only to be disappointed by a very cold spell, with late frosts, that cut our crop to less than fifty per cent., making it an off year. Peaches, we had none; pears, but few. Price of apples to shippers, forty to fifty cents at picking season.

Our orchards are growing in number and size. Planting goes on increasingly.

As you have a paper, Mr. President, on pruning, I will not intrude by anything on that part of our treatment, nor would I feel authorized to say much of cultivation, but hope you will allow an expression of my growing conviction that we must cultivate and must prune our orchards if we would have symmetry and growth of tree, and uniformity in size and good quality in fruit. And for young orchards we think of no better crop than potatoes or corn. Among orchardists there is a keen inquiry for the coming apple, every year, however, planting more and more of Ben Davis.

Proposing not to bore you with length, I am,

Respectfully,

D. S. HOLMAN.

REPORT ON ORCHARDS.

BY CHAS. PATTERSON, KIRKSVILLE, MO.

The past season has not been a profitable one for apple orchards in this part of the State, as a general thing. In fact, it has come as near to being a general failure as has ever been known here since we have had bearing orchards. Instead of making considerable shipments as has been done in previous years, even from what we thought short crops, there have been very few apples shipped this year, and they might have been wanted before spring. Yet a few orchards bore fair crops, and of different varieties, making it difficult to designate any for

adoption or rejection, from this season's teachings. Even Ben Davis has failed extensively in a majority of orchards, while in others it bore a fair crop.

The most plausible and most readily accepted cause for this would probably be the past series of severe winters. And there is no doubt in my mind but extensive damage can readily be traced to this. The very uncommonly severe spell we had about the middle of December, 1884—twelve degrees below zero—after a warm, late fall, caught a great many trees with circulating, unmatured sap, and actually bursted the bark wide open for as much as two feet from the ground, and loosened it nearly or quite all round, which of course killed them outright. How many others may have been injured less visibly might be estimated still higher. Some trees bloomed, set and matured a full crop, but both leaves and fruit made a sickly, stunted growth, though highly colored and resembling specimens of same varieties from the extreme North. Part of these will probably die in a year or two, while some may recover. Others may have been similarly injured by previous winters, and yet remain lingering between life and death.

But fortunately this is not near extensive enough to account for the general failure. I have replaced, last spring and this fall, less than ten per cent. in my own nine-year-old orchard, from this and all other causes, that occur in all seasons. Being in luxuriant growth from continuous cultivation, they must have been uncommonly susceptible. In some older and some uncultivated orchards there was no sign of such injury.

Beyond this I cannot attribute our failure to the severe winters. It does not appear that fruit buds are killed by the winter, unless the whole tree is killed. On the contrary, any injury to the tree, such as borers, peeling off the bark, etc., causes it to set more fruit, as appeared to be the case with some of my trees. But being generally charged with the responsibility, as the most convenient and plausible cause, their occurrence at this period is scarcely less unfortunate than if the charge were true, because they serve as scapegoats, and divert attention from the real cause. Such damage as has actually occurred here from winters, occurred only a few years ago in Arkansas, and I believe Texas. Nursery stock was damaged worse there than any I ever had, and orchards must have been the same, though perhaps less conspicuously because there were fewer of them. Yet probably no one hesitated to plant orchards there or thought of going further south.

As I tried to indicate two years ago, I think grass-sod has killed more trees and made more trees barren here than all other causes combined. It seems to starve them almost as effectually as tying a

horse to a stake with plenty of food all around him. It may be more severe on our prairies than some others, because they make the finest of hay and a very close sod, but I see the same indications mentioned even in New York. And the rule was there thirty years ago, that when a tree made less than six to twelve inches of growth, it needed cultivation. Here I have searched whole orchards in vain for a two inch cion.

Whenever the orchard is seeded down, it will go to bearing, like it would from any other injury, and continue so for perhaps five to eight years, and then it will surely begin to fail, to the great astonishment and disgust of the owner. If it were a cow, he would probably feel of the horns to guess if they were hollow, but scarcely dream of her hollow belly, though almost visible between the ribs. The tree shows just as unmistakable signs of starvation, by failing to make a lively growth of wood, as well as making small, nurly fruit, yet he has probably never thought of noticing that. Weeds or clover are not near as bad as grass-sod, especially if no tramping of stock is allowed, but they cannot be recommended as the best that can be done, unless clover is plowed under as soon as it gets its full growth.

On these premises it seems very safe to predict that we will continue to have short crops and failures until we change our methods and try to deserve better. I sometimes think it a very beneficent provision that we cannot make anything without studying and working for it—that it gives a laboring man a chance not vouchsafed to the easy and careless chaps. But at other times it seems we can put in a good deal of vain labor, too, because we know so little about nature and her operations.

I had some rather bitter experience of that kind this year with the codling moth.

I put paper bands on the trees in good time, and as soon as the worms matured, we found and killed a goodly number. The trees were free from scales, and the ground cultivated and hoed in raspberries, etc., leaving apparently little other shelter for the worms. And what we caught seemed to be in fair proportion to the number of apples stung. Most of those stung this early fell to the ground at some time, but I never could find a worm in a fallen apple, hence hogs or sheep could not have served me. I flattered myself with abundant success in exterminating the first crop of worms, and think yet that I did proximately clean them out, and according to the reports of their history, that should have made me proximately exempt from the second crop. When they became rather scarce in August, I began to think myself safe. But judge of my disappointment, if you can, when they began to

ten-double in numbers. After the first of September till apples were gathered, we killed fully 10,000 worms, and of course had that many or more wormeaten apples, and far more than any of my neighbors, near by or further off.

The stumbling block is, where did all the moths come from that laid these eggs? The only theory I can form is that they came from town. There are a number of apple trees, especially crabs, scattered inside of a half or three fourths mile of my orchard. Many of them were loaded with apples, and very nearly all were occupied by early worms. I found at one time thirty worms under the scales of one tree. These, when transformed to moths, must have found their way to my orchard, as there were scarcely any breeding places for them nearer. But other orchards, nearly and quite as contiguous, had no such uncommon proportion of worm-eaten apples as mine, which seems still unaccountable.

The next and most important question is how to circumvent them next year. I know sprinkling with Paris green or London purple is recommended, and believed to be efficacious with some close observers. But I fear they have had but few to contend with compared with mine. However, with all my doubts and misgivings about it, I shall have to go at it, if nothing more plausible is offered, but would like to hear from all who have any experience or judgment on the subject.

With most people when you are done talking about apples, you are through with the catalogue of fruits. I hope to see a change in this before many years.

Early Richmond cherry trees bore all the fruit they could hold, still there were very few in market, which I hope to improve on some day.

We had a few specimens of Keiffer pears on very young trees, and all who tasted them when well ripened pronounced them good. No blight so far.

Strawberries and Raspberries were a good crop, and people always demand more of them. No perceivable hurt by winter, but we could see that strawberries were some better where covered. Snyder blackberries can also be called a full crop, though some chance canes failed to perfect it, probably from injury by winter; other kinds were killed to the ground, unless we except the Taylor, of which there are very few, with no perceivable preference over Snyder.

REPORT ON ORCHARDS.

BY F. LIONBERGER, NEW FLORENCE.

CONDITION OF ORCHARDS.

Some of the orchards in this county are in very fine condition, though many of the trees were greatly injured last winter. There are a great many young orchards coming on that look very fine and promising, altogether according to the treatment they receive. Peach trees are in very bad condition; the old trees are so badly injured that they will be of little use, and but few young trees are planted. The prospect is that when we have a good season again for this noble fruit that there will be no trees left to bear.

I, however, have no reason to complain about the condition of my peach trees, but I gave them a very severe pruning last spring as well as the spring before. Cherry trees are also in bad condition, with the exception of a few of the Morello varieties. The greatest trouble about orchards in my opinion, seems to be that a great many plant their trees too close together, and that knowledge of horticulture is badly needed by a good many, at least more than a good many possess. How such men can be reached with practical information is a matter of great importance. It is not an uncommon practice with many to set out a lot of trees and then to sow small grain among them, and thus stunt them at the start, of which the borers are always ready to take advantage.

We ought to have more local societies, and I think it would be a good thing if some of the local papers would give a column for horticulture, which the most of them would do if our experienced fruit growers would assist the editors. In this way a great many could be reached with practical information that otherwise could not be. Good varieties of fruits could be recommended and some of the humbugs could be shown up. A great deal of good could certainly be done in such a way.

Again, we should see that every copy of our valuable reports be given to men who would read them.

Arrangements should be made to bring our standard books on horticulture before the public as much as possible. It would help a great

deal if they could be got at reduced rates through the Secretaries of our State Horticultural Societies.

DISCUSSION.

E. P. Henry finds that the coddling moth fills old rails, boards and chips all around our towns, and think near towns they are much worse than farther away; thinks we had three crops this year.

Samuel Miller finds the poultry a good protection to his fruit, and poultry and pigs are a sure preventive, he thinks.

W. G. Gano believes, as does Mr. Miller, that hogs are the best preventive.

Mr. Murtfeldt says we must be particular in terms, and we must say *the larvæ* of the coddling moth and not the coddling moth; thinks it almost impossible for *one alone* to fight this insect, but wants the neighbors to combine and exterminate them.

N. F. Murry trapped the moths with cans of sweetened vinegar, but find the hog the best preventive: uses up all the fallen fruit by feeding to the hogs.

BEST SIX VARIETIES OF APPLES FOR PROFIT AND BEST TWELVE FOR THE FAMILY.

BY E. P. HENRY, OF BUTLER.

The discussion of the subject of "Best Varieties of Apples," has had a place in almost every meeting of this society since its organization, and very properly so, I think, as my own experience and observation has taught me. It is surely the most practical as well as the most important subject discussed to every apple grower. If a mistake is made in planting the tree it can never be corrected. It is a subject of interest to look over the reports of this society and examine the lists of apples recommended by the society and by individuals. The The old-

est report I have is 1868. Raul's Janet then headed the list for profit, and Ben Davis was at the other end of the list. There is but one apple that has stuck to all the lists found scattered through these reports and recommended by the society and by individuals as an apple for profit to plant, and that is the Ben Davis. It has, I think, very justly won its way to the head of the list, while Raul's Janet has drifted from the head out of the chosen few altogether.

Without hesitation, then, I will say that my first choice of an apple for profit is Ben Davis; second, Willow Twig; third, Jonathan; fourth, Grimes' Golden; fifth, Minkler, and sixth, Huntsman; and I make this acknowledgment that I never before left the Wine Sap out, even of the four best.

For the family varieties, would name Early Harvest, Sweet June, Sops of Wine, Lowell, Maiden Blush, Red Streak, Famuse, Grimes' Golden, Minkler, Jonathan, Huntsman and Lady Sweet.

This leaves out a number of very valuable apples for the home orchard, and I will close by saying that this is only suggestive and that you can add to it or take from it to suit your individual tastes.

DISCUSSION.

N. F. Murray thinks we should not leave out early apples. Obtained as good prices for them as any others. Gives as his list of six, Ben Davis, Winesap, Grimes Golden, Jonathan, E. Harvest, Summer Pennock.

W. G. Gano would like to know if any one would plant a list of six varieties for profit alone.

C. W. Murtfeldt: If you flood the market with Ben Davis, you will find the time come when you cannot sell them.

E. Liston thinks the time is coming when we cannot sell them as well as other varieties. The Ben Davis will not hold in Southwest Missouri, and thinks a great loss comes by rotting; and we must be careful not to plant too many Ben Davis.

C. W. Murtfeldt thinks if we plant forty to eighty acres of Ben Davis, we will rue the day. Great care should be exercised in planting.

N. F. Murray: We grow fruit for a different market than do those of Eastern Missouri, and the Ben Davis are good for the Northwest and the mines, Colorado, Montana, etc. Thinks it is one of the best keepers there are in the country. If Ben Davis rots, it turns black, and does not rot others. Is one of the best to evaporate. It is

one of the best to handle. Wants an apple equal to Ben Davis in all things and of better quality.

J. P. Durand thinks we may yet get too many of Ben Davis, and the tastes of all the west will reject the Ben Davis. Has in his orchard the Janet, Ben Davis and Winesap, but does not know what to plant now. Jonathan has paid better than Ben Davis, always nearly double in his orchard.

D. S. Holman thinks that the call for the fruit is what we want, and the call is for Ben Davis. There is no use to fight the Ben Davis, for it will take care of itself.

Hazeltine has planted 600 acres, and is continuing to plant. All his sons are planting Ben Davis, and they are planting by the ten thousands.

H. Shepley raises apples for the Texas market and the Ben Davis has brought ten times as much money as all other varieties. Rome Beauty does bear well. It is a much better keeper than any other variety.

Mr. Workman of Indiana, thought that the Missouri Pippin would come to be one of the best, but does not find it so; and all other things in consideration, Ben Davis is the best.

H. E. Van Deman of Kansas: The Ben Davis is the leading market apple, and is still being planted. Think we have one better in quality, and that is the York Imperial.

Van Houton of Iowa, needs something different up in Iowa, and there must be something. Still believes the Ben Davis is one of best for money in the whole western country.

Henry Speer thinks that the Ben Davis is a good apple in quality, and is good enough to eat, at least for him, and the Ben Davis is the most profitable of all of forty varieties. Would like to know if it would not be better to plant some summer and fall apples.

The Secretary names: Ben Davis, Willow, Minkler, Jonathan, Grimes and Rome Beauty.

For Montgomery county, best six varieties of apples:

For market—Ben Davis, Jonathan, Rome Beauty, Winesap, G. Golden and Huntsman's.

For family—E. Harvest, R. Artrachan, M. Blush, Smylies Red, Vandevere, Janeton, Winesap, Jonathan, S. Cider, N. Pippin, G. G. Pippin and Pa. Red Streak.

F. LIONBERGER,
New Florence.

My views and experience of six best winter varieties of apples for profit—first:

Ben Davis, 90 per cent.; Winesap, 3 per cent.; Rall's Janet, 2 per cent.; Willow Twig, 1 per cent.; Huntsman, 3 per cent.; and Grimes Golden, 1 per cent.

Twelve best for family use with me—first:

Ben Davis, 18 per cent.; Winesap, 12 per cent.; Maiden's Blush, 8 per cent.; Early Harvest, 8 per cent.; Grimes Golden, 8 per cent.; Huntsman, 8 per cent.; Chenango Strawberry, 7 per cent.; Red June, 7 per cent.; Red Astrachan, 7 per cent; Duches, 7 per cent.; Keswick Codling, 7 per cent.; and Sops of Wine, 3 per cent.

J. M. PRETZINGER,
Clinton, Mo.

BENTON COUNTY, Dec. 10, 1885.

L. A. Goodman, Esq., Secretary:

DEAR SIR: Since I failed to hand you a list of apples, I will send you one. The six varieties best adapted for market in my county are Ben Davis, Jonathan, Rome Beauty, Huntsman's Favorite, Wine Sap, and Maiden Blush, judging more from their productiveness than anything else.

I believe it costs less to raise five bushels of Ben Davis than three bushel of any other variety.

Yours very respectfully,
F. SCHWETTMAN.

LINCOLN, Mo.

LAMONTE, Mo., Dec. 9, 1885.

Messrs. Gilkerson & Bros.:

DEAR SIRS: I would like to attend you meeting, but I am not feeling very well. You may put me down as one of your members, and I will pay you for next year. I have tried a good many sorts of apples, and find the following to do the best:

Summer.—K. B. White, Red June, Sweet June, Benoni, Lowell and Summer Pearmain.

Early Fall.—Rambo, Fameuse, McLellan, Maiden's Blush, Wealthy, Fall Orange, Orange Pippin and Gavenstein.

Early Winter.—Rome Beauty, Grimes, G. Pippin, Striped Sweet Pippin, Belmont and Jonathan.

Winter.—Ben Davis, Willow Twig, Stark, Small Romanite, Lansingburg and Huntsman's Favorite.

Pears.—Burre de Anjou, L. B. de Jersey, Duchess d'Angoulme Worrell.

Now if the above will do any good you can turn it over to the Secretary. Most of the above have been heavy for the last ten years.

Truly yours,
GEO. H. SHEPHARD.

Six varieties for profit: Lowell, 5 per cent.; M. Blush, 10 per cent.; Jonathan, 10 per cent.; Willow Twig, 10 per cent.; Janeton, 10 per cent.; Ben Davis, 55 per cent.

Twelve varieties for home use: Early Harvest, Duchess of Oldenburg, Sops of Wine, Hightop Sweet, Lowell, Maiden's Blush, Mother, Jonathan, Grimes' Golden, Willow Twig, Ben Davis and Janeton.

BUTLER, Mo. HENRY SPEER.

Six varieties of apples best for profit: Ben Davis, Wine Sap, Maiden's Blush, Grimes Golden, Clayton and Jonathan.

GREEN CASTLE, IND. W. A. WORKMAN.

LIST BY JACOB FAITH, OF MONTEVALLO.

As I have been requested to make selections of apples, I make a selection for timber soil. In this selection I have been governed somewhat by the experience of others:

Orchard of 1,000 Trees.	Timber soil.
Red June	5
Early Harvest	2
Golden Sweet	5
Sops of Wine	3
Ramsdell Sweet	4
Bailey Sweet	5
Haskell Sweet	4
Red Winter Sweet	4
Talman Sweet	2
Ladies Sweet	4
Cammac Sweet	3
Hubardston Nonesuch	4
Lowell	5
Maiden Blush	8
Grimes Golden	15
Snow or Famuse	12
Keswic Codlin	3
Winter Wine	8
Jonathan	30
Huntsman	10
Smith's Cider	5
Little Red Romanite	100
Winesap	75
White Winter Pearmain	25

Orchard of 1,000 Trees.	Timber soil.
Missouri Pippin	30
Willow Twig	100
Minkler	10
Rall's Janet	20
Ben Davis	495
Total	1,000

The above list for family use and market is too large if far from market, and some may think there are too many sweet apples, but sweet apples are a better and cheaper feed for horses, cattle and hogs than corn. For other sections of the country, this list would not give satisfaction; this is for Southwest Missouri. I am in favor of dividing the State into three divisions, Northern, Central and Southern, for the reason that fruit that does well in one division of the State may be of no account whatever in another. Take the Red Astrachan, for instance, which bear well in some sections, but with me trees that are a foot in diameter will not average one-half bushel of apples to the tree. I am highly pleased with the Secretary's Budget, and take great interest in reading it. It is very complete, and our Secretary deserves great credit for the judgment used in make these clippings, as he is pleased to call them, but being a practical horticulturist he is qualified to select just what is of the most interest and benefit to members of the society. I also believe that Mrs. Goodman, the Secretary's wife, is a great help in his work, judging by her busy note taking at our last meeting. The Secretary's report shows more work than one man can do.

SOME OF THE NEWER VARIETIES OF APPLES AND THEIR VALUE FOR PROPAGATION.

BY F. LIONBERGER, NEW FLORENCE.

There seems to be quite a number of very fine seedling apples in this county, which in my opinion are quite valuable for propagation. The first I will mention is Smiley's Red, also called Thill's Favorite by a few. The apples are medium to large, nearly red, unsurpassed for desert, cooking and evaporating. A seedling that originated in the northern part of this county with Col. Smily and was first brought to notice by Mr. Thill Nichols, a local nurseryman. The trees are upright growers, very hardy and productive. Lucy Pew is another fine apple that originate, with a Mr. Pew of this county. The apples are medium to large, roundish, greenish yellow, splashed with red, nearly red when fully ripe, flesh white, sprightly sub-acid, calix closed, stem short, basin rather deep and well formed, cavity deep, quality first rate. Trees hardy, upright, leaf of a yellow tint. They leaf out very early in the spring, and are inclined to overbear. I consider this a very valuable apple, late fall.

Next to these I will mention the Logan apples, as I will call them. In the year of 1806 and 1807 one Jonathan Bryan brought a quart of apple seeds from Fleemen county, Kentucky, and planted them in the southern part of this county (now Warren county). Out of these seeds four valuable varieties were produced, which have never before been brought to notice.

The first I will mention is the

Logan.—The original tree is still standing and is in perfect health yet, good for many years more. It is now about 49 years old, and the trunk has a circumference of nine feet, while the circumference of the top is about 180 feet. It may be called quite a historical tree, when I mention that it stands in the neighborhood where Daniel Boone used to live, and as he (Daniel Boone) died at a much later date, it is a well established fact that he has eaten apples from that tree. The apples are medium to large, rounded, nearly red. The first apples always get ripe in wheat harvest and then continue to ripen gradually until the last of September. I have this fall picked apples from the tree as

late as September 21, for the Montgomery County Fair, and after the fair was over have sent them to Secretary Goodman. The trees have never been known to miss a crop. I consider it very valuable.

Uthlout.—Is another apple out of the same lot of trees; it is a very fine early fall apple, of large size and good quality. The trees seem to be hardy as well as productive.

Hornett is a very fine fall apple, medium in size, yellow and very good; it is highly valued by all that know them. The trees are very hardy and bear well.

Logan's Late.—Also a seedling out of the same lot of seed. There is but one tree in existence; it stands now and always has in a hard yard. The tree is now about 50 years old. I think that any tree that can grow on such a place and get so old, can be considered very hardy. The apples that I saw were medium to large, but neighbors tell me that often they grow to be very large. I think that this will prove to be a very valuable apple, and can, I think, be yet improved to a great extent by getting young trees and cultivating them.

Within the last few days another valuable apple was brought to my notice. There is but one tree and it was grafted in 1817 by one Aleck Davidson, who first brought cions from a valuable seedling from Greenville county, South Carolina to Kentucky, where he grafted a tree or two, from which cions were brought to this State, and a number of trees were grafted in 1817; one of them is yet standing. I was also informed that when this tree was grafted the Bryan orchard (a few miles distant) was bearing finely. I will watch this apple the coming season and will report accordingly.

The Secretary announced that there were present delegates from the Iowa State Society: Geo. Van Houten, of Lenox, Iowa; from the Indiana State Society, W. A. Workman, of Greencastle, Indiana; from the Kansas State Society, H. E. Van Deman, of Geneva, Kansas; and they were all heartily welcomed to our society and invited to make themselves at home in our midst, and take part in our deliberations as one of ourselves.

Society adjourned until 7 P. M.

WEDNESDAY, 7 P. M.

Meeting called to order by the President and the regular order of business taken up.

CARE, CULTIVATION AND PRUNING OF THE APPLE ORCHARD.

BY N. F. MURRY, ELM GROVE.

The subject or subjects you have assigned me, are all and each of first importance to success in producing Missouri's greatest fruit staple, and need to be well understood and diligently carried into practice by every one who wishes or expects to make apple growing a success. After all that has been said and written to educate the people and to advance the fruit-growing interests of our country, I am safe in saying, from my own experience and observation, for thirty years among the people, east and west, that not more than one-fourth of the apple trees planted ever reached the fruiting period, and a large per cent. of those that do in their neglected condition escape the ravages of stock, rabbits, gophers, borers and injurious insects, never become paying trees. The very appearance of such orchards only tends to discourage and weaken the general interest in apple growing.

In what way can we accomplish a *change for the better*. I answer, by educating the people on these important questions, not alone by *precept*, but by the *example* of more and more successful orchards.

Very much has already been accomplished in this direction by our State and county horticultural societies, but the task is only begun. I earnestly wish that our people throughout this great State, where God and bounteous nature have done so much for man, could be fully awakened and led to more fully appreciate the importance of this great and grand subject. This done, and apple growing would receive an impetus that would soon bring a degree of prosperity hardly yet dreamed of. Fruit-growers, if true to our noble trust, we will do all we can in this work through our organizations, and let us remember that as individuals we have before us a wide and open field for much needed and useful labor, and one in which we can accomplish a part of what God requires of each one of us—that we do what we can to make the world better and happier while passing through it.

In presenting my views on the first part of our subject, "care of the apple orchard," we will start with the young trees just after planting. Supposing them to have been good trees, planted in good average

soil—placed a little deeper than they grew in the nursesy—with tops inclined to the southwest a few inches, so as to brace against the prevailing summer winds, and branching at three to four feet from the ground. Such being the condition of the young orchard, I advise that it be planted in root crops, melons, beans, or dwarf varieties of corn.

Cultivate such crops, and along with them cultivate the archard. Be careful not to damage the trees with the implements used in cultition. See that the whiffletree does not bark the trees. Hoe around the trees when necessary to keep the soil clear of any weeds that the plow or cultivator has not destroyed. Keep the soil loose by any means; keep off all vines, such as morning glory, etc. While hoeing keep a close watch for borers; they may be detected by worm dust at the surface, or by scraping gently over the bark for three inches below the surface with a knife, and if a hollow sound is detected, or if the bark yields under the pressure of knife or fingers, then cut till you *find and kill* the worm. A piece of whale bone a few inches long, and no thicker than a small straw, can be used in many cases to punch him to death, and so save cutting the tree so badly. Cover such wounds on the trees with soil.

Cultivation should cease in young orchards, especially if the ground is rich, by about the fourth of July, so that the young wood may ripen before winter sets in.

Late in autumn the trunks should be wrapped and tied up with paper, hay, straw, corn stalks, or like material, to prevent *rabbits* from barking them. This will also give quite a protection against *bark-bursting*. This wrapping should be removed early in summer that the trees may receive the full benefit of air and sunshine.

Care should be taken to keep the trees in proper position during summer, as they often get loosened by wind and bent over. They should be straightened up and earth pressed firmly about them. A piece of tough sod may be used and tramped into advantage. Should such treatment fail to keep them in place, stakes may be used, but care should be taken to so tie the tree to the stake that it will not be rubbed and bruised on it.

The number of years that the apple orchard should be cultivated. Most writers tell us "for several years," and then leave us to guess what is to be done thereafter. Many seem to think that when the orchard comes into bearing it is able to take care of itself among grass and weeds, hence leave the trees to their fate. I fail to see the consistency of such a way of doing.

I am a firm believer in continuous cultivation. While the orchard is young the income from the crops referred to will pay well for the

work. and when the trees shade the ground too much for such crops, then cultivate for fruit alone.

This is necessary in order to keep the ground mellow and moist, and to cut the roots so as to multiply the small fibrous rootlets which are essential to the highest condition of fruitfulness.

Have you ever taken into consideration the amount of water that a large apple tree, heavily loaded with fruit and leaves—or with leaves alone,—will require in the hot summer days to keep up the supply thrown off by the foliage and retained by the fruit? If so you will not be surprised at seeing the leaves small, yellow and sickly, and the fruit small and shriveled on the trees in hard soil, with grass, weeds, or small grain robbing the little starved rootlets of their drink.

In cultivating care should be taken to keep the surface as level as possible. If the land is poor or is a heavy clay a top dressing of stable manure, sawdust, chips, ashes or lime, or a mixture of any or all of these materials, may be given with great advantage.

If we expect continuous heavy crops of fine apples, year after year, from the same trees, we should be as constant and as faithful in their care, cultivation and feeding as the successful stockman is in the care of his fine animals.

The cultivation of the bearing orchard should consist of plowing the ground late in autumn, and of stirring it several times in early spring and summer before the trees are bent by the weight of fruit.

I recommend small mules, harness with no hames or anything else sticking upward to injure the limbs of the trees; also short whiffle-trees as the best and most efficient outfit for this work.

Destruction of insects is one good result of frequently stirring the soil and keeping it clean.

PRUNING.

While I unhesitatingly denounce the cutting and slashing generally practised, as worse than no pruning, yet I am a firm believer in careful annual pruning, to begin with the young trees when first planted.

Prune to shape and thin the top. Cut out all cross limbs, and see that the head is evenly balanced on the trunk. Leave no forked trees, for sooner or later they will split.

After the first full crops the tops will be spread with weight of fruit, and for several years thereafter but little pruning will be needed more than to cut out the broken limbs and suckers.

In a few years it will be noticed that the trees have become more or less drooping, and many of the lower limbs will be too near to, or perhaps even touching the ground.

At this period the pruning should be confined mostly to thinning out and cutting off these trailing under-limbs, and it will be found necessary to cut some pretty large limbs. Whether with saw or knife use the tool so as not to split or to even check below the cut off, and paint thoroughly all cuts over one inch in diameter and no harm will follow.

TIME FOR PRUNING.

I have a very decided preference as to when my trees shall be pruned.

Watch the progress of the season, and just as soon as your trees have begun to grow pretty fast, begin and finish as soon as possible. There will be but few, if any, suckers thrown out, the mechanical pressure of the process of growth will tend to prevent checking, and the new bark will soonest cover small cuts and partly cover large ones.

Men, women and children of Missouri—with her plains and hills, and her unnumbered variations of soil, from Iowa to Arkansas, from the Mississippi to her western boundary, by nature the best of the States for producing the greatest and surest crops of apples of the richest colors, the highest quality, and of the widest range among the best varieties—do not fear that you will not get paid for your work in the necessary article of money, nor in the high and refined satisfaction of results accomplished in one of the best of all employments, and remember that what pays for doing at all pays best for doing well.

After which the following was read by W. G. Gano, of Parkville:

To the Missouri State Horticultural Society:

The productiveness of this section of our country, in early times, was wonderful. The young trees were no sooner introduced into the soil when they would spring forth with such strength and vigor as to astonish us who have been accustomed to their culture in the old Eastern States. Before we were prepared for it, our cellars were overflowing with the most beautiful, delicious fruit, God's best gift to man; so delightful to the sons of Missouri, that they doubtless felt that they could justify our first parents in Eden for partaking so freely of all the fruit of the garden, considering that it was the first growth of a new country.

But change is written in indelible lines all over the broad expanse of earth. Elements, animate and inanimate, vegetable and mineral, all alike pass the ordeal, and the careful observer will note the character and rapidity of these changes. The scientist will study the forces at work, and reveal the causes of the various effects produced. The skillful physician will carefully diagnose his case before he prescribes for it.

In like manner should the horticulturist understand the nature and wants of tree-life before he can deal wisely with the tree itself. This can be accomplished only by close attention to the business, and we are persuaded that no profession or calling requires more observation and study than that of the horticulturist.

It is a lamentable fact, evident to every member of this profession, that many—very many—orchards in this section of country have lost their pristine vigor, and are fast becoming unprofitable and worthless. This can be attributed to many and varied causes, the most potent of which are sheer neglect, vile treatment and the want of proper food supply for the trees. But the chief cause at the bottom of all is ignorance, a want of the knowledge of the laws governing tree life.

I shall not attempt to present any special remedies to apply in these cases; for the treatment should be about the same as that of an orchard properly cultured and developed from its beginning, but shall present a few suggestions for the treatment of orchards in general.

The question arises, "Shall we cultivate our orchards?" and in reply, I say yes; but it must be done with the greatest care.

I think that young trees, as well as those bearing fruit, are far less likely to suffer from drouth and the want of proper nourishment and food supply, where the land is planted to a hoed crop, and after stirred with a cultivator, than where it is in grass or in any kind of sowed crop. When the trees come into bearing, we get finer fruit and more of it from an orchard well fertilized and thoroughly cultivated. We have known men to set out young trees in meadows and old pastures, digging holes in the sod just sufficient to accommodate the roots, and saying, "Why should anyone insist on trimming trees." In a few years they smile at beholding these trees one mass of bloom, and later in the season, they are still more pleased to see them bending under a load of ripening fruit. This they call productiveness, when it is more often premature decay and death. It is no wonder that many trees die the first cold winter. All over this State, many failed to grow this and last spring. Many limbs and branches died this summer on ac-

count of two year's heavy crops which impaired the vitality of the trees.

After such heavy cropping the trees loose their healthy appearance, bearing a sickly color, and the once upright, elastic limbs are drooping and stiffened as with age. How could we expect them to flourish in this condition? Even the beautiful flowers loose their bright pinkish color. The apples, instead of being rosy, crisp, juicy and delicious, are colored with milldew, dry and insipid to the taste, following a law of nature, "that like begets like," so sickly trees produce sickly fruit. Our orchards and markets are full of it, the consequence of over-cropping and over-bearing. No intelligent farmer would expect to get a remunerative crop of grain of one kind from the same piece of ground for twenty or twenty-five years in succession, without a constant effort to keep up the fertility of the soil, and even with such effort a rotation of crops is by far the wiser course to pursue. But with the orchard there is no chance for rotation. When it is once planted, it is for a generation, and year after year the same draft is made on the soil, increasing as the trees grow larger, until every square foot of the soil is filled with a network of roots and fibers, taking up from every spot the elements upon which the life and vigor of the trees depend. Hence, the great necessity of regularly adding to the soil such fertilizers as will best replace these elements, and supply the constant draft made on the soil.

To cultivate an orchard successfully for growth and profit, commercial fertilizers are out of the question. They would cost too much for the doubtful profit in them, and were they as good as claimed, they are by nature too stimulating and short lived. You would see its effect in the tree but not in the fruit. Ashes, either leached or unleached, spread broadcast over the ground, are of great value, and there is little danger of using too much.

While it is evident that by very heavy and constant manuring it is possible to stimulate a too rapid growth of the trees, resulting in shortening their lives, still my observation has led me to conclude that where there is one thus injured by two much manuring, there are scores that are more injured by not getting enough. Seed your orchards to clover and pasture to hogs, and while you are converting the clover and wormy apples to pork, you will be at the same time destroying the codling moth, and fertilizing the ground. In fact, I know of no better or more practical way than this in cases where the orchard is located on steep hillsides, where there is danger of the land washing by being plowed.

Plowing is an important item, and we cannot be too careful to prevent injuring the trees. A high-topped hame should never be taken in an orchard, as it is very likely to break or buise the low branches. Great damage is also done trees by the ends of the whiffletrees bruising and mutilating the trunks, and I see no good reason why something cannot be contrived to effectually prevent this injury. I have seen a cut of a contrivance in the Michigan State Horticultural society's report of 1881, which may be practical. The whiffletrees are carried under the bodies of the horses, and a chain fastened to the center of the evener is all that there is between the horses and the plow.

A very important matter connected with making orcharding profitable is the pruning, and while it is true, as a general rule, that the skillful orchardist may give his trees about such shape as he pleases, still the pruning should be done with a thorough knowledge of the natural characteristics of the growth of different varieties of trees. For instance, no well posted fruit grower will attempt to give a like shaped top to a Red Strawberry and a Ben Davis. The pruning should never be done in a hap-hazzard way, but with an intelligent idea of what form of tree is best adapted to the different varieties. The extremes of a too compact and a too open top should be avoided. With all varieties the skillful orchardist will be able to secure a handsome, well rounded top sufficiently compact to give the proper shade to both trunk and main limbs, and at the same time sufficiently open to admit the amount of light and air necessary to perfect the fruit of the more central portions of the tree. As to the best time of the year for pruning much has been said and written, and considerable difference of opinion and practice prevails, and while I believe the time of pruning of less importance than the manner, still I think it can be most successfully and skillfully done when the trees are in both fruit and leaves, and all things considered, perhaps no time is better adapted to this important work than the months of May and June. From my experience as well as from observation, I am of the opinion that the profits of the orchard are augmented by heading the trees low. On such varieties as Ben Davis and a great many other varieties whose branches incline to a more lateral growth, thus giving a low spreading top, I would start the top about four feet from the ground. While with such varieties that incline to a more upright growth I would endeavor to give not over three feet of trunk. Trees thus formed with their tops low will be more easily kept erect, will have less fruit shaken off by wind, and the expense of gathering will be quite a per cent less than from those allowed to grow much taller.

This brings us to the insect warfare, which to the fruit grower is the most difficult obstacle he has to surmount. The migratory habits of the moth, and the dilatory habits of the farmers, make it quite difficult for those to succeed who attempt to rid their orchards of this pest. Concert of action and persistent, unyielding purpose throughout the neighborhood is the most feasible plan that can be adopted to save our fruit from such wholesale waste as the people of Missouri are now sustaining. Nearly one-half of our fruit is entirely destroyed, and a great deal of the balance rendered unfit for market in consequence of allowing codling moth free access to our orchards. Shall we not organize a thorough and systematic warfare against the most potent enemy of the fruit problem than has heretofore been organized in this section and save at least a much larger proportion than we now do of this as fine and delicious fruit as the world produces.

With all the failings of the orchard, a little cultivation, pruning and mulching, and fighting the insects the best we can, will usually reward the husbandman as well as capital invested in any other enterprise. It requires the exercise of at least a little plain common sense to achieve success in raising fruit. Some people know it all at the start, but the successful man gets his information at the other end of the route.

W. G. GANO,
Parkville.

EFFECTS OF THE WINTER ON OUR ORCHARDS AND WHAT CAN BE DONE WITH THEM.

T. W. GAUNT, MARYVILLE, MO.

Mr. President, Ladies and Gentlemen:

The duty has been assigned to me to analyize or look into the cause of the evil effects of the winters on our orchards, and also with a view of introducing some practical remedies. It is a subject that I have been investigating for many years. It covers a great field of practical thought. It is a subject that horticulturists and nurserymen are alike interested in. We feel sore and disappointed when a severe winter has robbed us of some fragrant flower, shrub or plant.

Especially do we feel disappointment when we realize that the severity of the winter has impaired the vitality of the fruit buds of our choicest trees, so much so that it is impossible for them to bring forth fruit. In passing over the country, I have observed many orchards set on low damp ground, and sometimes on seepy hillsides no better than the low damp ground. Such situations are only fit for the growth of willows, cottonwood or low swamp brush, altogether an unfit situation for an orchard. Late rains have a tendency to stimulate a late growth of trees planted on low situations, and thus the trees are not in that matured condition to pass through a severe winter without being seriously damaged or killed outright. The winter of 1883-4 was very damaging to young orchards set on damp ground. I noticed a thrifty young orchard that was planted on high ground, many of the trees were badly damaged, the bark split from the ground twelve to fifteen inches up on the body, also the bark was loosened one-half round from the body of the tree, and notwithstanding the high situation was too damp; a similar damage will occur to orchards on high or low ground if the situation needs underdraining, and if during the mild winters the trees on such locations come out without damage in the spring, the fruit is not to be compared with the finely developed, rich flavored fruit grown on trees planted on high, dry land. I invariably recommend planting an orchard on the best high dry ground, so that the best results may be obtained. Orchards planted on high, dry situations mature their fruit buds and produce abundant crops. I never heard of any orchard planted on bluff land that ever sustained any injury by the winter. I am satisfied that the tender varieties injure almost every winter; that in the alternate thawing and freezing the sap vessels are often damaged, and thus the flow of sap is retarded in its circulation throughout the tree, hence the tree becomes prematurely old and stunted; as a result, the fruit is very inferior, not fit either for table or market, running down to small scabby fruit such as the White Pearmain, Early Harvest, Carolina June, and others. On the other hand, the varieties Astrachan, Oldenburg, Northern Spy, Willow Twig, Domine, and others, appear to withstand the severest of our winters, and bring forth fruit to perfection, the old trees producing as large, fine fruit as when they were young. Nearly all the orchards need a very thorough underdraining at a depth of about five feet, using tiles of four inch inside diameter.

The drains should be dug between each row of trees two rods apart. This will relieve the whole situation at once, and prevent all future damage of our orchards by the winter, in that the wood will mature well which will enable the tree to resist the action of the

frost. There will be no more splitting of the bark at the collar of the tree. There will be no more immature fruit buds. The roots will be relieved from the water pressure that in the past they have been compelled to bear. I do not blame the surly winter which God hath ordained for a wise purpose for the damage of our fruit trees. I attach blame to the men who do not plant their orchards on the highest and driest situation on their farms.

I have a system of underdrains of near two miles on my place that is doing its work night and day in a very satisfactory manner. It is a cure for wet ground, the plants, vegetables, all kinds of grain, small fruits and fruit trees all luxuriate in a soil that is well underdrained. I can recommend it to every citizen of the State who owns a farm, believing it to be the only remedy for bringing into successful cultivation all the wet soils.

PEARS—LOCATION, TREATMENT AND BEST VARIETIES FOR PLANTING.

BY J. A. DURKES, WESTON, MO.

The pear tree, in its wild state, is a native of Europe and Asia, extending from the Mediterranean sea northward as far as Sweeden—eastward to China and Japan.

The culture of the pear is one of very ancient date. The great length of time during which the fruit is in season for eating or culinary uses, its superior delicacy and flavor, and the great beauty of the tree has always maintained for it a very high interest in the annals of horticulture.

Roman writers speak of it, mentioning many varieties and the uses their excellence adapted them to.

The estimation of the fruit grew apace with the civilization of the people, and the introduction of superior kinds.

So far had this improvement been advanced from the acrid wildling that as early as the first part of the last century a writer informs

us that in his time there were known two hundred and fifty sorts from which seventy or eighty could be selected as the best. Du Hamel, a celebrated French writer on fruits and arbor trees, 1768, gives one hundred and nineteen of better sorts, to which he could add thirty or forty more he did not esteem so well for culture.

The efforts of Dr. Van Mons and others during the first quarter of the present century, gave an increased intersest in pear culture. The result of their labors was an acquisition of many of the very best varieties we cultivate now.

The number of kinds increased very rapidly during the century preceding the year 1831. During this period it reached from the amount as stated to that of 677, and to this the additions made almost annually are very numerous.

The tree is one of great longevity. In its native haunts, it generally occupies soils and positions conducive to a very slow, firm growth, just the opposite of the apple, as the latter flourishes best in rich, deep, loamy locations. The productiveness of the pear tree increases with age. In our own land many fine old trees are found—become famous by their age and the great crops they have borne.

With feelings of much gratitude may we of the present generation look back upon the labors of the first settlers in their endeavors to introduce the cultivated fruits of the gardens they forsook for a new home. So soon as the little cabin was built, the clearing made, the chosen seeds they had brought with them were planted. From these seedlings have sprung most of our choicest native pears, such as the Dix, the Sekel, the Sheldon, the Howell, and many others; of the original trees, after an elapse of fifty and sixty years, many are still bearing and in healthy condition.

This, certainly, demonstrates the fact that many places at least exist in the wide extent of this great land well adapted to the growing of pears.

From the fact, perhaps, that it is not indigenous to this continent, and the kinds that have been produced from American seedlings as well as those of European origin, being subject to the same disease alike—the perfect adaptability of varieties to certain soils, situations and localities, will still require many years of patient study, observation and experiment; moreover, with a country so extensive, a climate so diverse in its changes, we could not hope for success with all and failure with none.

The pear tree requires a dry situation, where drainage is perfect, a moderate, rich loam, with subsoils at once dry and still retentive of moisture, and where these overlie vast beds of limestone, it has been

considered of much advantage. Elevations and ridges, where the ash, linden and the oaks are mostly found growing, seem to contain all the elements desired for the pear.

The pear tree being an upright grower, the roots descend almost straight, far downward into the subsoils, while producing but few laterals. It depends little on them for the supply of sood.

Pears budded on the quince should have locations more sheltered and soils somewhat richer, with a subsoil more open and porous, the roots of the tree in this condition (as a dwarf) being more fibrous and nearer the surface.

Cultivate the trees, but an excessive stimulus should be avoided. After the orchard comes into bearing, its vigor can be kept up by top dressings with manures, lime and ashes, and mulching with vegetable litter. Plowing late in the fall will in many cases be very beneficial. Every planter should be the judge to what extent his orchard may need this, as no fixed rule can be given to meet all cases.

In cultivating the pear tree it should never be done later than May. If the grass and weeds become too tall and thick cut down with a scythe; they, in turn, become a good fertilizer.

It will be seen by these remarks that in our choice of elevated, perfectly drained sites, soils of a dry calcareous character and in mode of cultivation, the aim is to produce an early summer's growth, a perfect ripening of the wood, and the flow of the sap entirely checked before the first cold changes come. The experience of most growers for the past forty years has been, that where these conditions could be attained, trees were less subject to blight.

In cultivating our fruit trees during late summer a second annual growth is formed, which often is continued by mild and rainy weather far into the season, sudden severe changes occurring in the weather, freezing the sap in their cells, causing them to contract, hindering the further flow. The sap loses its consistency, becomes thick, sour and stagnates in the tree. Seasons and conditions like these we believe to be the very root of the disease—pear blight, the best authorities agree in this theory—our own experience of twenty five years has given reasons to confirm it.

In training, a conic form is preferred, the limbs starting quite close to the ground, the aim being to shade the trunk and larger limbs as much as possible.

We often permit trees to grow into a bush, throwing up several stems from the root, either pear or quince, thus inducing a larger amount of wood growth from the roots and dividing its powers among

many feeders. Where trees are located in rich and damp soils this method has been very good.

In planting trees on quince it is advisable to place them deep in the soil, far below the union of bud and stalk, making half standards as soon as possible. Often a deep upward cut into the bark is made, just at the point of union, believing, that the callousing of the wound so made would induce an earlier growth of roots from this point than if the trees were left to a natural growth. But little pruning is required after the tree has been formed and comes into bearing, thinning out the weak and interlacing branches, the cutting off here and there of some straggling ones, to keep in a proper shape, will be all that is needed, early spring is the best time for this work. Pinch back to induce the formation of fruit spurs during the growing season (June and July). The check of the growth by this also gives the tree an advantage to resist disease.

In speaking of varieties for general planting, we have come to a point of greatest difficulty; it is almost impossible to name any two that would give the same results, even in a limited territory. Therefore it is well to try many varieties, planting more largely of those that have been tested in the immediate neighborhood.

We give a list of some of the older kind that have been thoroughly tested in almost every part of the land and are known to succeed in general where planted. Many new candidates are in the field, for which much is claimed, and it is hoped that among them are such that may prove themselves suitable to every part of the country.

The Bartlett, originated more than a century ago, stands at the head of the list for general cultivation everywhere, at the east and the west; during its season it leads in the markets.

For family and ameteur marketing no garden should be without the Rostiezer, no summer pear will give greater satisfaction than this. The Tyson, a native seedling, is one of our best summer pears. The Giffard D'Amalis and Bloodgood are quite hardy and annual bearers. The Howell, the Hovey, the Buffam, Steven's Genesee and Kirtland, all American seedlings, have adapted themselves to many localities.

The Duchess, Flemish Beauty, White Doyenne, Louise Bonne and Sheldon are excellent fall varieties.

The Beurre D'Anjon is known everywhere and its own merits are the best recommendations for it.

For size, beauty and productiveness, the Beurre Clairgean ranks high, the tree being an early and abundant bearer, and on our grounds has never shown any signs of blight.

Beurre Bosc, Doynne Boussock, D'Alencon, Lawrence, Beurre Diel and Onondaga have proven in many sections to succeed admirably.

The Vicar, the Pound, the Winter Nellis, Easter Beurre and D'Aremburg are hardy and productive kinds for winter.

The Seckel, the ideal of excellence among pears, has become a universal favorite; it is hardy, healthy and productive.

The culture of the pear is one of great and peculiar interest, the great excellence of the fruit will always maintain for it renewed efforts for general cultivation. Hoping, therefore; that some suggestion made in this paper may stimulate an effort in that direction, we close with these words of encouragement from the pen of the late Dr. Warder: "Pears have been grown in this country; pears may again be grown here; pears are grown in some places; they may be grown in many others; let us then plant pears."

THURSDAY, 9 A. M.

By invitation the society visited the Normal School at the opening exercise, after which they decided to move their quarters to that place at the noon hour.

The meeting was called to order by the President, and after prayer by Mr. Murtfeldt, the society took up the regular order of business.

VINEYARDS.

REPORT BY G. E. MEISSNER, BUSHBURG, MO.

Mr. President and Fellow Members:

In most parts of our State the grape passed through the very severe and rigorous winter of 1884 to 1885 with comparatively slight

injury, and notwithstanding the late and unfavorable spring, gave promise of an unusually fine yield of fruit in the early part of summer, but alas! the rot and mildew have once more thrown their blighting influence over that promise, and we record another season of more or less marked failure throughout a large portion of the State.

Fortunately we have a few varieties which have shown their resistance again to these dread fungoid diseases, and of these varieties the Norton's Virginia and the Cynthiana still rank at the head of the list. So far as I have observed and heard, they have done remarkably well, and probably have given full average crop.

The Elvira also has made its mark again, and, with the exception of some localities, has suffered but little from the rot, and has generally given a fairly satisfactory crop. Our friend, Jacob Rommel, the originator of the Elvira, may well be proud of the appreciation which this grape has won, not only in this State but in many other sections of our country. I believe, however, that the Etta, a seedling of the Elvira, and another of friend Rommel's productions, will in time outrank its parent, being of a finer, better, more sprightly and vinous quality, and valuable alike for the table and for wine.

The Ives, Perkins, Norton's Seedling, Lady, Grenis Golden, Montefiore, Mason's Seedling, Pocklington, have, with us here, given tolerably fair crops and suffered less damage from rot and mildew than most other kinds.

However, I will enter into no more details concerning varieties, as both Mr. Rommel and Mr. Teubner, my fellow member on the grape committee, have signified their intention of handing in their reports, and will probably speak of the different kinds, and make a better report on them than I am able, having had but little occasion myself for personal observation outside of our own vineyards, and in other parts of the State.

I would rather say a few words on another subject, which is of great interest to our American grape culture.

For the last five or six years the *Perenospora viticola*, (our American Grape Mildew), has prevailed to an alarming extent in the Old World, notably in Southern France and in Italy, and the ravages caused by it in those countries have scarcely been less damaging to their crops than the losses caused by the Phyloxera. Its effects on the European grape—and the entire *vinifera* class is especially susceptible to it—have been precisely the same, as its effects here are only too well known on varieties that are subject to it. Two years ago, already my friend and partner, Mr. Bush, expressed the hope in our Bushburg catalogue, (page 49), that some remedy would be found against this

dread disease. Happily this hope seems now to have been realized, and in view of the importance of the discovery of remedies, which seems at the same time simple and efficacious, I propose to give you a brief translation or extract of several articles treating on the question, which have appeared in the November number of the "*Messager Agricole*," published at Montpelier, France.

One of the articles is a communication by Prof. Millardet of Bordeaux, entitled "On the Treatment of Rot and Mildew," (*Extrait des Comptes rendus à l'Academie des Sciences, No. du, 5 Octobre, 1885*), in which he says: "On the first of May last, I made a communication to the society of agriculture of the *Gironde*, concerning a treatment of the mildew by means of a compound of lime and of sulphate of copper, (blue vitrol). The knowledge of this mixture, the determination of the proportions of the composing substances, the instruction as to the most favorable moment of their application, are the results of two years of study and experiment made with the help of Mr. Ernest David, manager for Mr. Nathaniel Johnston, the proprietor of the Chateaux Dauzac and Beau Caillou in the Medoc. In consequence of this communication several proprietors in the Medoc were led to apply on a large scale the treatment which I had recommended. Mr. Johnston alone, who entered upon it with a will, had the treatment applied to fifty thousand vines on his two establishments. It is the result of these experiences which I take the liberty to submit to the academy.

"To day, on the third of October, the treated vines present a normal vegetation; the foliage is healthy and of a beautiful green; the grapes are black and perfectly matured.

"The non-treated vines, on the contrary, present the most miserable aspect; the most of the leaves have dropped; the few which remain are half dried up; the grapes, which are still red, can serve for nothing else than to make a "piquette." The contrast is most striking."*

After some remarks on the varieties treated, etc., Prof. Millardet gives the mode of treatment as follows: "In 100 litres (26½ gallons) of water dissolve 8 kilo. (about 17½ lbs.) of sulphate of copper; also make with 30 litres (about 8 gallons) of water and 15 kilo (33 lbs.) of fresh (unslacked) lime a thick lime milk or lime wash, and mix it with the solution of sulphate of copper. It will form a bluish pickle. The operator, stirring it up, pours some of this in a can or bucket which he

*Prof. Millardet has accompanied his communication by photographs of a treated and a non-treated vine, which indeed present an astonishing contrast, as also the analysis which he gives of the most of the grapes, showing the difference in the percentage of sugar.

takes in his left hand while with the right, with a small whisk or broom, he sprinkles or spatters the leaves, taking care to avoid touching the grapes with the compound. No danger to the person need be apprehended."

"With Mr. Johnston 50 litres of the mixture have been sufficient for the treatment of 1,000 vines.* The treatment has been applied from the 10th to 20th of July; at some points it has been repeated a second time, end of August, but without marked advantage. It is shown that a single application is sufficient. The mixture, when it has dried, adheres well to the leaves. After the treatment the vines have gone through several heavy thunderstorms at the beginning and end of August, and frequent rains in September. Notwithstanding this, one can to-day easily recognize on half of the leaves the spots where they have been touched by the compound, but even those leaves which have not retained the least trace thereof are in as good a state as those which still show the spots."

"It is not necessary that the leaves be entirely covered with the preserving mixture. I venture to say that a single splash even on a leaf will be sufficient."

Prof. Millardet insists upon a timely application and as a preventative treatment, saying that those who waited until their vines were already rather seriously attacked reaped much less benefit from the operation.

In concluding Prof. Millardet says: "There is a last important point to be considered. Notwithstanding all care, it will happen that some drops of the coppery mixture will fall on the grapes. Will the copper be found again in the wine? And if it should be found, would it be in quantities sufficient that health could be affected thereby? My colleague, Mr. Grayon, has promised me his help to study this question. A trial made by him on 800 grammes (nearly 2 lbs.) of the fruit taken from treated vines failed to reveal the presence of copper in absolutely certain manner. The researches in this direction will be continued, and I hope to be able, before long, to lay their results before the academy."

In a discussion of this question at a meeting of the Agricultural Society of the Herault, at Montpelier, the view is expressed that any danger to health need hardly be feared in consequence of the infinitely small quantity of the coppery compound which might adhere to the fruit, if proper care has been bestowed while applying it to the vine.

* For our American vines here with their larger spread of vegetation, especially where grown on trellis, this quantity would suffice probably for only one-half or one-third that number of plants.

But another remedy, which is absolutely free from any objection on this score, has been applied with remarkable success in Italy, where it was recommended by the department and schools of Agriculture. The brothers Belussi, near Conegliano, in the province of Trevise, especially deserve great credit for the intelligent and persevering manner in which they have experimented in this direction for a number of years, until at last success has crowned their efforts. The *Messager Agricole* contains communications on the subject by Prof. Cerletti of the royal school of viticulture at Conegliano, Italy, report by Mr. Dehrain, professor of agricultural chemistry at the school of Grignon, France, and report by Prof. Velicogna of the imperial and royal school of agriculture at Geritzia, Austria. These two gentlemen were sent to Italy expressly by their schools to investigate the matter. Their articles are too long to give you a complete translation of them. They all agree, however, in reporting the most astonishing success of the new remedy.

This remedy consists simply of a lime wash or "lime milk," as the French call it, which is prepared in the proportion of 2½ kilo. (about 5½ lbs.) of fresh lime slacked in 100 litres (26½ gallons) of water. With this liquid the vines are sprinkled abundantly, and from the middle of May until the middle of August this operation is repeated five or six times.

With this mixture no especial care need to be taken as it contains nothing that is injurious to health, and even if some of the lime should still adhere to the grapes when they are ripe, this could be easily removed by washing the fruit in water.

In speaking of the results of the treatment Prof. Velicogna says:

"In every row of vines which had not been limed, but had been sulphured energetically, and at several times on each vine and on each cane not limed, the *Perenospora* (mildew) had made such ravages as I have never seen before in our country. The 10th of this month, September, four-fifths of the leaves were lost. On some vines some canes had no trace of foliage left. The grapes are few, badly nourished and quite green. The shoots of this year are short, sickly and puny.

All the rows of vines, every plant, every cane, which from the middle of May to middle of August, has been limed five or six times, are completely exempt from the *Perenospora*, not a trace of the disease. The vines have conserved all their leaves, whitened by the lime, but large and fully formed, and of a dark green color when they are wshed. As everywhere else there are not a great many grapes, but the bunches are fine, well developed, well nourished and black as ink."

Now anyone who knows how some of our finest grapes, the Delaware, for instance, suffer from the mildew in unfavorable seasons, how in many sections they cannot be grown at all for this reason, will appreciate the high value of this discovery of a simple and practical remedy, and its importance if it should prove equally efficacious here. The Delaware is not only very rarely subject to rot, while it is very susceptible to mildew, but doubtless if we could conquer the latter it would prove one of our most valuable and profitable grapes to grow. But I have strong hope that this lime treatment may also prove of great service as a preventive aganst the grape rot, and if such should really be the case, it would be the greatest boon for our American grape culture.

We propose to make thorough experiments with it next season, and I would strongly urge upon all of you who are interested in the grape, and who may have suffered in your vines from the ravages of mildew and rot, to give the new remedies a fair trial, remembering, however, that the efficiency any remedy depends entirely upon its timely and through application. Life and health permitting, I hope we may be able to compare notes, and report favorable results at the time of our next annual winter meeting.

Let us not despair of grape culture, because of a few consecutive years of failure of some varieties, but let us take an example rather of courage, energy and perseverance displayed by the people of the old world, where the grape forms the principal source of revenue for such large extents of country.

Forty years ago they were ravaged by the *Oidium*, the European grape mildew, which swept all over southern Europe, and soon reduced the grape crops to a minimum, but they persevered, and finally, with the discovery of the sulphur remedy, they conquered this foe. Hardly had they recuperated and begun to feel secure again in their favorite crop, when the Phylloxera came and utterly destroyed hundreds of thousands of acres of the finest vineyards in the world. Undaunted by this they renewed the fight, and by the use of American resistant stalks they overcame the evil effects of the Phylloxera.

While still struggling with the insect, the *Perenospora* appeared and ravaged southern Europe from Spain to Italy, crossing the Mediterranean even into Africa to the newly established vineyards of Algiers. Now, by means of these before mentioned remedies they see their way to victory, also over the latest enemy of their cherished grape.

If we look at what they have overcome, we cannot help but to admire those people, but we must also profit by their example, and with

an equal degree of intelligent perseverance, courage and energy, we will surely also conquer the foes of American grape culture as they have succeeded in conquering the no less formidable ones of the European grape. Let us keep on in the good work, and profit from the experience of others as well as from our own; finally our efforts will be crowned with success, and we will reap the merited benefits.

After which came a report by

JACOB ROMMEL, OF MORRISON, MO.

The grape growers of Missouri are still in a progressive condition, regardless of the partly failures for the last few years. The grape growers at present are composed of more practical men than in former times, and making growing grapes more a specialty, likewise we now have several large wine establishments making wine a specialty, and buying the grapes from the grape growers and paying more for them as they would generally bring in market for table grapes.

The growing of grapes for wine and the making of wine is our main dependence, as they are our main consumers of our grapes. Without this we should have been compelled to suspend mostly with our grape growing. Therefore we look forward for grapes for wine making; and improve such. The following are grapes mostly growing:

Nortons, Cynthiana, Ives and Concord for red wine.

Catawba, Elvira, Martha, Goethe and Missouri Riesling for white wine.

These have done best for a number of years.

There are on trial numbers of new ones; many highly prized ones have proven unreliable here, and there is quite an anxiety to produce or to procure reliable grapes for wine making and we are in hopes to find such out of the many new ones now on trial.

The last season has been a most unfavorable one, being wet throughout, causing grapes to rot badly and many of them a total failure.

The following kinds did best and produced the main bulk:

Nortons, Cynthiana, Ives, Elvira, Martha, Missouri Riesling and Goethe.

Concords—Almost a failure by rot.

Moore's Early—Much like Concord, larger in berries and better in quality, earlier and not much affected by rot.

Pocklington—A large, fine, late grape, rotted badly.

Triumph—Not reliable.

Catawba—Light crop by rot.

Clinton and *Bachus*—Rotted badly.

Herbemont—Almost a failure.

Rulander—Likewise.

Black Hermann—One third rotted.

White Hermann—Little rot.

Amber—Almost free from rot, rather a shy bearer.

Beauty—Almost a failure by rot.

Pearl—Rotted one-half.

Transparent—One-half rotted.

Montefiore—Rotted but little.

Etta—Almost free from rot.

Delaware Seedling No. 1—Very little affected by rot, very fine and productive.

Black Delaware—Was fine with but little rot.

Faith—Little affected by rot, fine in quality, very early, of medium size bunch and berries.

Lady—Rotted but little; it is much like Martha but better in quality and two weeks earlier in ripening and larger in berries.

Lady Washington—Almost a failure and not reliable here.

Greins Golden—Little affected by rot but poor in quality.

Marsalias—Almost free from rot, very productive but poor in quality.

Conqueror—Rotted but little, a black grape much like Ives but better in quality.

Hartford Prolific—Rotted badly.

Telegraph—Almost a total failure by rot.

Delaware—Little affected by rot; however, poor grower and not profitable.

Cottage—Rotted badly.

Neosho—A fair crop, very prolific but poor in quality.

Racine—Of no value except for arbor purposes on account of fine, healthy foliage and rank growing habits.

Of the Roger's Hybrids, the *Goethe* is the only one reliable.

Early Victor—Did well, not much affected by rot, very early, valuable for market.

Noah—Has not proved reliable.

Creveling—Not reliable.

Those are grapes that have been cultivated for a number of years.

Newer ones have yet to show their test, one or two years will not answer.

Experimenting is expensive combined with years of labor, and so far, out of so many new ones, we have as yet few of real value. The same may be said of other fruits, especially of apples, the test of many of the so highly praised ones have not proven to be what was expected and now we fall back on some of the older kinds that were set aside for the newer ones. It is strange that many of our newer fruits will retain their merits for a short time only, and some of our older kinds maintain their merits so long.

REPORT BY CHAS. TEUBNER, LEXINGTON, MO., MEMBER OF COMMITTEE ON VINEYARDS.

In this vicinity grapes are not grown to any extent. There are but five or six vineyards of a few hundred vines each. Some of our farmers have a small trellis of vines, but these are left to grow at will, or pruned in an insufficient manner. The Concord is the variety mostly grown. Our climate and soil, however, is not unfavorable to grapes; in fact the soil on our river bluffs is, I believe, well adapted to their growth. The rot is usually less destructive than at Hermann or Columbia, Missouri. The past season, however, grapes rotted considerbly, in some places three-fouths in others half were lost, the whole crop being about one-fourth. A neighbor of mine who has a small vineyard (mostly of Concord) which receives rather more attention and cultivation than that of others, lost over three-fourths of his crop by rot. His few Norton's Virginia suffered like the Concord, except one vine, which is trained on the east side of his house, and which ripened a fine crop. His vineyard is on rather poor, sandy clay soil, on the lower end of a western slope, the free passage of air draughts being obstructed on the south by an orchard, and on the west by a hill. The vines have been in bearing a number of years. Another neighbor whose vines, partly cultivated, were on a rich loamy soil on a hill with an eastern exposure, but surrounded on three sides by buildings and an orchards, also lost most of his crop by the rot. A number of trellises on different farms, generally on rich prairie soil, but uncultivated and left to grow at will, suffered less with rot, but the remaining bunches, often many in number, had but a few straggling berries, and these, on account of the excessively wet season, and lack

of pruning, failed to ripen. A couple of Concord vines in my yard, one on each side of a walk, pruned and once summer pruned, bore nicely, and were not much affected by rot. About one-half of the bunches were sacked—in two pounds paper sacks—when the berries were quite small; these escaped the rot entirely, every berry being perfect, with a beautiful bloom and excellent in quality. The unsacked berries, though not rotting much, were to a great extent wormy, and the others the birds got. A Janeton tree stood near one of the vines into which some of the canes had grown, and as an experiment I pruned one or two of these, but the bunches on them were not as large as those on the main vine, and did not ripen up as well, besides being as wormy and rotting as much as the unsacked bunches on the trellis. The soil in which they are growing is a sandy clay, with a sub-stratum of a sandy nature. The soil was bare and not loosened by cultivation, and the surface well drained. The vines had plenty of access to sunshine and air.

Chickens had their range about and under the vines this year as in the past years. I mention this fact to show that it did not prevent the grapes from being freed from the ravages of the grape curculio. In connection I will state that several varieties of plums, Chicasaw as well as some to me unknown varieties of blue plums in the same yard were so badly stung by the plum curculio that, although heavily set with fruit, none of it matured.

What few varieties of grapes, other than the Concord, are grown here, such as the Goethe, Catawba, Clinton and Taylor's Bullitt, suffered as much and more than the Concord, the Goethe having been badly injured by the previous winter. The Concord was also injured to some extent by the winter, but not enough to have cut short the crop. Lack of knowledge in the culture of the grape is the principal drawback to grape growing in this county.

DISCUSSION.

N. F. Murray—The grape planted near the steep hillside on river bluffs pay exceedingly well. One instance where they have paid exceedingly well—$300 per acre. Thinks that if grown higher up on the trellis they would pay better and not rot.

Prof. Tracy—The cause of the rot is not a disease, but by spores brought in contact with the grape itself. These fungi develop more upon weak plants. No treatment of the vine will cure the rot. Bagging grapes is the only remedy and will not cost much.

Mr. Robards—Has tried the bag business; covered fifty bunches and found that where covered they did well.

Mr. Workman, of Indiana—Says they have tried bagging grapes, and find it success; finds they do better upon high trellis or trees, and are a success.

Mr. Van Deman—Finds this bagging is not a complete success.

Mr. Galloway—Thinks the spores do not enter unless the grapes are punctured.

Mr. Gano—Found at St. Joe a great number of excellent new varieties, and they succeed much better there than here.

Mr. Workman—They will keep much longer than if not sacked.

S. Miller—Finds the Worden better than the Concord.

T. W. Gaunt—Thinks we need very high and dry ground; need underdraining, he thinks.

Prof. Tracy—Says it will do no good.

Mr. Miller—Has the highest land in the county of Montgomery, and grapes rot the worst.

N. F. Murry—High training is the only success in his county.

Mr. Van Deman—This rot is sporadic and in the atmosphere, and no cultivation will stop it.

E. P. Henry—Thinks all these men are correct in their views, and this spread is through the air, but that it will not spread very far in one season, but if one vine is affected it will soon spread to all in the vineyard.

REPORT OF THE COMMITTEE ON SMALL FRUITS.

BY SAMUEL MILLER, OF BLUFFTON.

L. A. Goodman, Secretary of the Missouri Horticultural Society:

As my attendance at the annual meeting is uncertain, I will at least give a report on the small fruits. Have written to the other members of my committee to send me theirs or to send direct to you.

As usual the strawberry comes first, and as there was but a poor show here the past season, I have not much to tell about them.

Crescent, Capt. Jack, Cumberland Triumph, Hart's Minesota and James Vick did pretty fair. Cornelia did splendidly and promises to be our best late berry. I must not overlook Glendale, which had an immence crop of fine fruit, while if not of the best quality, is well worth having. None of the other new ones did any good. Jumbo is simply Cumberland Triumph.

Of cherries we had the best crop that has been for eight or ten years. One tree of Napoleon bore over a bushel of as fine cherries as I ever saw. Some one says our bees deserve the credit for this crop; as cherries are not sure unless bees are in the vicinity to fertilize the blossoms.

Raspberries, a fair crop on the Centenial, Seneca, Mammoth Cluster; Gregg a poor crop. Turner as usual full and good; Crimson Beauty, Scarlet Gem and No. 2 bore as well as could be expected in a mass as I have them to grow plants. Of the latter two we had berries all summer until frost, when they still had fruit and blossoms. Schaffer was somewhat injured by the winter and the crop not large. Merllow gave us some splendid berries of good quality from plants set out last spring. If this proves hardy it will be a great treasure. Cuthbert had no chance, as the beds were overhauled in digging up plants.

Blackberries—Lawton and Kittatinny have gone overboard with me; Western Triumph was injured last winter and did not give a full crop or near so much as I expected in the spring. Snyder is an Ironclad, bore a full crop of good berries, although not large.

Now, as to grapes, there was a pretty fair crop left after all the rot. The Concord rotted about the worst, as usual, and I have no use for it. Worden will supersede it when it becomes known. Early Victor was splendid and is still the best early one on my grounds. Moore's Diamond is the earliest and best white one. Of the new ones, Lady Washington, Prentis, Jefferson, Peter Wiley, all brought fruit to perfection in paper sacks, the only sure remedy against insects, rot and birds. Marsala don't rot at all. Had sent me a bunch of a new grape by F. B. Munrow, Denison, Texas, of great beauty and excellence; from Geo. W. Campbell, Delaware, Ohio, two new seedlings, one white the other black, that will vie with the best. The Ulster Prolific from Caywood & Son, Marlboro, N. Y., bids fair to take a place in the ranks; a bunch of Woodroffs Red from Michigan, not ripe, but large and handsome; from Pratt Brothers, Rochester, N. Y., a couple of bunches of the Empire State which speaks for itself, and along with the Niagara, will, if they prosper over a large extent of our country, create a revolution in the grape trade.

The Niagara Co., of Lockport, N. Y., sent me a basket of the Niagara grapes that surpassed any lot of out-door grapes I ever saw; quality, first rate. There is still a bunch in my possession in excellent condition (Nov. 6) and looks as if it would keep until Christmas.

And lastly, but by no means the least important, were two lots of grapes from John Burr, of Leavenworth, Kansas, among which were about the best native grapes I have yet tasted. I will neither give their names nor numbers, as they are not before the public, except the Jewell, which is now in the hands of Dr. Stayman of the same place. This is about the earliest and best grape among the earlies, a week earlier than the Early Victor.

Such progress in the grape line has never been shown before in this country. When such grapes as Empire State and Niagara become plenty there will not be so many car loads of California grapes come across the Rockies.

SMALL FRUITS.

BY Z. T. RUSSELL, OF CARTHAGE, MO.

Members Missouri Horticultural Society:

By request of the Secretary of your society, I send the following report on the varieties of small fruits as seen on my place the past season:

Chas. Downing—Plant rusts, and is not productive, therefore not profitable.

Crescent—Most productive and profitable by far of any sort yet tried.

Crystal City—Ripens first berries of the season, but one row of Crescents will make a quart of ripe berries sooner than five of Crystal City; very shy bearer, and therefore of no value.

Capt. Jack—Had expected much of this variety; was a complete failure, except a few berries that were allowed to remain of spring-set plants, which were very fine.

Cumberland—Hardy, productive, large and fine, but light colored and too soft for shipment; one of the best for home use.

Dan'l Boone—Has not fruited with me yet; its appearance is not promising; I doubt its proving to be of any value here.

Daisy—No fruit yet; plant looks much like Cumberland, though I can see easily a difference.

Glendale—Good crop of large, very firm berries of dark color and poor quality; late; good shipper.

James Vick—First year's fruiting; not a productive, large or desirable in any way except in hardiness of plant, unless it does better than it has this season.

Jersey Queen—Largest and finest berries I ever saw, and very productive considering its size; good quality, but too soft for much handling.

Manchester—Large, well-shaped berries; productive; pleases me very much; plant rather sensitive to heat and drouth, otherwise one of the most desirable in the whole list for profit.

Miners—First season's fruiting; hardy, very productive, large and fine.

Old Iron Clad—Of no value.

Wilson (genuine)—With this I am highly pleased; very productive, firmest of all; requires good cultivation, otherwise will be too small. If it continues to do as well as it did for me the past season, it will be sometime yet before it is entirely superseded by newer sorts.

Wilson (as purchased from two different parties here)—Early and productive, but small and soft; plant a weak, rusty grower of no value whatever.

Windsor Chief—Almost as productive as Crescent; large, late dark colored; valuable for home use and near market, but too soft for shipment.

Woodwards No. 1—Weak grower; irregular in shape and size; of no value that I can see.

Bidwell—Hardy, productive and firm; irregular in size and shape; ripens one side at a time; is of excellent quality.

Black Giant—First year's fruiting; productive, large size, dark colored and firm; looks like overgrown Wilsons; good quality, promising.

Mine is a clay soil, and runs all the way from very gravelly to no gravel at all. The slope is to the south gently. The Capt. Jacks were on gravel.

These notes are all made from memory, and may differ somewhat from the form they would have received if made during the fruiting season, but in the main they are correct according to this year's experience. I hope, however, that another year's experience will enable me to change some of them very materially.

Raspberries and Blackberries—Of these I can't say much; black raspberries ripened in the following order: Davison, Tyler, Sonhegan and Doolittle, Mammoth Cluster, Duncan or Kentucky and Gregg. I regard the Gregg as the most valuable of all, but as it is late, we need an early sort also. This place is best filled, I think, by the Tyler, it is one of the hardiest, earliest and largest we have. The Sonhegan is very similar to it.

Red Raspberries—Of these I have only two, Turner and Thwack, that I shall speak of at present. They are both hardy and productive. Turner is the earliest and best quality; Thwack the firmest and most profitable. They yield less and are more expensive to pick than Black Caps, and are therefore less profitable here since they each sell for about the same per quart.

Of blackberries I have only three varieties, Brunton's Ey., Snyder and Kittatinny. Brunton's is not as hardy as I would like; has been killed the past two winters so badly that it bore no fruit to speak of. Snyder is perfectly hardy, but the fruit is too small to be profitable when there is a crop of Kittatinnies, but when that sort fails, the Snyder pays big, as people must have blackberries of some sort, and the Snyder is really good, only it doesn't look so fine as the larger sorts. Kittatinny is the best sort I have tried; but it was damaged considerably last winter by cold. It is very productive, very large and fine, and sells better than any other sort. It is, however, somewhat subject to rust.

With grapes, gooseberries, currants, etc., I have not had enough experience to enable me to say anything that I think would be of interest.

I would like very much to be with you at your meeting at Warrensburg, but circumstances are such that it will simply be impossible. I hope, however, that you may have a good time and an interesting and profitable meeting.

REPORT ON SMALL FRUIT.

BY F. GUTEMANN, OF NEW FLORENCE.

I will here give a report on the condition and prospect of small fruits, based mostly upon experiments made on my own place.

At present my strawberry beds look very fine and have a fine prospect for a good crop. I will here give my experience with the varieties I have on trial and others that I have planted quite largely:

Crystal City—Has brought in the most money for me, because they were the first ones to get up and were not infested with insects to any extent. At present the plants look excellent.

Ida—Was not infested with insects, but it is so utterly worthless that I have pulled up all of the plants.

Cumberland—Is one of my very best, but was troubled with insects some; I shall, however, plant them quite extensively. The plants look very fine at present.

Jersey Queen—Is a noble berry and brings the top price in market here, but will not fill boxes fast enough, a moderate grower with me.

Big Bob—Is worthless.

Daisy—Wants further trial with me.

Manchester—Is fine but quite subject to rust.

Crescent—On limited trial would say that it must be of great value and expect to plant it extensively.

Piper—A very robust grower, productive, but the fruit is rather dark in color.

Captain Jack—One of my best, but the plants at present look indifferent.

Iron Clad—Promised a great deal last spring but went into bankruptcy. Whether it was the late frost or the insects that caused it, I am not prepared to say.

James Vick—The only fault I find with it is the berries are not quite large enough.

Sharpless—Looks excellent at present, but that is all I could say as it need further time.

Glendale—I like for a late berry, a robust grower.

Raspberries—I have a large collection but am not yet prepared to express my opinion very extensively. I will just make a few remarks:

Shaffer's Collossal—Is my best. Then Turner, Cuthbert and Thwack. Lost Rubies did right well.

Scarlet Gem—Played off on me with its everbearing qualities; Gregg was killed to the ground.

Doolittle—Is one of the best black ones I have; Moody is worthless; Caroline is a general favorite, but do not know what it will be for market. Crimson Beauty and Staymans No. 2 needs further trial.

ESSAY ON STRAWBERRIES.

BY JACOB FAITH.

MONTEVALLO, Dec. 8, 1885.

L. A. Goodman:

DEAR SIR—I am very sorry indeed that I cannot attend the present meeting of the society, but if I cannot be present in person I will be in spirit, and hope that you may have a profitable meeting, and I hope that the present meeting may be a notable event in the history of the society.

Growing strawberries is in its infancy and has been kept in the dark, but this wholesome fruit is finding its way into more general cultivation. I have never in a single instance been asked the question, will berries add health and comfort to the human family? but as the wish to accumulate money predominates the question as generally asked is this, is there any money in growing berries? My answer is this, that it is owing to locality, soil, climate and the proper selection of varieties, also the distance from market, etc.; but as the main idea in growing strawberries is for the money there is in the business. I will give a tabulated statement of my experience with several varieties as to the cost of production per quart and the average price received and the approximate profit:

Varieties.	Cost of production..	Picking.....	Boxes.....	Marketing..	Price received....	Profit.....
Crystal City.....	4 cents.	2 cents.	1 cent.	1 cent.	15 cents.	7 cents.
Crescent Seedling....	2 "	1½ "	1 "	1 "	10 "	4½ "
Chas. Downing.....	2 "	1½ "	1 "	1 "	10 "	4½ "
Glendale.....	3 "	1½ "	1 "	1 "	10 "	3½ "
Miner's Prolific.....	3 "	1½ "	1 "	1 "	10 "	3½ "
Captain Jack	3 "	2 "	1 "	1 "	8 "	1 "
Kentucky.....	3 "	3 "	1 "	1 "	6 "	loss 2 cts
Windsor Chief.....	4 "	2 "	1 "	1 "	9 "	1 c profit
Cinderella.....	6 "	2 "	1 "	1 "	8 "	loss 2 cts
Cumberland	10 "	1½ "	1 "	1 "	10 "	" 3½
Manchester.....	20 "	2 "	1 "	1 "	9 "	" 15
Wilson.....	12 "	1½ "	1 "	1 "	9 "	" 6½
Big Bob.....	40 "	1 "	1 "	1 "	11 "	" 32
Sharpless	10 "	1½ "	1 "	1 "	10 "	" 3½
Col. Cheney.	6 "	1½ "	1 "	1 "	10 "	½ c profit
Jucunda.....	25 "	1½ "	1 "	1 "	10 "	loss 17½ c
Lening's White.....	5 "	2 "	1 "	1 "	11 "	2 c profit

The above varieties were grown on light, sandy soil, well manured with stable manure. In a different climate and on clay soil the result would be different, showing that great care should be used in the selection of varieties to suit soil and climate. My advice to inexperienced parties would be to read the reports of Horticultural Society of their State to get the benefit of the experience of leading horticulturists.

We have been very successful in saving our peach trees and also the fruit by wrapping the trees with straw, slough grass or corn fodder or sugar cane, sown thick to make it grow fine. I have two hands at the present time wrapping trees; the cost does not exceed seven cents per tree.

We have two ropes with loops at one end; put the rope around the tree and draw gently while the man on the opposite side of the tree holds the rope and keeps the limbs straight; when the rope is drawn sufficiently tight, fasten, then place the second rope above the

first and proceed as before. When the tree is well drawn together, fasten with broom twine; then take off the ropes and proceed to put on the straw, shingle fashion, commencing at the bottom, one man holding the straw while the other puts the twine around and ties. Two men will tie from 30 to 50 trees per day, according to size. After the trees become seven or eight years of age they are somewhat difficult to tie. The straw should be left on until the trees are done blooming, and should be unwrapped on a cloudy day to keep the hot sun from killing the tender fruit or bloom.

The Crystal City if planted on rich soil will make too many plants, while if planted on poor soil it will be more productive, and the berries will ripen earlier. While the Crescent Seedling, Chas. Downing and Capt. Jack being very productive, require rich soil to mature the berries.

Early Washington, Wilson, Jucunda, Big Bob and Manchester have such short roots that they do not withstand the March freezing and thawing, nor the hot dry summers of Southwest Missouri.

F. H. King is testing an accidental seedling found growing in clay and among rock thrown out of the bottom of a cellar. It came up in the summer of '83, and withstood the two severe winters following without any protection whatever, which proves its hardiness; being a pistilate, it did not set any berries in '84, but made a dozen new plants in the spring of '85. King set a number of Lening's White as a fertilizer, and the seedling plants were loaded with fruit. The plants resemble Capt. Jack. The berries are oblong, ovate in size, larger than Capt. Jack, of fine flavor and the firmest berries I ever saw. King has taken great pains to increase the plants, and now has several thousand; will test it thoroughly next season, and report at summer meeting. I have great confidence in this new berry.

Below will be found the product of one acre of the best varieties of strawberries:

Product 1,865 gallons at an average price of 30 cents per gallon	$559 50
Expense	325 00
Profit	$234 50

Of raspberries I will make the following report as the varieties that have paid best on my soil, a sandy loam:

Varieties.	Cost of production per quart	Picking per quart.....	Boxes per quart	Marketing per quart.....	Sold per quart	Profit per qt..
Tyler.....	3 cts.	2 cts.	1 cent	1 cent	12½ cts.	5½ cts.
Centennial.....	3 "	2 "	1 "	1 "	12½ "	5½ "
Missouri Mammoth.....	4 "	2 "	1 "	1 "	12 "	4 "
Mammoth Cluster.....	5 ",	2½ "	1 "	1 "	11 "	1½ "
Gregg.....	5½ "	2 "	1 "	1 "	11½ "	2 "
Miami.....	6½ "	2½ "	1 "	1 "	11 "	0 "
Doolittle.....	9 "	3 "	1 "	1 "	10 "	loss 4c
Brinkle's Orange.....	7 "	2 "	1 "	1 "	12 "	1 cent
Davidson's Thorn.....	10 "	3 "	1 "	1 "	10 "	loss 5c
Lum's Everbearing.....	15 "	4 "	1 "	1 "	20 "	1 cent

Of red raspberries the Brandywine, Turner and Thwack pay best in the order named. Henrietta is the largest red, but the canes winterkill badly; does not pay.

Huve not realized much money from growing blackberries. Snyder, Kittatinny and Taylor's Prolific pay best in the order named.

In the above report I have named only such varieties as I have thorougly tested. I am testing a number of the newer varieties with which I am not sufficiently acquainted to make a satisfactory report, as my report is already too long. I will not give my mode of planting and cultivating, but will send that in time for publication.

DISCUSSION.

Van Deman—Gives the Hopkins a good name as one of the very best.

Murry—Likes the Hopkins best of all others.

Snyder is the very best blackberry in the north and is not so small as some think, and if treated well will pay excellently.

Be careful about new varieties, Cuthbert is a valuable red.

A. Ambrose—Finds the Snyder rusts as bad as Kittatinny.

E. Liston—Likes the Snyder blackberry and the Gregg raspberry; finds the currants do well on the north side of fence.

Van Houton, of Iowa—Found the Snyder has been hardy for the last ten years in Iowa; thinks mulching is one of the best preventives of drouth.

E. P. Henry—Thinks that winter killed means summer killed; drouth is much worse than winter.

Mr. Fink—Finds that the Gregg winter killed worse than any other variety; the Mammoth Cluster is much better.

Capt. Hollister—The strawberry is the main stand by; the Wilson is the best for market of any or all others; if well taken care of it will pay the best of all others. The Chas. Downing is the second best and have always paid well. Raspberries are not so profitable as are the strawberry.

T. W. Gaunt—One of his neighbors raises currants by mulching with sawdust.

Mr. Workman—Finds the Stone's Hardy is hardy, prolific, small, but bears a long time.

BERRIES A COMING STAPLE CROP.

BY CHAS. PATTERSON, KIRKSVILLE, MO.

There is a latent demand for strawberries and blackberries, that very few are yet aware of. By latent demand I mean the same as there once was for a sewing machine, mower, and all other labor saving contrivances, as well as what are now staple fruits. No tired seamstress or drudging house-wife was ever heard to wish that somebody would invent a machine to ten-double their powers, or lighten their tedious tasks. And it requires an army of "oily-tongued agents" to demonstate its efficiency by actual work, before it could be brought into general use. But as soon as this was done, the demand became active. It very soon became a necessary article for all thrifty house-keepers. Just so will berries of all kinds become articles of necessity, rather

than luxuries, as soon as people find out the use of them, and how surely and easily a supply can be provided.

The cities are always first to be supplied with such things. Only fifteen or twenty years ago there were barely strawberries enough in the markets to supply the wealthy and extravagant for a few weeks, and other berries were scarcely thought of. Now they have regular fruit trains, bringing as high as fifty and a hundred car loads daily from distant Southern States, prolonging the season several months. When the cities get glutted, some of the surplus is re shipped to country towns. Otherwise very few of the latter are well supplied, especially if we except strawberries; not because they care less for them, but because no one in the vicinity has happened to see the inducement to fill the latent demand.

Like many others, I carried on a nursery for ten or twelve years without growing or selling any berry plants worth mentioning. There was so little sale for them that it would hardly have paid, and, to tell the whole truth, I had not found out the good of them myself, and hardly knew how easily I could have grown them. When planting my orchard, I determined to plant one and a half acres of berries, so as to have plenty of some kind of fruit until the orchard should come in bearing. When the first full crop ripened, the second year after planting, I could see that I would have a surplus, and would have to hustle around to find sale for them. I soon found sales so good that only by peremptory refusal did we get any to put up for ourselves. I four-doubled my planting, and planned for drying a surplus, if any, but we have only got a scant supply ourselves by the same arbitrary method although another party here claims to have grown as many as I did. I have now at least 25 acres planted in berries, mostly last spring, and have made all arrangements to make it 40 acres next spring, including buying and paying for what plants I am wanting, which will surely enable me to ship some to neighboring towns two years from next summer, and possibly dry or can a surplus.

But the latter is a very distant contingency. The demand is more likely to increase as fast as my planting. I have already frequently sold one to three cases of six gallons to farmers living a distance from town, and they could soon consume as much as the town people. If I could carry them by the case into farmers' kitchens of this county, as I can in town, I would risk 100 acres. Of course some of these customers will plant and grow their own berries as soon as they find out more about them, but it is very safe to trust their conservative, not to say negligent tendencies, to not do so all at the same time. It is no unusual thing for the blacksmith's mare and the shoemaker's wife to

go barefooted. They can all plead great pressure of work, which we cannot well dispute, but nevertheless, where there is a strong will, the way and time can always be found. I have been there, and know what it is to have to go to mill and lay up the bars too, but if I had the same pressure to go through again with my present knowledge, I could grow a good supply of berries too—better than I could afford to do without them.

To arouse and stimulate the will power, cause a want of berries to be felt by the farmers, who never will have them for daily use unless grown by themselves, is the object of this paper. I have already proved that wherever they are offered at a reasonable price, city, town and country people at once learn to consider them a necessity, or a most desirable substitute for other articles of diet. We may be sure that these enormous quantities are not all consumed by the wealthy and extravagant. They monopolize only the few that come from Florida in February and March at $1 to 50 cents per quart. The common laboring people in moderate circumstances doubtless take the bulk of the main crop, and even the poor, who have to consult economy as severely as any of us, make them take the place of something else.

I would emphasize these examples as showing the drift of public opinion, and the certainty of berries becoming as much a staple crop as apples, at no distant day. An attempt to describe the enjoyment and relish of them, would be as vain as to describe the taste of any fruit we never saw or tasted. Eating a few out of hand, is no more like having them regularly on the table, nor more satisfying than making a meal on raw turnips. And even the first few meals may not be enjoyed as much as expected, because the taste has to be somewhat educated to anything. Nor is an occasional piece of berry pie, when company happens in much of an educator. Homeopathic doses of medicine may be well enough but when it comes to fruit, I prefer two or three lifts with a table spoon, and then as much more of the same or a different kind for a change and desert. It is a fact, that when once accustomed to a liberal fruit diet, a man does not crave or need as much meat. It is a fact, too, abundantly verified in my own experience, that it saves doctor bills, and enables a man to enjoy his nourishment and his work. Where I used to be costive, bilious, rheumatic, etc., by spells, I feel a remarkable change, and have seemingly entered on a new lease of life, after adopting fruit as a staple diet. Give a man a good dish of berries every meal from the time strawberries ripen till blackberries are gone, something over two months, and I will trust him to provide a supply for the year round as soon as possible.

There is no reason, at all valid, why the farmer cannot have a full supply of berries, both fresh in their season and canned or dried, as well as the richest city people, and better, too. He is an object of envy to them, because he can have fresher milk, cream and butter than they can, and so he might have fresher berries, right from the vines, against theirs that have been jolted over hundreds of miles and exposed one to several days, necessarily often becoming more or less stale. By far the larger part of the berries I grow are used for canning, which people prefer to do themselves, because they get them fresh and better than factory product, as well as cheaper.

If I were to fit up another location for the support of a moderate sized family I would never think of planting less than half an acre of berries, nor putting it off for a single season. We used and put up in my own family of about ten persons, ninety gallons of berries last season, and many were picked for immediate use and not kept account of, besides all the pieplant, currants, gooseberries, grapes and apples we chose to use. Some seasons a quarter acre would furnish that much, and others the half acre might come short of it, though they are generally at least as sure a crop as corn and moreso than apples.

I would plant them in the orchard. In a young orchard they will do quite as well as by themselves. In an old orchard I would manure the ground and give plenty of room, and with good cultivation they would be the means of saving the orchard from destruction by meadow sod, as well as making a bountiful direct return. Plant rows six to eight feet apart and two to three feet between plants. Keep the ground well cultivated, so as to never be swamped in weeds or grass, begining early in spring. Top raspberries and blackberries as soon as there are two—not over three feet high. Cut back the branches again about one foot from the stem in the spring. Plant strawberries also as much as five feet between rows, and keep cultivating and laying the runners so as to make a matted strip, which will bear the next year. After the crop is off, prepare the unoccupied strip and let the runners spread over it, after which the old strip should be prepared for them to spread young plants on next year. These alternations can be continued for a number of years.

I aimed to make these instructions short, and certainly succeeded in that, though I can see no essential additions needed, when supplemented by the judgment that every good farmer has. There is nothing intricate or difficult about it, at least no more than in growing corn. People are more liable to fail, as they do in growing fruit trees, by imagining that because many such things grow wild therefore we

need only plant and gather fruit. That experiment has been tried so often and with such uniform results of failure that we may as well save repetitions.

THURSDAY, 3 P. M.

While the change was being made to the Normal School a visit to the Springs was decided upon and carriages were brought out at 2 P. M. and conveyed all the delegates to the Springs, and everyone expressed themselves as delighted with the beautiful place and the medical properties of the spring.

After meeting in the Normal School at 3 P. M. the President called the meeting to order.

A paper was read by the Secretary from Prof. Taft.

REPORT ON VEGETABLES.

BY PROF. L. R. TAFT, COLUMBIA, MO.

In most sections of the State the past season has been a favorable one for the growth of vegetables, but the prices realized for them have been quite low. The abundant crop has been a blessing to the cultivators of small gardens for family use, and to those who purchase their supply, but to the market gardener it has been qualified by the fact that others, as well, have been favored with rich harvests, so that he was obliged to sell at a low price, and thus his actual profits were no more, perhaps, than would have been derived from a half crop.

The aim of the gardener is to raise larger and better crops than his neighbor and in less time. The result of his efforts will depend on

the location and condition of the land, on the quality of the seed and the cultivation and care given the crop.

The land, if possible, should have a southern exposure and be protected from the sweep of the north and west winds, while a supply of water for irrigating purposes is desirable. The soil should be open and friable and contain a considerable quantity of sand. If it is too compact this can be remedied by the application of from ten to forty cords of coarse manure per acre, which will also provide food for the sustenance of the crop. This should be spread in the fall, if possible, and the land plowed in order that it may be acted upon by frost.

In the spring it should be cross plowed and worked with harrow and drag, until it has been brought to a fine tilth. At the proper time sow the seed so as to secure a succession, and, if possible, arrange the rows that they may be cultivated by horse power. During the season of growth stir the soil frequently, especially after a rain. If the vegetables are to be sold great pains should be taken in their preparation for market, as the result of the sale depends as much on the taste and neatness with which they are put up as it does on the quality of the vegetables themselves.

The selection of the seed used should be carefully attended to. "Poor seed is dear at any price," and the best results cannot be hoped for unless a proper selection of varieties is made.

Out of over two hundred varieties grown the past year the following are of especial merit:

Beans, Bush—Red Valentine, Golden Wax and Dwarf Horticultural. *Pole*—Southern Prolific and Dreer's Improved Lima.

Beet—As an early variety the Egyptian has at last found a rival in the Eclipse, which has quality, high color, productiveness and perfection of form to place it among the best. Early Blood Turnip and Dewing's Improved are valuable either for early or late planting.

Cabbage—To secure a succession, no better selection can be made than Early Jersey Wakefield and Henderson's Early Summer for early, and Fotler's Brunswick and Late Flat Dutch, as late varieties. The Cauliflower requires higher culture than the cabbage. The Early Erfurt is the surest header, but the Early Snowball presents the best appearance, if well grown.

The cabbage worm is the great drawback to the growing of cabbages, but a simple remedy by which they can be checked in their ravages, is found in dusting the plants while the dew is on, with dry earth or ashes.

Celery—The Boston market still holds its own as one of the best market varieties; the Dwarf White also is a valvable variety. The

pink, red and golden varieties, are rapidly coming into favor, and should receive a careful trial White Plume, a self-blanching sort, is early and can be grown without banking. The plants, however, are tender and weak growers. It is a poor keeper, and lacks the crispness and rich nutty flavor so desirable in celery.

Sugar Corn—As a very early kind, the New Cory seems to be the best, as it is as early as the Marblehead, and the ears are a half larger. Crosby's Early makes a good second early, while the New Amber Cream promises well. Evergreen Sugar and Stowell's Evergreen are as yet unsurpassed as late varieties.

Cucumber—Several of the White Spine varieties are excellent, either for table use or for pickling, while Tailby's Hybrid for slicing, and Green Prolific for pickling, are among the best.

Lettuce—The Simpson and Tennisball varieties are among the best for forcing, while Salamander and Hanson are adapted for garden culture.

Onions—For early onions, where sets are used, the yellow and silver skin varieties are equally desirable. When they are grown from seed no better choice can be made than the Yellow Danvers. The Red Wethersfield is a great cropper, and the Silver Skin and Pearl are mild table sorts.

Peas—The competition among the seedsmen causes them to fill their catalogue with long lists of varieties, in the hope of exceeding the number offered by their rivals.

Oftentimes an unscrupulous dealer re-names an old variety with a high sounding name, and disposes of it to a credulous public at an exorbitant price. This gives rise to a vast number of synonyms as is seen particularly in the pea. Each seedsman has a variety generally called by his own name, which is the earlist and most productive variety known. As an example of this, we have Landreth's Extra Early, Sibley's First and Best, Henderson's Earlist of All. If these varieties are planted side by side, and given the same care, they will grow to the same height, blossom the same day, ripen at the same time, and yield the same number of pods, and in stem, leaf and pod, be exactly identical.

For the earliest varieties, either of the three above mentioned, would be recommendable; for second early, American Wonder, Horsford's Market Garden and McLean's Advance, are good, while the Marrowfats and Champion of England, hold the first place as late varieties.

Potatoes—Experiments by reliable persons have demonstrated the folly of planting small tubers, or of pieces cut to a single eye. The

seed should ue medium size, smooth, sound and healthy, and the crop will be fifty per cent. larger than can be obtained from single eyes. For early, the following varieties have done well, viz.: Early Sunrise, Early Ohio, Early Illinois, Early Harvest and Beauty of Hebron, while Rural Blush, White Star, Corliss' Matchless, Peachblow and Dakota Red are best for late varieties.

Radishes—French Breakfast, Chartiers and White Olive, are among the best.

Squash—*Summer*—Fineapple, White Bush and Yellow Crookneck. *Winter*—Essex Hybrid, Boston Marrow and Hubbard.

Tomatoes—Acme, Perfection, Satisfaction, Favorite and Cardinal, with Yellow Pear for preserving. The New Cardinal Favorite are of especial merit.

Turnip—White Egg, Purple Top Globe and White Flat Dutch.

While the above named varieties succeeded best this year, it is possible that, if the season had been a different one, they would have been no better than hundreds of varieties, for which space forbids my speaking.

The above list contains several new varieties, which seem to be all that is claimed for them, and they deserve to go on the list. There are also many promising varieties which need further trial to determine their value.

VEGETABLES.

BY J. N. MENIFEE.

We horticulturists, in our eager pursuit for every kind and variety of fruit, and how to grow them, and how to make the most out of them, are liable to lose sight of other important branches of horticulture. We offer premiums for and expect to see the best fruits on exhibition at our meetings, but to see vegetables with the fruits is the exception. Not so in our markets, for there is a demand for them there. Not so at our tables, for they are a necessity there. Do we faithfully represent

the horticultural interests of our State if this is true? Until recently many had the erroneous idea that strawberries would not grow for everybody, that there was some secret about the cultivation or management of them, therefore never tried to have them, but when the subject was properly discussed, lo! all could grow them, and that on almost any kind of soil.

Discuss the subject of growing celery. Let its real value be generally known, and its cultivation would be increased a hundred fold, and people would cease to ask "which do you cook, the tops or the roots?" But perhaps no other crop of equal value is so shamefully neglected and grown with so little intelligence or care as the potato. A little information about the seed culture and storing of this one vegetable would save us thousands of dollars annually. Among many other vegetables, the value of which is not appreciated, I would name asparagus, cauliflower, salsify, rutabagas and mangel wurtzels.

The humble opinion of the writer is when the subject of growing vegetables has been as thoroughly discussed as the subject of growing fruit has been, our motto will no longer be hog and hominy, but fruit and vegetables.

THE FRUIT BUSINESS FROM A COMMISSION MAN'S STANDPOINT.

BY E. T. HOLLISTER, ST. LOUIS, MO.

The very unsatisfactory result of the sale of the past season's crop has caused the horticultulist to search for the cause of the great depression in prices, so as to enable him to avoid a recurrence of the same thing, and in most instances inquiries have been made too far from home to ascertain the true cause of his misfortunes.

The common carrier and commission merchant have both been forced to submit to a large amount of abuse, the first being almost invariably accused by charging exorbitant prices for carrying the goods to market, and the latter of almost all the items of negligence and dishonesty that occur to the mind of the unfortunate shipper.

In searching for the cause of his misfortunes, it would be well to commence at home and ask himself if he is certain that his goods are in a merchantable condition when sent to market, and if they are in such shape as to make them inviting to the eye and palate of the purchaser, or such goods as he himself would select were he a purchaser instead of a producer.

It is a well known fact that fully three-fourths of the fruits sent to market are packed in such a manner as to deceive the purchaser, and to induce him to purchase a condsiderable quantity of worthless stuff to get a small quantity of such an article as he wants; and the buyers have become so accustomed to being imposed upon in this manner that they look with suspicion upon all goods offered in the market, and refuse to buy the honestly packed article, except at the price of the "snide" packed goods, until after repeated trials they find a brand that is always honestly packed, after which they always look for this brand and willingly pay a better price for it than for other brands that look equally as well upon the face; but not as much as he would be willing to pay were the market not full of the low priced goods with which he is forced to compete.

The universal disposition of the American people to accomplish great things has caused a great many of them to do what is forcibly expressed by the slang phrase "bite off more than they can chew," or, in other words, to plant more than they can properly cultivate and reap, making it impossible for him to properly cultivate and mulch his berries, to prune his trees, thin out the fruit and protect it from its insect enemies, things that are absolutely necessary to enable them to produce such an article as will realize fancy prices when placed upon the market, and when harvest time arrives he finds it impossible to get a sufficient number of careful pickers to gather and pack his crop, and, owing to his inability to personally see to the many details of the business, almost every package goes to market with more or less over-ripe or green and inferior fruit, making it unsalable except at a greatly reduced price, much to the disgust and dissatisfaction of the shipper.

The remedy for this great evil is for every one to plant no more than he can thoroughly cultivate and place upon the market in good condition.

If the crop is strawberries, pick the whole patch over seven days in the week, neither picking them too green or allowing them to get too ripe, and always leaving the sandy berries out of the box, which should contain an honest measure of whatever sized package is used.

If peaches, they should all be of the proper degree of maturity to

enable them to reach the market for which they are intended in good condition, and should not be packed with a few nice specimens upon the outside and a great amount of worthless trash in the middle of the box, as, I am sorry to say, is the case in a great majority of cases.

If apples, place a fair sample upon the face with good, sound, smooth fruit clear through the barrel, carrying the over-ripe, knotty or inferior fruit to the evaporator, cider mill or pig pen, where it will do you much more good than in the middle of the barrel where it is usually placed, causing the purchaser to use language that would make the packer blush with shame could he be present.

The fruit business of the country has become of too much importance to be conducted in the haphazard manner of the past, and unless a radical change is effected, the producer will see the experience of the past season repeated annually, and find the balance upon the wrong side of the sheet.

The apple crop has never paid the producer what it could be made to pay with proper management, because of the great haste of the producer to get it into market and realize upon it. It is an almost universal custom, as soon as a few wormy apples fall upon the ground, to go into the orchard and pick the whole crop, especially of fall fruit, and in many cases a month before the proper time; and in this immature condition it is sent to market, where it is either sold for a very low price or allowed to decay in the hands of the commission merchant because, on account of its utter unfitness for use, no one will purchase it if they can get an article that nature has rendered palatable.

Every orchardist should be prepared to take care of his winter apples, so as not to be forced to rush them into market in the fall when the receipts are so heavy that they must in most cases be sold to speculators who store them up for winter use, when they almost always realize a handsome profit upon them, which might be realized by the grower if he had patience to wait for it.

In conclusion, I will say that to make a success of the fruit business, it will be necessary for the ignorant to either learn or quit the business, the dishonest to become convinced that the only way to succeed is to change their course; for all to produce only what they can place upon the market in good condition; ship only good goods, such as you would yourself purchase were you at the other end of the line; select a commission merchant that has a reputation, experience and facilities for handling your class of goods in the most accessible large distributing market, consign all your goods to him, giving him a regu-

lar supply, never dividing shipments with different houses, and making competition with your own goods, and placing them where the buyers, who are accustomed to purchasing your brand, will not know where to look for them, or changing from one market to another, as the quotations happen to meet your fancy, and you will find that the result of your season's business will be more satisfactory and your financial condition better than those who pursue a different course.

DISCUSSION.

Mr. Murray thinks the important question of fruit-growers is to get money to pay for our labor.

Mr. Hollister—Have good, clean barrels, well faced and well packed, with even, good, sound fruit. Never use anything but barrels for apples. Use common apples all through as well as on top of barrel.

QUESTION BOX.

The Secretary read the following:

1. Will everbearing raspberries bear continually, and what are they?

Answer by S. Miller, gives the following:

Scarlet Gem, Staymen's No. 2, Miller's Everbearing, Shafer's Collosal.

2. When shall we gather apples to keep well, early or late?

E. P. Henry—Some varieties early, and others late to keep well; Jonathan needs early gathering; Rambo needs early gathering.

3. Describe the curculio?

Answer by C. W. Murtfeldt.

4. The Stannard apple, its value?

Ans. Large, fine, showy apple, but of poor quality.

5. Is it practical to top graft apple trees ten to fifteen years old?

Ans. No; they sun scald; Miller says he has done it successfully, by taking three years to do it.

6. Will it pay to plant pecans?

Yes, Mr. Hollister says, there is an unlimited demand, and thinks it is one of the most valuable trees we could plant.

THURSDAY, 7 P. M.

Society met the Normal School, and was called to order by the President, and the first on the programme was a paper on Flowers, by Miss Ella Lytle, of High Hill, Mo.

HIGH HILL, Mo., December 3, 1885.

Mr. Chairman, Ladies and Gentlemen of the State Horticultural Society:

I have been called upon to write an essay, and it being my first attempt will endeavor to be brief as possible, selecting for my subject Flowers, as I find myself a great lover of them.

Flowers are nature's jewels, and deserving of a place in our hearts as well as our homes; our homes are more cheerful by reason of their presence. Even the dug-out or the log cabin of the pioneer is made attractive by a vine creeping about the doorway or above the window, with its beautiful foliage and delicate flowers of delicate colors, and fragrant scents, together with a few cultivated flowers, in its adornment.

Then let each home have a place for their cultivation. They will reward us with both beauty and fragrance; they will teach us important lessons.

The influence of flowers is potent upon all for good; and sordid must be the person who does not receive pleasure from them. How the little children admire them, and love to pluck them from the bush, and occasionally do, when mamma don't see; from earliest infancy they behold them with ecstacy.

The progress of our race is indicated by the care of flowers; as we grow in importance as a people it is seen in the cultivation and love cherished for them. No home would be complete without them. How much sunshine they give us when sad and gloomy days appear, which often do in the course of life. They show good taste and refinement; they teach us to love the infinite and remove from us the bad. Immortality and vice can not exist where there is a proper appreciation for flowers. How the invalid appreciates a boquet; how beutiful the table can be made to look when a boquet of delicate flowers appears; how much more cheerful and entertaining the parlor can be made with the addition of a few flowers carelessly arranged and set about for the guests to look upon; how generous has been the Father in his dissemination of "Nature's Jewels." He has planted them upon every hilltop and in every dell. How often, (when roaming about the hillsides, and along branches, when I see a little panzy peeping up from its rocky bed) do I recall child hours when I used to play about the branch and among the hills gathering wild flowers and making wreathes, busy all day long and never tire.

Hoping that you will excuse my limited paper.

Respectfully submitted,

ELLA LYTLE.

FLOWER AND FRUIT MISSIONS.

BY C. W. MURTFELDT, OF KIRKWOOD.

EMMIE.

"* * * * *" And we passed to this ward where the younger children are laid:
Here is the cot of our orphan, our darling meek little maid;
Empty you see just now! We have lost her who loved her so much—
Patient of pain tho' as quick as a sensitive plant to the touch;
Hers was the prettiest prattle, it often moved me to tears,
Hers was the gratefullest heart I have found in a child of her years—
Nay, you remember our Emmie; you used to send her the flowers;
How she would smile at 'em, talk to 'em hours after hours!
They that can wander at will where the works of the Lord are reveal'd,
Little guess what joy can be got from a cowslip out of the field;
Flowers to these spirits in prison are all they can know of the spring,
They freshen and sweeten the wards like a waft of an angel's wing;
And she lay with a flower in one hand and her thin hand crossed on her breast—
Wan, but as pretty as heart can desire, and we thought her at rest,
Quietly sleeping—so quiet our Doctor said "Poor little dear,"

* * * * * * * * * * * * * * *

The flower and fruit missions of our cities are among the most beautiful charities. Generally and most appropriately they are conducted under the auspices of benevolent ladies, although occasionally a gentleman is permitted to take part in collecting and handling the flowers, or to contribute a V or an X for the purchase of fruits or other incidentals. People who live in the suburbs of our large cities, where lands are not yet sold at so much per front foot, cultivate flowers on purpose to supply the mission on a given day in each week, from early spring until late autumn. It is no uncommon sight to see express wagons filled with baskets full of flowers and boquets. These are gathered by the children of the mission bands of the churches in our suburban towns and either made up into small boquets, or brought loose in baskets to be arranged by the ladies of the mission. When all is ready these same ladies enter their carriages and start for the various hospitals, asylums and homes for the friendless, and even for the prisons, while the sick and poor living in private houses when known are not forgotten.

It has been frequently noticed that Wednesday morning is most anxiously awaited by the unfortunates confined in the institutions named, and who knows but that the beautiful and fragrant blossoms speak to them of the fact that they are not utterly forgotten by their heavenly Father or entirly cut off from the sympathy of our common humanity?

Ten or twelve years ago I had the pleasure to read before this society a paper on landscape gardening prepared by Prof. M. G. Kern. (I am sorry he is not now present to follow my paper by some practical remarks on the cultivation of flowers). The meeting I speak of was held at St. Joe. Among the gentlemen present was Judge Bliss of the Supreme Court. The reading of that paper made a deep impression upon the Judge, and he cited the case of a young gentleman with whom he was personally acquainted. This young man was sick with consumption; he had been traveling for his health, had found little relief and had come home to die. A ministering angel in the person of a lady, who understood the benign and soothing influence of a few well arranged flowers sent daily a boquet to the sick room. I believe there was no romance connected with this benefaction of the flowers; but they spoke to the sick of sympathy and affection; they were intended and very likely answered the purpose to call off his attention from his sufferings, and to point him to the better land "where everlasting spring abides and never fading flowers." The young man so valued this particular act of kindness that he would not for a moment allow anyone to step in between himself and his boquet. While the Judge recited this incident he was so overcome by his feelings as to utterly break down and begged to be excused.

While on a visit to "friends" in Minneapolis, who makes a business of cultivating flowers, an order was received for a basket of flowers to be placed by the bedside of a very sick man "like unto that sent last Sabbath;" it was the gift of a thoughtful brother; did the sick man know who sent the flowers? Who can doubt it? And so I have drifted from the Flower Mission to the mission of flowers. There are those who profess to understand their language, do you?

In the course of human events there are birthdays, marriages, festivals, and, also, funerals. Moreover there are still other festive occasions, such as concerts, family reunions, anniversaries of public and private events; openings of churches and other public buildings, fairs, expositions, and let us not forget Christmas and New Year. What would we do on all these occasions without flowers? Can language speak more plainly than the presentation of a well arranged and fragrant boquet offered by the bashful and timid lover to his "best

friend?" And need she blush when she sends back that little blue flower with yellow center called forget-me-not? Do these two understand the language of flowers? But my purpose was—to return for a moment to the flower and fruit mission—to incite my hearers to these resolutions, viz.: "I will raise some flowers to give away; I will soothe and cheer the sick and the poor with their fragrance and beauty. If possible, I will aid in establishing a Flower Mission in my city, town or hamlet, and I will thus test the truth, that 'it is more blessed to give than to receive!'"

ADDENDA.

I am sure of a pardon, if I add what transpired in St. Louis during Christmas week where the activities of the ladies of the flower mission were again called into requisition. Said the president to me: "We have received five barrels full of oranges, as fine as ever I saw, five barrels of splendid apples, ever so many boxes full of ginger snaps; about one thousand pounds of candies, and two thousand beautiful Christmas cards." Now, reader, do you wish to know what became of all these contributions? The following from the Globe-Democrat gives you the desired information:

FLOWERS AND HOLIDAY GIFTS.

"Sick and in prison and ye visited Me," will be as Christ himself has told, one of the reasons He will assign to the blessed for the favor they will meet with at His hands on the great judgment day. The ladies of the Flower Mission seem more than anxious to have those words addressed to them, and the work they have been doing gives guarantee of it. For some time past, as told in the Globe-Democrat, they have been making preparations to give their suffering proteges a treat which would cause them to share in the general Christmas joy. The Presbyterian rooms have been constantly at their disposal, and yesterday after they had put the last touches to bundles and parcels they set out on their work of mercy, and these were the distributions they made:

City Hospital—445 bags of fruit and confections, 500 magazines and books, 400 Christmas cards, basket of toys and a dozen lemons. Female Hospital—345 bags of fruit and confections, 300 books and magazines, 325 Christmas cards, and a basket of toys. Poor House—855 bages fruit and confections, 300 books and magazines, 400 Christmas cards, basket of toys. Girls' Industrial Home—3 glasses of jelly, 1 box of candy, 1 picture scrap book and toys. Pacific Railroad Hos-

pital—50 bags confections, 50 magazines. Good Samaritan Hospital—60 bags fruit and confections, 60 magazines, 7 volumes German classics, literature, a basket of toys and 60 Christmas cards. Children's Hospital—One dozen home-made jellies.

Carriages were kindly loaned by Mrs. J. J. Mitchell, Mrs. Wm. Gaus, Mrs. Maggie Hendell and Mrs. Keener. The work has been accomplished by the efforts of the following ladies: Mesdames Barnard, Coe, Crawford, Cooper, Cavan, Gaus, Hays, Street, Paufts, Smith, and Misses Connon, McGarrah and Haynes.

The following formal document was drawn up by the ladies:

In rejoicing over the Christmas work of the Flower Mission, the ladies desire to return their thanks to the many kind friends who have made this effort to make some gleams of joy to the unfortunates in our poor house and hospital so perfect a success. They are but the distributors of the bounty of others, and it would be a pleasant task, did time permit, to mention each by name; this is impossible, for there are legions. To the mayor, health commissioner, and to the benefactors in the city and its environs, to each and all, the ladies hereby return their grateful acknowledgment.

BEAUTIES AND WONDERS OF THE FLORAL WORLD.

BY MRS. WADE BURDEN, OF SPRINGFIELD.

Flowers are our earliest instructors. Their silent lessons of purity and grace leave their impressions on the mind at its most susceptible period. We gaze with rapture on their unfolding beauties. We delight to decorate our persons with them and beautify our homes. We bring them as offerings to the sick bed, and strew them over the bier of the dead. The study of a single plant has been known to convert a hardened sceptic, leading him from "nature to nature's God." This was the mission of Picciola, the prison flower. Our very existence depends on the larger plants and trees; they furnish our food and medicine, gratify our taste, afford the material for building and furnishing our

houses, provide the means of tranportation on land and water, besides ornamenting our grounds and giving constant pleasure during the period of their growth.

We have no more striking evidence of contrivance than in the dispersion of vegetable life. Forests of beech wave in the Himalaya at an altitude of fourteen thousand feet. The bottom of the sea is clothed with an endless variety of green, red and purple algæ, and the dark caverns of the ocean are green with the enormous frauds of the vine-leaved fucus. This genus is remarkable for the great length of its stems, some of them extending three hundred and fifty feet; it grows very rapidly, forming immense beds, often impeding navigation.

Lands of almost endless winter might have abundance of moss-grass and lichen, and even poppies and ranunculus in sheltered spots, while plants may be found in hot springs at the temperature of boiling water, and shrubbery has been known to flourish in the crater of the Vesuvian furnace.

Vegetable life defies perpetual darkness; seeds carried by the birds have sprung up in caves where no ray of light could penetrate, and grown to the height of two or three feet. The entire failure of moisture seems to be the only insurmountable obstacle to the growth of plants. DeCaudolle mentions a plant known as the Rose of Jericho, (*Anastatica Hierschuntina*), growing in the arid wastes of Arabia and Palestine; it becomes almost woody owing to the drought. Its branches fold over each other till it assumes the form of a ball; its seed vessels are tightly closed, and the plant adheres to the ground by a solitary branchless root, in this condition it is easily swept away by the wind. If it meet with water as it rolls along, the branches unfold, the pericarps burst and the seed which otherwise could not have germinated readily sow themselves in a moist soil where the young plant is able to support itself.

It is in the torrid zone that vegetation exhibits its greatest variety, most vivid in color, stately in form, and of almost overpowering fragrance. The central part is celebrated for the abundance and grandeur of its flora. The same tribes which are the slender and humble plants of northern regions, become lofty trees within the tropics. There the Erethrina or Coral tree grows to a great height, and is covered with brilliant crimson blossoms, while the Mimosa is conspicuous by its airy foliage and golden flowers, and beautifies even the wastes of burning Africa.

Equinoxial America astonishes all beholders with its lofty trees, covered with creeping plants binding all together in a solid mass of verdure and adorned with beautiful flowers. Humboldt says that

" when a traveler, newly arrived from Europe, first enters the forests of South America, if he is strongly susceptible of the beauty of picturesque scenery, he can scarcely define the various emotions which crowd upon his mind, he can scarcely distinguish what most excites his admiration, the deep silence of these solitudes, the individual beauty and contrast of forms or the vigor and freshness of vegetable life which characterize the climate of the tropics."

" It might be said that the earth overloaded with plants does not allow them space to unfold themselves." The cactus family belongs exclusively to the New World, while the beautiful and stately rose tree seems to be entirely wanting as a native plant throughout the southern hemisphere.

To the naturalist the changes in plant-life from the poles to the equator, is a very interesting study, in pursuit of which many an enthusiast has risked his life, enduring all kinds of hardships on artic seas or burning sands, and in climbing to almost inaccessible heights, more than satisfied if he can discover some hitherto unknown variety of the vegetable kingdom.

THE WORK OF TO-DAY.

BY MRS. C. I. ROBARDS, OF BUTLER.

The foundations of all good and noble enterprises like the bases of those superstructures which are built to stand the wear of ages are only accomplished by great and well executed labor. On the contrary, visionary enterprises are the result of hasty effort and may be compared to foundations of sand.

While it may be true that "there is nothing new under the sun," it is also apparent that work, as each moment arrives, may lead to the seizure and application of circumstances or events, and these may lead to remarkable developments for our good.

For instance, while it is true that the apple is no doubt the oldest fruit of which we have any record, yet by the application of hybridization by budding, by grafting, and all the skillful arts of development

and preservation, we have from the origin of the humble wild crab the acknowledged king of all fruits.

I see the necessity for work and the application of each present moment, says one, but where is the pay and how soon will it come ?

I have only to answer that all compensation should not be measured by standard coin. Rewards for good deeds may be so numerous and so related to each particular event, as to be unseen and unknown to us until they arrive. But they are nevertheless just as sure and far better pay than many promissory notes.

Presuming that I am speaking to lovers of horticulture only, I can easily illustrate by saying plant the seeds of a few strawberries or raspberries or sow the seeds of a geranium or rose, give them proper attention and tell me whether you have not received more actual pleasure by the unfolding of each tiny leaf, by the indescribable joy springing from the opening of the first lovely bloom and the crowning pleasure of all in the development of some new character of fruit that your fond anticipations lead you to believe may be of value to the world, than if you had been presented any stipulated daily compensation for your labor. Nor is this all. Riches and fame even in the most sordid sense by which they are viewed by all mankind may just as surely lie in horticultural enterprises as in any other. Only industry, only close application of each day's opportunities, however, will insure these rewards.

The work of to-day presents itself in such manifold shape and meets us so obstrusively on every hand, that the industrious find great difficulty in keeping ahead of its imperious demands. Every element, every property in the universe invites, yea, impels to work.

From the glowing tropics, with its rich treasures of lucious, sun-ripened oranges, bananas, lemons and figs, even to the barriers of the frozen regions, the varying climes in their seasons put forth their peculiar forms of vegetation, silently inviting us by the fragrant odors of their bloom and the healthful and delicate flavor of their fruits to work for their adoption, for their cultivation and development.

Wherever we go, wherever we look, some new fruit or flower attracts our wondering admiration and excites an eager curiosity to learn its history, to become its possessor and work out its destiny for ourselves.

In the work of to day we have the highest illustration of the truthful adage that "God helps those who help themselves." For as some higher order of fruit or flower comes to the front in obedience to the cunning manipulations of some patient seeker after improvement, nature kindly takes up the work and sends her messengers, the sum-

mer winds and the toiling bees, to scatter the subtle seeds in the mingling of yet other and improved forms of beauty and usefulness.

When once embarked in horticultural pursuits, not only can we not afford to stand idle, but its demands of every day become so irresistable that there is no need for asking what shall I do next. Day by day, bud, leaf, bloom and fruit require our presence and our attention.

Nourishing food is demanded for plant and tree. Proper conditions of soil must be maintained. Noxious weeds will spring up to impel us to renewed labor. But these all are friendly aids to this industry.

He who thinks that even the most persistent weed is a curse makes a great mistake, for were it not for these uninvited forms of vegetation the slothful person might argue that no cultivation is required and neglect to give at the proper time that mellow and healthful condition required to receive the nourishing showers.

While there are no secrets in horticulture, yet the complete application of its requirements and the full adoption of its necessities are so numerous that the farmer, the mechanic and the merchant find it impossible to carry to perfection and keep pace with all its demands.

Hence the labors of the florist and pomologist are demanded for the whole world. These are the pioneers in a great and unlimited industry that ever offers greater rewards for higher effort and that at the same time makes its plans of work so apparent that all who will may imitate. No life so humble, no position so exalted but that its benefits are the same.

Nature, impartial nature, offers the same unadulterated fruit of the vine, the same spicy, health giving apple alike to peasant and king. In truth, horticulture is no longer a common pursuit, but properly understood and practiced, is a distinct science.

By this road, then, stand fame and wealth to invite you to greater effort. Through this gateway you may find the footprints of a Vick, a Wilder and a Warder. In this honorable pursuit are found inducements to temperance, frugality and industry and the consequent results of long life and happiness.

Life among fruits and flowers produces cheerful influences over the children, creates a love for home, and highest and holiest of all inducements, creates a love for the bountiful Giver of all.

To the old home will cling the memories of the young men and maidens who begin new life in other homes, and from the sweet influences implanted there will spring bright impressions to be adopted and improved by them.

Thus the work of to-day is only the stepping stone to the work of

to-morrow. If well done its beneficent results will never die. If poorly done, though its effects may never be effaced, it were better it had never been begun. We might well suppose that the primal occupation suggested to man would receive the endorsement of Him who sendeth the rain. We might also believe that He who planted the first garden would smile benignly upon those who adopt the work of which he was the originator.

"And the Lord God planted a garden eastward in Eden, and out of the ground made the Lord God to grow every tree that is pleasant to the sight and good for food. And the Lord God took the man and put him into the garden to keep it and to dress it."

The words of holy writ! What higher endorsement could we ask?

A vote of thanks was tendered these ladies for their very interesting and valuable papers which they have presented.

DISCUSSION.

Prof. Osborn said he thought they should have something to remember the Society by, and gifts from different men to the Normal School were freely offered by

Stark Bros., Louisiana;

N. F. Murry, Oregon;

W. A. Workman, Greencastle, Ind.;

Geo. Van Houten, Lenox, Iowa;

B. T. Galloway, Columbia;

A. Ambrose, Nevada;

Samuel Miller, Bluffton;

C. H. Fink & Son, Lamar;

D. S. Holman, Springfield.

Prof. Tracy gave an illustration of the self ringing bell for greenhouses, so that different degrees of heat and cold can be known.

Prof. J. W. Sanborn gave a lecture on "Fertilization," and discussed it from the standpoint of profit and loss.

The first efforts of our early settlers took all the best elements from the soil, and now we have to replace some of these elements to the soil. The crops have been running down until they are much below what they should be.

The time has come in our State when we must take up this subject and begin the use of fertilizers.

If all this is true in the work of the farm how much more is it true of the work of horticulture. It takes the brain of the horticulturist to reach the best ends.

There are fourteen elements in the soil—three are found in all soils, and these are the most valuable.

All fruits contain twice the amount of potash as do grains, and hence need potash applied to the soil more than do our grains. Ashes are, therefore, of the utmost importance in growing fruits, and care should be taken of them and used. Scatter the ashes all over the ground and not close to the tree.

The orchards are, first, deficient in potash.

Second, they are deficient in phosphoric acid. Bone meal will supply it.

Third, nitrogen is a producer of foliage. Dried blood is a great supplier of this element.

Chemical fertilizers are abundant and the most valuable. Yard manure will supply all the elements but not always just what we want. It should be fermented until it is fine and then can be applied to trees and plants more easily. All manures should pass through the fermenting process and is then more valuable. All manures should be applied on the top of the soil and not be plowed in.

FRIDAY, 9 A. M.

The Society met at the Normal for chapel exercises after which it was called to order by the President and a paper was presented by B. T. Galloway on the "Rusts and Mildews."

RUSTS AND MILDEWS.

BY B. T. GALLOWAY, OF COLUMBIA.

We shall not attempt in this brief paper to mention all the diseases commonly known under the above names. We will, however, describe a few of the commoner forms which appear every year, and cause more or less damage to your trees, vines, etc.

The first thing to be borne in mind is that the minute parasites we call fungi are plants. They grow, produce fruit and finally die; and, like the higher plants, each owes its existence to a parent.

We will give a brief outline, showing how plants and animals are classified, which will enable you to understand more fully the place these plants occupy in the plan of nature.

There are two great departments in nature: First, the inorganic, and, second, the organic world. The earth, the rocks, and all things destitute of life, make up the inorganic world. The organic world consists of plants and animals. Animals make up the animal kingdom, vegetables the vegetable kingdom. In classifying the members of both the above kingdoms we begin with the lowest forms and arrange them according to the development of their various parts.

The vegetable kingdom may be divided into seven divisions, namely:

1st. The Protophytes. These are the simplest of all plants; they are exceedingly minute, and for the most part consist of but one cell. The minute plants, known as Bacteria, belong to this division. Bacteria are all about us; they are in the air we breathe and the food we eat; they are present in all putrefying matter, and it has lately been shown that these minute plants probably cause the disease known as pear blight.

The next group of plants called *Zygosporeæ*, are mostly aquatic, and are of no interest to you as horticulturists; the green slime so abundant during ths summer months on ponds and all stagnant water, is a good example. *Oosporeæ* is the name of the next group, and some of its members are very destructive; the white mould, (*Peronosporæ infestans*), which attacks the potato and causes such wide-spread destruction, belongs to this group. The disease of the vine, commonly known as the American grape vine mildew, belongs to the same order (*Peronosporeæ*) as the fungus which causes the disease of the potato. The next group called *Carposporeæ* is far more important than any of the preceding. Its members, commonly known as mildews, rusts and smuts, are all more or less destructive, and taken collectively they constitute the group commonly known as fungi.

The three groups remaining are *Bryophyta Pteridophyta* and *Phanerogamia Bryophyta*, the mosses, liverworts, etc. *Pteridophyta*, the ferns, horsetails, etc. *Phanoerogamia*, the flowering plants.

Below is a tabular arrangement of the seven divisions:

Organic world. { Kingdoms: Animal, Vegetable. } { *Protophyta*, *Zygosporeæ*, *Oosporeæ*, *Carposporeæ*, } Fungi. *Bryophyta*, *Pteridophyta*, *Phanerogamia*.

The several examples given are by no means types of their respective divisions, we merely mention them because most of you are familiar with them.

Returning to the discussion of the fungi proper, we will first speak of the fungal diseases, commonly known as mildews.

Mildew is a loose term and is used to designate a number of fungal diseases. The gardner has his mildewed roses, verbenas, etc. The housewife her mildewed linen. The shoemaker his mildewed leather, and so on.

Of the many destructive mildews, that which occurs on the foliage of the grape vine, and known as the American grape mildew, is the most common. As many of you know we have two diseases of the vine differing materially from each other, and both are known under the name of mildew. They resemble each other very little, and with a little study it is quite an easy matter to distinguish one from the other.

The first is known to botanists as *Peronospora viticola*, (American grape mildew); this fungus appears here in Missouri about the middle of July. Most of you are no doubt familiar with the spotted distorted leaves that appear as if they had received a sprinkling of hot water.

If we carefully examine one of these spotted leaves, we will find on the under side of the leaf, opposite the spots on the upper side, little tufts of a white, frost-like substance. Under the microscope this white, frost-like substance, has the appearance of a miniature crystaline forest; bundles of delicate branching threads appear, and on the extremities of many of the branches small globular bodies can be seen. The small globular bodies called *conidia* serve to propagate the fungus during the summer; the little white tufts visible on the exterior of the leaf are the stalks that serve to support the *conidia* or summer spores. The vegetative body of the fungus called *mycelium*, is internal, and the branches which bear the *conidia* reach the surface through the breathing pores of the leaf.

The *mycelium* spreads through the tissue of the leaf, and obtains

nourishment from the cells by means of sucker-like branches called *hastoria.*

As stated above, the *conidia* serves to propagate the fungus during the summer. The germination of the *conidia* is a very interesting process, and may be observed by any one having a compound microscope. When sown in a drop of water they first absorb some of the water and swell; soon lines of demarcation appear, and shortly afterwards the walls of the *conidia* are ruptured, and a number of small motile bodies escape. These little bodies called *zoospores* remain motionless for a few moments; soon, however, they begin moving, and by means of two hairs or *cilia*, with which each *zoospore* is provided, they swim rapidly about. After moving about for some time, the *cilia* drop off and the *zoospore* becomes motionless. Each *zoospore* then sends out a tube, and if this is in the proper position, it enters one of the breathing pores of the leaf, and gives rise to another crop of *conidia.* Water is absolutely necessary for the germination of the spores, and this is one reason why the mildew is more abundant during a wet season.

The *conidia* or reproductive bodies are formed at intervals from the middle of July until frost. The first frost destroys them, but before they are destroyed another kind of reproductive body is formed on the internal *mycelium.* These bodies called *oospores*, fall to the ground with the leaf, remain dormant during the winter, and the following spring germinate. They are much larger than the *conidia*, and are hidden in the tissue of the leaf. There are two investigating membranes; the outer is thick, hard and colored, while the inner is nearly transparent.

As stated above, they remain dormant during the winter and when the leaf decomposes in the spring they germinate. In germinating the *oospore* absorbs matter, swells and finally ruptures the outer membrane allowing the inner membrane to escape. Enclosed within this thin membrane is a number of *zoospores* and they are set free by the bursting of the thin membrane. The *zoospores* are active for a time, but they finally settle down and send out a tube the same as those derived from the *conidia.* We have then the life history (beginning with the winter spores in the tissues of the decaying leaf) about as follows: The winter spores when they germinate in the spring, give rise to a *mycelium* which in turn gives rise to the *conidia* or summer spores. These *conidia* are blown about by the wind and when they fall upon the proper host plant and there is moisture enough present, they germinate, producing the internal *mycelium* which may in turn

give rise to a second crop of *conidia*; this process continues until frost, when the resting spores are formed.

The order *Peronosporeæ* to which this fungus belongs contains some very destructive species. *Peronospora infestans* is the potato fungus which occurs in the leaves, stems and tubers of the potato.

P. Viciæ forms a white coating on the leaves of the garden pea. The reproduction and growth of all the above species agree with the one on grape leaves.

The next group of fungi to which we invite your attention is known to botanists as the order *Eysiphaceæ*. The members of this order usually occur late in the summer, and they cover the leaves of the plants they attack with a dirty white coating.

Unlike the members of the preceding order the vegetative portion of these parasites is superficial, that it is on the exterior of the leaf. One of the best known species as well as the most interesting to you as horticulturists, is that which occurs on the leaves of the grape and commonly known as the European grape mildew to distinguish it from the American species already described.

This fungus is known to botanists as *Uncinula spirallis*, and it is believed that this species and one that occurs on the vines in Europe are identical. At any rate as far as the life history of both have been traced there is no difference between them. As stated above, the plant body, which resembles a dense mass of cobwebs is on the exterior of the leaf, and nourishment is obtained by means of irregular protuberances which project from the side of the *mycelium* next the leaf.

It is believed by some that these projections penetrate the walls of the cells next to the epidermis of the leaf, using the contents of these cells in the building up of their own body.

These parasites are propagated during the summer months in the following manner: The cobweb-like threads on the exterior of the leaf send up a number of short branches; these branches are cylindrical and at first one celled, but ultimately there are several transverse partitions formed across the upper end of the branch, dividing it into several cells. When these cells have attained the proper size they separate from the stalks supporting them and constitute what is known as the *conidia*, or summer spores.

The *conidia* are blown about by the wind, and when they fall upon the proper host plant and there is sufficient moisture and heat present, they germinate and ultimately give rise to the white cobweb-like thread from which they originated.

Late in the fall if we examine a leaf of any plant infected with one of these parasites, we will find scattered among the white cobweb-

like threads a number of small black globular bodies which appear to the naked eye as mere specks. These small globular bodies, called *sporocarps*, contain one or more sacks, and these sacks contain the reproductive bodies that live through the winter and germinate the following spring; consequently they are commonly known as winter spores.

The life history, then, of the members of of this order, is about as follows:

The old leaves containing the ripe *sporocarps* fall to the ground and the following summer they decay and the *sporocarps* containing the reproductive bodies are set free. Under the proper conditions the reproductive bodies germinate, and ultimately give rise to the white threads or *mycelia*, from which in time arises the *conidia* or summer spores already described.

We have then this important difference between the two mildews *Peronospora Viticola* and *Uncinula-spiralis*), that attacks the foliage of the grape which will enable anyone to distinguish one from the other. *Peronospora Viticola* appears in the spots on the under surface of the leaf, while *Uncinula spiralis* covers the upper surface of the leaf with a dirty white coating.

The members of the last order (*Erysiphaceæ*) are exceedingly common. *Erysiphe lamprocarpa* occurs on the verbena, and also on various plants belonging to the sunflower family.

Podosphera Kunzi occurs on the plum. *Erysiphe Martii* often attacks the cultivated pea, doing it great injury.

REMEDIES.

There are many preparations when applied to plants infested with insects, either kills the insects outright or drives the intruders away. And as soon as the cause of the trouble is removed, the plants usually recover. In dealing with the fungi, however, it is somewhat different, as in most cases the plant body of the fungus is internal. That is, it is in the tissue of the plant infested.

It is almost impossible to destroy the fungus protected in this manner by the tissue of the host plant. It must be remembered that this work is yet in its infancy, and that little or nothing has been done toward testing the effect of different preparations on fungoid growths.

There is yet another wide field for work and experiment, viz.: It is a well-known fact that animals (man included) in perfect health are less liable to disease than those that have had their vigor impaired by some cause or causes. This is also true of plants, consequently whatever has a tendency to impair the vigor of a plant, subjects it to the

attacks of one or more of these parasites. We can impair the vigor of our plants by giving them too much stimulating food, or we can impair their vigor by not giving them enough of certain ingredients necessary for plant growth.

A lengthy article might be written on this subject alone, but we have not the time at our disposal. Learn, however, to feed your plants properly; give them good cultivation, and you will find that they will resist many of the insect pests which prey upon them, and also the attacks of many of these parasitic fungi.

In returning once more to a discussion of the mildews that occur on the grape vine, we will mention some of the preventives that have been used with success.

The American grape mildew (*Peronospora Viticola*), which was the first species described, is far more destructive than the second form. The plant body or *mycelium* of this species you will remember is internal, and the branches which bear the reproductive bodies, forms little white tufts on the under side of the leaf.

Now moisture is absolutely necessary for the growth of this fungus, and the parasite is rarely found on leaves that are kept constantly dry.

It is found that the grape is rarely troubled with mildew if the leaves are protected from dew. We think it will pay any one having only a few vines to protect them, either by artificial means or by training them under trees.

Wm. Sanders says: "That a good locality for vineyards is one where there is exemption from late spring frosts; from heavy dews during summer nights, and from early frosts in autumn; and the best results will be found where all these conditions exist, and failure will follow in proportion to their deficiency.

About the cheapest method of fighting the disease is to select such varieties for planting as are known to be able to resist the mildew.

The following list of American vines with regard to their resistance to mildew was prepared by G. E. Meissner. I will read the list:

TABLE OF AMERICAN VINES (PRINCIPAL VARIEEIES) WITH REGARD TO THEIR RESISTANCE TO MILDEW (*Peronospora*).

I. CATEGORY: almost entirely exempt, even in unfavorable seasons sons and localities. Cynthiana, Norton's Virginia, Concord, Hartford, Ives, Perkins, Champion, Cottage, North Carolina, Elvira, Missouri, Riesling, Noah and Taylor.

II. CATEGORY: suffering somewhat, *but not seriously*, in exceptionally unfavorable seasons and localities. Cunningham, Hermann, Ne-

osho, Dracut Amber, Lady, Martha, Telegraph, Mason's Seedling, Black Pearl, Blue Dyer (Franklin), Clinton and Goethe.

III. CATEGORY: suffering seriously in unfavorable seasons, and *not recommendable for localities usually exposed to mildew.* Herbemont, Lenoir, Louisiana, Rulander, Alvey, Catawba, Diana and Isabella.

Dusting the leaves with sulphur is a good remedy for the second form (*Uncinula Spiralis*), but sulphur has very little effect on the *Peronospopa*, because the plant body is internal.

A mixture of coperas and lime (five pounds of coperas to twenty-five pounds of lime) has also been used with success.

The members of the next group of fungi to which I invite your attention are exceedingly abundant. They are commonly known as rusts, and *Uredineæ* is the name of the order to which they belong. The plant body, or hypha, lives in the tissues of the host plant. The hypha is composed of long, branching, colorless threads, and the reproductive bodies, known as spores, vary in color from orange red to dark brown. The spores are formed beneath the epidermis, and when they have attained the proper size they rupture the epidermis and appear to the naked eye as a rust like powder.

One of the most remarkable things concerning these plants is their alternation of fruit forms. As an example of this we have occurring in spring on the young branches of the red cedar (*Juniperus Virginiana*) a fungus which forms a jelly-like mass. This fungus has received the name *Gymnosporangium Macropus.* It is now believed that this is only one stage of a fungus that occurs on the leaves of the pear, apple and hawthorn, and known under the generic name of *Roestelia.* The full life-history of most of the plants belonging to this order is unknown, but the life-history of those that have been traced is about as follows:

Early in spring the leaves of many plants will be found spotted with a number of wart like protuberances. If we examine these protuberances with a lens we will find that they consist of a number of little cups, and that the cups are filled with an immense number of orange-red, globular bodies. These cluster cups, as they are commonly called, can be found on the leaves of the gooseberry, barberry, mandrake or May apple, and many other plants. The orange-red, globular bodies, called spores, are the reproductive bodies, and when they fall upon the proper host plant they germinate and produce in the tissue of the host plant a dense mass of *mycelium.* In a short time this *mycelium* gives rise to a second form of fruit, which ruptures the epidermis and forms reddish-brown postules on the leaf. The spores or re-

productive bodies of this form are one-celled, and stalked. Late in the summer the same *mycelium* that has been sending up the one-celled, stalked spores, gives rise to bodies that are one to many-celled, and are supported on distinct peduncles. These bodies fall to the ground with the leaf, remain dormant during the winter and the following spring germinate and give rise to the cluster cups first described.

The first stage is known as the *Æcidium* stage, and the spores are called *æcidiospores.*

The second is known as the *Uredo* stage and the spores are called *uredospores.*

The spores of the third stage are called *teleutospores* and they are the last produced in that season.

There is usually another kind of reproductive organ present, which has received the name *spermagone.* They are small, flask-shaped bodies, filled with slender filaments. Some *spermagonia* evolve an odor, and insects are occasionally attracted by this odor, which, according to De Bary, resembles the odor of orange flowers. Very little is known, however, concerning the *spermagonia*, and they are useless in the determination of genera and species.

No doubt you are all familiar with the rust that occurs on the leaves of the blackberry and raspberry. This fungus is known to botanists as *cacomma nitens.* Very little is known concerning its life-history, but as far as made out it is about as follows:

The vegetative portion of the fungus appears in the tissue of the host plant early in spring, and at length forms a dense felt-like mass of threads. These threads ultimately give rise to an immense number of globular bodies, which rupture the epidermis of the leaf and appear as orange-red postules. The globular bodies are the spores and they are at first chained together, but soon after they rupture the epidermis they are dispersed and may be found scattered over the surface of the leaf. Under favorable circumstances each spore is capable of producing a new plant, and when we take into consideration the immense number of spores we can understand how rapidly the disease may be propagated. If we compute 300 postules as occuring on each leaf (and this is no unusual number), and suppose each postule to contain 150,000 spores we shall have then 4,300,000 spores on one leaf.

Only one stage of the rust is known, but no doubt the fungus is only one form of one of the many rusts that occur later on. We only know of one remedy for this disease and that is to dig up and burn all infested plants. Time expended in dusting the leaves with lime, ashes, etc., is little better than thrown away.

Doubtless you all have noticed the white discolored spots on the leaves of the strawberry. These spots are usually about one-fourth of an inch in diameter; the center of the spot is a grayish white, and surrounding this is a dark colored stripe, which is about one-sixteenth of an inch broad. This disease of the strawberry is attracting considerable attention, and as frequent inquiries are made concerning the fungus, we will briefly describe it: The disease is commonly known as the strawberry white rust; it is not a true rust, however, as it belongs to another order differing somewhat from the *Vredineæ*. The vegetative portion of the fungus is internal, it penetrates the leaf cells, causing the white spots described above. The spores or reproductive bodies are cylindrical, and they are supported on slender stalks, which are about three times the length of the spore. When examined with a lens, the spores and stalks appear as small mealy tufts in the center of the white spot. The disease is most active about the middle of May. Plants attacked with the fungus have their leaf surface diminished; this, of course injures the berries as there is not enough sap elaborated to properly mature the fruit.

Frank Earle, of Cobden, Ill., is of the opinion that the disease causes more damage toward the northern border of the strawberry belt. He also says it is very hard to estimate the per cent. of damage caused by it in any given season, as its action is quite local—some fields being badly injured, and others near by are but slightly affected. Wilson, Downing, Cumberland and Capt. Jack are mentioned as rusting badly, while Crescent, Bidwell and Manchester are comparatively free from rust. Dusting the plants with lime every two or three weeks, beginning early in spring, is said to be the cheapest and best known remedy for the disease. It is also claimed that mulching the ground aroud the plants prevents the rust.

And now, in conclusion, I wish to urge you to learn all you can concerning the habits of these interesting parasites, and also the habits of the many insect pests which cause such a vast amount of damage to your crops. In short, study nature and you will derive both profit and pleasure from your work.

AN ARGUMENT ON FORESTRY.

BY M. G. KERN, COMMISSIONER OF FORRESTRY, ST. LOUIS, MO.

The intimate relation existing between the people and the forests of a country, has of late years become a topic of animated discussion in the United States, although our forest resources have heretofore been considered practically limitless. Scientists and students of political economy, who, supported by the valuable statistics collected by the National Government, have pointed out the danger of exhusting from the primitive forests various species of timber most valuable in the industries reaped by their philanthropic labors quite frequently the name of alarmists. The elaborate discussion of so important a subject should not fail to arouse the intelligent attention of the people, especially of those directly interested in the leading industries, which depend on certain regions of surrounding country for a constant supply of raw material for their respective workshops.

The marvelous transformation of the country from a state of nature into an empire of agriculture and industry such as the world never beheld before, has necessarily caused the destruction of untold acres of primitive forests, and the waste of much valuable timber.

The evils incident to the destruction of the forests, recorded in the history of the countries of the Old World, have been sensibly felt in America likewise. Sudden changes in the climate, alarming diminution of the volume of the water courses, excessive droughts, destructive floods, and sweeping storms, and hurricanes have become the unwelcome visitations, and must be attributed in great measure to the great reduction of the forest area of the continent.

The leading centers of manufacture having used up the most valuable timbers of vast territories surrounding them, have been compelled to extend into districts far remote from the factories for their indispensable supply of material. The lumber industry has assumed the most gigantic proportions, and bids fair to exhaust the forest wealth of districts formerly supposed to be practically inexhaustible.

Our railway system, embracing fully 200,000 miles of track resting on a bed of wood, undergoing a constant process of decay, demands each year a quantity of the most valuable hard wood timber, and it

fairly baffles the imagination to divine the source of constant inexhaustible supply.

Yet notwithstanding this enormous drain on the forest resources of the land, no real scarcity has thus far been felt, nature's bounty being still equal to the emergency. The intelligence of the nation, however, is fully aroused to the imperative necessity of adopting a wiser policy in the future than has characterized the past epoch of wasteful management of the nation's most precious inheritance.

Opinions, quite naturally, differ widely even in this respect. A goodly portion of reasoners still indorse the French Monarch's saying, "after me the deluge," believing that posterity will take care of itself. True intelligence, however, recognizes the grave importance of dealing wisely and in time with so important a national problem, as is involved in the perpetuation of the timber sources of the continent, to which the national prosperity is so closely linked.

Consulting the policy pursued by every well governed European nation, we see that the government itself is the watchful custodian of the forest resources of the country, protecting them by stringent laws rigidly enforced.

Forestry is a branch of the Executive Government itself, which derives an important revenue from that part of the public domain. Without this safeguard the wants of a great nation, inhabiting a comparatively limited area of country, could never be supplied. Only a systematic routine of planting and cutting timber can secure a never failing supply.

Notwithstanding the radical difference existing between the political system of Europe and America, and the mode of ownership of the forest lands of both continents, we can nevertheless learn two important lessons from the European plan. The one is rigid protection of the forest districts owned by the government itself, the other is the necessity of the system of forest culture, by which alone the most valuable and indispensable timbers can be perpetuated and their gradual extinction prevented.

If America would hold fast to these axioms and live up to them, then her forest interests could be considered safe for all time to come.

We may point with satisfaction to the vast areas of timbered lands still intact and ready to yield their timber wealth at the shrine of national progress, and fancy that there is still enough for all possible demands.

But let it not be gainsaid that this array of timbered territory is to a great extent deceptive as to the quantity of timber valuable for industrial purposes contained therein. Much of it has often been picked

over, the best timber being culled, leaving the forest a forest of firewood instead of marketable material. The timbers of greatest value disappear almost unnoticed amid the mass of wood, which accident has produced and preserved.

Many admit that the most valuable part of the forests of the east Atlantic and Middle States is already used up, but point to our unparalleled modern facilities of transportation, by which all needed supplies can readily be landed at our doors.

We are told that the southern States have still an unlimited quantity of the most valuable timber, and will gladly supply the country after the northern forests are exhausted. But how long will the timber wealth of the Gulf States hold out when the formerly quiet and almost unexplored forests of the south are penetrated from all sides by the railways. This timber region can be stripped of its original wealth as readily and speedily as has been done in the northern States.

Point to the Pacific coast, to the timber wealth of Oregon, Washington Territory, British Columbia and even to our Alaska acquisition, in proof of the assertion that the continent is still limitless in timber supplies, and you simply deceive the people by plausible arguments. Do we not frequently hear and read this strain of reasoning proclaimed by men and newspapers, who have every opportunity to know far better.

The planting of timber trees most valuable and indispensable to the industries, and in consequence becoming scarcer from year to year, is the only safeguard against future want. Plant and cultivate for a few years after planting, on a scale to some extent, at least, proportioned to the demand for the kinds for which the greatest strain is brought on the native forests, and you practically solve the problem of the forestry for future years.

Let this rational proposition be accepted by the intelligence of American agriculture, and be put into real practice where possible, and scarcity of timber for house and railway construction, for fencing and for the industries at large, will be neither spoken of nor feared. The solution of the problem is an easy one indeed, based simply on that axiom known to every farmer, however illiterate he may be, by which he knows that seed time must precede harvest time, that he must work for what he wants to eat, to wear and to sell.

Yet how strangely unpopular is the proposition that trees must be planted and cultivated hereafter by the tiller of the soil with many whose cherished traditions run fondly back to the old timbered States, in which the clearing of the land was formerly the foremost occupation of the farming population.

A man indulging in obstinate and often stupid opposition to forest culture will naturally feel himself safe in his position so long as he stays inside the timbered regions of the western States, where he has the full benefit of the fertile prairie soil and timber enough on the farm to whack away at to his heart's content. What learned plausible arguments on the uselessness of tree planting some of these wise men will shower upon their neighbors or upon the rising generation, which has not ceased altogether to look for sensible advice to older men.

Tree planting to such is equivalent to park-making, which the farmer would better let alone. But place one of them out there on a stormy, howling Kansas or Nebraska prairie and keep him there for a year or two and how differently will he feel on the subject of forest planting; a protecting tree, a grove, a small forest, all planted by the hand of an intelligent settler, will appear to him a real gift of Providence; and most likely he will go and do likewise. He will look in wonder at cosy homes, big barns and miles of fencing, the material of which was raised right there on that farm, not by the owner's grandfather, but by himself within the last fifteen or twenty years.

This is but a slight instance of the mighty movement in forest culture on the prairies, now fairly in vogue in the western and northwestern States, a movement of far-reaching influence and benefit to the treeless portions of the country. It has been inaugurated and led on by the Horticultural Societies of those States; and for it posterity will bless the memory of many of the leading pioneers, who laid the foundation of a horticultural system under which orchards and forests will grow side by side, while happily no one will blame the forest for not bearing a crop of fruit likewise, nor envying the span of ground on which it grows, claim it for pasture for their stock.

The forest wealth of Missouri has been, and is still enormous. The railways of adjoining prairie States rest to a great extent on ties grown in Missouri forests. The annual cut and export of valuable timber for various industrial purposes has in the past been very great and it is still an important source of revenue to the people; but signs of failing begin to be sensibly felt.

The geographical distribution of forests through our grand and fertile prairies is peculiarly advantageous to the demands of agricultural pursuits, offering sheltering timber tracts to almost every prairie district.

The evils incident to vast extents of treeless prairie are, therefore, happily avoided by kind nature. Our State claims justly to be the fairest portion of the glorious west. Our horticultural development has attracted the attention of the whole nation to the advantages of

of our State. Unfortunately, however, many wondering eyes followed one of our leaders in horticulture across the mountains, and are flirting at present with the tropical advantages of California. But never mind, they will look our way again, and feel ashamed of ever slighting so fair a country as old Missouri.

But though surrounded by all this horticultural glory, can we afford to ignore the leading progressive ideas of this day which have ushered our sister prairie States on the pathway of successful and popular culture, from which they are already reaping a rich harvest of material benefits? Let us reflect for a moment what a wealth of most valuable timber might be raised on thousands of acres of alluvial lands along the Missouri river, which being subject to periodical overflows, are in greater part uncultivated, and given up to a spontaneous growth of willows and useless brushwood.

How many thousands of acres of productive soil remain idle and produce absolutely nothing to the tax-paying owner? Suppose some of these to be stocked with the catalpa, yellow poplar, the ash, and other highly valuable economic timber trees? A few years of cultivation suffice to rase any plantation of trees, closely planted, to such a height as to shade the ground and prevent the growth of weeds. Considering the insignificant price of seedling trees offered by the wholesale nurseries of the west, it can truly be said that intelligent enterprise in this direction is within the reach of all. The trees thus cultivated in forest form will grow whilst the farmer sleeps, and as for the cash value of those cut out as growth increases, and the prospective value of those remaining for future years, it may be quite useful and interesting to farmers of our State to consult the experience of the successful and extensive plantations of adjoining States, and profit by information disseminated through the excellent manuals of forestry published annually by the horticultural societies of Kansas, Iowa and Nebraska.

The manual published by the Forestry Association of Minnesota serves likewise special and complimentary mention. In which year of grace will Missouri's Report on Home Forest Culture be published? The answer to this timely question rests with the action of this time-honored society. With prohibition staring in our face, we may as well resolve to transfer our sympathies from grape culture to progressive forest culture, which no spirit of fanaticism will ever disturb or assail.

I have said above, that western and northwestern enterprise led on, not by the live-stock men or by the grain farmers, as a class, but by the horticultural intelligence of the people, has given to the treeless States a fair substitute for native forests.

Leading horticulturists have tested the hardiness and adaptation to the climate, of every species of forest trees. One of their foremost leaders has done most valuable service in the introduction and general distribution of two of the most valuable timber trees, the catalpa and the European larch, which latter is peculiarly suited to a northern climate. The rigor of their climate forced them to ignore one of the most valuable trees of the American Sylva. I refer to the cypress (*Taxodium Distichum*), which grows spontaneously along the Lower Mississippi as far up as the southeastern portion of the State.

A coniferous tree of rapid upward growth, a native of swamps and alluvial overflowing lands, must surely be considered a valuable boon for our State, in which we have millions of waste acres on which it would rapidly grow if generally planted. The tree is beautiful and very decidedly ornamental, and in consequence is used freely in parks and ornamental grounds.

Various specimens tower in Lafayette Park above nearly all other surrounding trees. Planted there about twenty-five years ago they have attained a heighth of some sixty feet, and a thickness of stem of eighteen to twenty inches. If pine wood of the value of cypress timber can be thus readily grown at home, its general culture and a consequent boom in Missouri enterprise can be only a question of time.

This native forest tree is worthy of more serious attention than it has enjoyed until now. Let the intelligent leaders of the arboricultural interests of our State resolve to investigate its value honestly, biased by no prejudice against a modest tree growing wild in the southern woods. And when in the fullness of time a welcome tidal wave of progress in forest culture shall gently ripple the placid waters of the Missouri river, dislodging, as we fondly hope, some of the sandbanks of intolerance to modern ideas of improvement successfully in vogue in other States, then shall we see the day when millions of this almost unforgotten tree will tower up singly and in mighty forests from the wide extended lowlands of our State, and when in consequence there will be millions in its culture.

Examples set by the few, and followed by the many, have ever been the stepping stones over which the progress of mankind has passed from one epoch of development to another. To such happy progressive influences we have to attribute in great measure the triumphant strides made by American horticulture and arboriculture. The fame of the early successful orchards has called forth more enterprise in planting than all the books and speeches of theorists could ever have set in motion.

The first successful groves and shady avenues planted on the bleak prairies of the far west have fairly revolutionized the opinion the peo-

ple entertained as to their agricultural value—dispelling quite speedily the idea of the existence of a great American Desert.

The early efforts in ornamental planting and artistic improvement of grounds made in leading cities, have generated the rural tastes of our country, whose evidences we meet around the homestead of refined people.

The metropolis of our State has done some noble work in this direction, the educational influence of which is felt in many progressive rural districts.

Our State, however, needs a conspicuous and convincing illustration of practical and successful timber culture, by which the people would be made acquainted with the most profitable timber trees, suited to the soil and climate of the country, and by which not only the possibility but more especially the ease and rapidity of lumber growth would be demonstrated.

Assistance to this important interest, if given by the Government of our State, would be a wise investment of public funds for public good. An opportunity of rare advantage presents itself for the accomplishment of this worthy end, while the improvement of a valuable tract of land recently purchased by the State is being discussed and begun. This tract is situated in the vicinity of the thriving city of Nevada, in Vernon county, and embraces 500 acres of land, both timberred and open prairies, which has been selected for the erection of a new asylum for the insane, an institution to be established and maintained in accordance with the most enlightened ideas and experience of our day, by which the necessity of grounds harmonious to the object is fully recognized.

In consultation with the Board of Commissioners in reference to the design and planting of the grounds, I have presented an urgent plea for a broad basis on which to plan the improvements of the future, securing sheltering and pleasant groves to the surroundings of the stately buildings, from which a wide spread panorama of smiling prairie scenery is visible in all directions.

The greater the sway of arboriculture and landscape gardening the more attractive and curative will be the aspect of the grounds gracing this model institution of our State. The plan, however, aims at an object greater still than the mere embellishment of an asylum ground. It contemplates the creation of a medium for the education of the people, a public arboretum of forest culture, through which much useful information in tree culture and rural taste might be disseminated throughout the southwestern portion of the State, the won-

derful resources of which are only in the infancy of their development.

The valuable tract of land so advantageously selected, should surely not unconditionally be given up to the unfortunate insane, when by a wise provision it can be made of benefit simultaneously to the insane and to the sensible portion of the people.

The Board of Commissioners have heartily indorsed these views, and have adopted at their meeting the resolution offered by one of their number, the Hon. E. W. Stephens, which reads as follows:

"*Resolved*, That we invite the co operation of all horticulturists interested in the advancement of practical and scientific forest culture in bringing before the next General Assembly a proposition to secure an appropriation to make the farm belonging to the Insane Asylum No. 3, a living illustration of the principles of an enlightened system of timber culture, to the advancement of which the efforts of the Division of Forestry of the National Department of Agriculture are prominently devoted."

The invitation contained in the above resolution is especially addressed to the Missouri State Horticultural Society. The hearty cooperation of its members with a timely movement for the advancement of a national cause of great importance, is most confidently expected, since many of them have stood for many years in the front ranks of horticultural progress, let their influence be made manifest when the time for action has arrived.

On motion, the President appointed a committee of five to report upon this suggestion of beautifying the grounds of the new insane asylum at Nevada: C. W. Murtfeldt, L. A. Goodman, D. S. Holman, J. A. Durkes and B. T. Galaway.

SOCIAL INFLUENCE OF HORTICULTURE.

BY CLARKE IRVINE, OREGON, MO.

Let us take wider views and if we discover aught relating to our main and central subject we may suggest something that will be of

use. Horticulture may embrace anything of the vegetable order, on occasion. Taking wider views regarding not only the things produced, but their effects on society, there is hardly any question that may not come into our discussions, which may thus become of interest to all the dwellers in our region. And there is hardly any section of the country where the people are so confined to a small number of products as in our own. It would seem that five-sixths of the labor is expended on cattle, swine and that great article for producing grease —corn. Ours is the greatest manufactory of fat the world has yet seen. Wherever the bone and muscle may be made we make the tallow and lard. Some men who might succeed admirably in other directions fail here regularly as graziers. While writing this I have just had a suggestive experience. The miller passed along and asked if "we wanted any buckwheat flour?" "If such an article, all buckwheat, can be had, we do." "That I guarantee. We ground it ourselves, and it is all you will get; for, searching the county over, but two hundred bushels can be found, all raised by one man who made a lucky hit. Everything else he had failed."

Another man came with some celery in a sack. "I had to hide this or you never would have got it," said he. "I had no idea I could sell it, but every time I get in town my whole load is taken from me by the first ones that see it. They tell me I could sell car loads of it in St. Joe." Now the man don't know very well how to raise anything else but celery. Every dozen stalks sell for from forty to fifty cents. With a little direction and encouragement he has a fortune in his power, only that making is so much easier than keeping money.

An old lady who lives with her sixteen-year-old boy on a small bit of ground was making some nice presents to a comfortably estated married daughter for her and her grand children. The daughter expostulated, "Mother! You connot afford to do this." "Never mind about me. I have sold my onions well, and George has sold his berries. We are all right. I sold twelve hundred dollars worth." These are the things one likes to hear. They stand at the very foundation of all the real strength and greatness of a nation. "The old woman must have worked hard!" Possibly, but she knew enough to hire on occasion. Do you know that there are men who would never dream of running a saw mill without hiring, and yet will not hire help on a 160-acre farm? Well, such men ought to run saw mills, not farms. "The best fertilizer ever put on a farm is a big rent," say English landlords, for then renters are forced to develop the power of every acre commensurably with the rent. Lord Brengham, speaking of North British farmers in 1816, said the renter of a 400-acre farm there, leav-

ing 100 acres fallow, would hire by the year nine regular men servants, whose wages would equal $100 per year each and board; also, two women servants at $30 each, besides extra hiring during seed time and harvest, and would require fourteen plow horses and one saddle horse and servant for my gentleman renter, who pays $3,000 per year rent and all taxes, blacksmithing and other repairs, making at least $500 more.

He was proving how ruinous protection was to them because it made them pay two prices for salt, leather, soap, candles, malt, while by actually prohibiting the entry of the cheap corn, wheat and wool of the United States and other nations it so over stimulated the prices of British farm products that in two or three years over-production had ruined all the British farmers who had no outside demand. [See his speech in Parliament April 9, 1816.] At that time the British farmer had no better market than we have. Yet he could afford all this outlay, live like a gentleman and lay up money. The fact is the limit to the capacity of an acre has never been found. The farmer who fears to fertilize and hire is like the merchant who fears to advertise. In truth we are not farmers, "we are nettle trampers and scratchers," as I heard a Nebraska pioneer say thirty years ago. It is true our laws cut us off from the world's markets, but we of the crowding and expanding west can greatly remedy that by going more into variety and exchanging with each other. To illustrate, a young man who came from England to Holt county seventeen years ago with nothing but his bare hands soon got a small bit of land. A big farming neighbor was hauling some barley to the railway and grumbling at the price. "How much do you get?" asked young John Bull. "Thirty cents and be d—d." "Haul it across the road to me for thirty and be blessed." said Bull. "You don't mean it?" "I do." "Cash down?" "Yes; cash down."

The whole neighborhood was amazed. Some said the Englishman was going to make beer. People came to see about it. "What are you going to do with that?" "Feed it. Its the best horse feed in the world," said the Englishman. "What! With corn all around us at fifteen cents?"

That Englishman is now regarded as the most responsible man in the neighborhood. Several of the men who thought him a fool have long been bankrupt corn raisers.

To think that in a county that has a reputation for fine cattle, and where large numbers of cattle are fed and swine are exported in great numbers and attention is given to horse flesh, that there if anyone happens to grow a surplus of peas or beans or turnips, carrots, beets, etc., he must send them to St. Louis or Chicago; that there the professing stock fancier would look on the producer of said pulse or tubers with

wild amazed eyes if he should ask him to buy a few dozen bushels. You may think that this is not strictly horticultural, but I am willing to swear to the best of my knowledge and belief the other is not horticulture nor oxculture. No wonder some are beginning to declare that fine breeds deteriorate in this American climate. The horticulturists who grow Hubbard squashes and Cuban Queens in their pumpkin patches have made the same discovery as to fine vegetables. One might suspect that many of us have become so full of the principles of the circumlocution office that our whole effort is "how not to do it." We work hard enough. The severest critic must admit that we drive and go ahead and expend elbow grease. Why is it, then, that for decade after decade the same errors are practiced? Simply because, as it seems to me, the American people take no intellectual delight in farm work and all connected with it. Other subjects are studied over and carefully estimated. This fundamental, all sustaining and embracing subject is left to be settled by mere physical force. Political questions vital to it are tabooed. Read newspapers and you will see much about our great industries. One might then conclude that agriculture or horticulture is no industry at all.

"What do you think of this new industry?" asked one of our most venerable, profound States—h'm—politicians of Sam. Kirkwood. "What is it?" "What is it? Why, man alive! the papers are full of it; it's a combination of metals by which beautiful articles of house furniture may be manufactured. It is supposed it will produce ten million dollars worth in a year." "Ah!" said Sam., "I know an industry that will beat that all hollow." "What's that?" "Industry of old hens! Their eggs are worth fifty million dollars." The venerable *statesman* looked at him as a lost man, and went off wagging his ears. This same kind of statesman would admire a silk industry, fostered by a tax, not to protect growers of silk, but manufacturers, while we import eggs from Germany, and no poultryman's wife here can afford a silk dress. If we can only save one million by enormous exertions in some novel method while wasting a hundred millions in taxes—indirect—and ruin to common labor, we have done a grand thing.

"Why," said Commissioner Le Duc, "we actually pay out millions of dollars for tea. Think of saving all that by making tea here." Accordingly, he expended several thousand dollars and made five pounds of American tea almost as good as Chinese! He forgot that all international commerce is but the trading of commodities, and we pay for our tea in grain, meat and cotton to England who gives China opium for tea. Put a few hundred thousand Americans to growing tea

instead of cotton and tobacco, and several million cattle and grain growers exchange the world's demand for their products for that of our tea makers, and strangle over a poor article at several dollars per pound. That is just the size of it. It is not saving money at home, but exchanging labor here should be the object. Save money, when every nation with any sense makes its own money at will, whether of gold, silver, copper, bronze or paper. A wave of the hand creates money under law. Not all the law-making in the world can create a potato—nothing but that source of all wealth of man—brain-directed labor in the earth.

It is a common complaint here that "I have fed cattle all winter and they came out little better than than they were last fall." Had there been greater variety of vegetable production this complaint would not be heard, for experience would have taught us long ago that brutes as well as men require variety in nourishment. One may preach constantly that a varied diet is needed, but unless we have it there can be no practice, and theory soon passes into oblivion without practice. Peas and beans contain more nitrogen than almost any other food. Huxley and Youman, in their little work on hygiene, tell us that animals fed exclusively on fat-producing food begin to die of nitrogen starvation. The animal begins to absorb its own bones and muscles and becomes really carniverous. The whole body becomes reformed in a few months instead of seven years. Just think of an animal deprived of all bone-producing food. A beautiful mare, owned by a former neighbor of mine, strayed off a short distance from home one fine winter morning. The neighbors were out looking at and admiring her when the owner came along—a man who thinks himself to be a great farmer and is so reputed. Compliments were paid to him on his ownership of such a splendid animal. "Yes, she is my pet; I would not take $500 in gold for her. Aint she a beauty?" "She is very fat," said one. "She ought to be; she just goes and eats corn with the fattening cattle, and eats nothing else." "But why do you let her do that," inquired a farmer? "O, I do it because I want to see how fat she will get," replied he, patting and fondling her. Just then the mare laid down to roll and in getting up she broke both hind legs square off. This is an actual fact, and its like is by no means uncommon. The spectators were amazed at this mysterious dispensation. One allowed it was a judgment on the owner's vanity. All went off puzzled; not one seemed to suspect the cause—nitrogen starvation. The bones of the animal were litetally honey combed.

Lately a farmer assailed the writer severely for "attacking the grand staple product of the country." "The healthiest, heartiest horse

I ever owned never would eat anything but corn and never seemed to get enough. It was the largest horse I ever saw. Your theory won't stand, sir." The bystanders were evidently well pleased, but I little suspected what a triumph was near.

"I cannot help what you think, and can only give you my experience. But your horse must have got some other food, hay, clover, or used hard lime water." "No, sir; cistern water and corn." "Well, all I have to say is this: If the animal was as heavy and lived as you say, I wonder his weight did not break his legs." "It did; one leg broke by his weight. How is that?" exclaimed he. "That is just what I have been trying to beat into your understanding. Bone is constantly being exhausted and corn gives no bone supply." "You must be right, then, for we examined into his 'carcase' and the bones were all like a sponge."

And thus, like multiplying vilanies, these proofs do swarm upon us. Yet those twin-brothers of ruin, ignorance and carelessness, lead us forever in the same ruts.

When one considers of only a few of the wastes and needless burdens of society, the wonder is that there remains a tribe above the Digger red men above ground. With thousands starving and millions dropping into penury even a few abuses that exist waste more than enough for all. Nothing saves the race but nature's wondrous liberality. And yet we are fast doing our level best to exhaust that, with only a few old antedeluvian Noachian "cranks" to comment on it.

Mangels, turnips and the like, if fed with corn, enable the animal to digest almost as much again. During the pomp of summer, while nature is sending above ground all the various grasses, stalks, fruits and flowers, she is quietly storing in these roots all the nourishing qualities of her green things, the juices of fruits and the exquisite boquet of her flowers. In them is the concentrated essences of meadow, garden and orchard.

In a great mangel one may imagine the consumate perfection of spring, summer and fall seeding, growth and harvest. Then come the leguminous expulse plants before named, all having their place, and all should find infinite demand in this grandest region for manufacturing flesh the world now has. There is nothing equal to diversified industries, but each should begin on the lowest planes and grow up by reciprocity of demand and supply at home. Thus one nourishes the other and all are connected by one beautiful chain, none owing boasted, swollen, sickly importance, to petting, patronage and indirect robbery of others. Each thus develops as the fiat of demand calls it, and nothing is neglected or wasted. In this country the waste of material

produced by care and toil is something stupendous, simply because other things not demanded are done.

In 1854 it was precisely as the American Magazine of Boston in 1834 said, all the surplus productions and wealth of the nation were in the rich south and west, and the people of New England having nothing to export, must go to the south and west to get rich, or make more than a bare living. To day all the surplus of this nation is made south and west. Yes, the wealth is created here, but the money which is not wealth, nationally considered, is only the instrument whereby wealth is exchanged, circulated and put in process for consumption, is all in the east or comes hence. Ah, if they could not produce exports, they found out how to appropriate ours, export and exchange it for what would get all we could ever make—banks, railways, telegraphs, telephones, insurance, (fire, life and accident), bonds, stocks—all are where "no surplus is created, and they are too poor to raise exports." How is this? It is like building all the houses at London, but going to Jerusalem for the tools.

In 1854 we were a great and mighty nation; our growth in population, manufactures and wealth, the wonder of the world. (See speeches in Congress, and census for 1860.) Eighteen thousand new manufactories were created between 1850 and 1860—less than eighteen hundred were started between 1870 and 1880—and a much smaller percentage of capital invested than between 1850 and 1860. We added 125 per cent. to the national wealth in the first decade; in that of 1860-70, not over 36 per cent. (owing to the waste of war); but in that of 1870 to 1880 we added still less, and by no means in the ratio of our increase of population and its expansion over territory. Nebraska, Kansas and Dakota may be said to have been almost created since 1870 with their miraculous product, but when we come to measure it by the dollars, there is no increase—more bushels but less dollars—"more turkey, no meat," as the Indian said. The "tramp" is abroad, a word and man unknown before 1870; and if it be said it is because we have more people, I deny it, and prove the denial; because, what with railway expansion all over the continent, so much more land was made accessible by 1875, that as compared with 1860. We were actually a dense crowded population in 1860 compared to what we were in 1875, when there were over one million tramps marching or slouching over the continent. Owing to the immense new territory opened to us by 1875, land fell down to nominal prices in the west, and the land market was brought low all over the civilized world. No; let us open our eyes. Villainy in high places was and is the sole cause; villainy so deep that the people may never comprehend it. Officials, whose sal-

aries were less than their living, who entered office poor, retired in four years millionares. That makes suspicion assurance. But let us leave this branch of horticulture, peculiar to Washington City and State capitals, and come more to the point.

It is reciprocity of labor in our country that is desirable more than "saving of money here at home." Far too much groaning is made over what they say we buy; forgetting that we pay for it with our surplus grain, meat, cotton, etc. So if we bought nothing we could never sell anything; and this exchange of commodities among neighbors, is the easiest, most profitable of all exchanges. People are made comfortable almost without knowing how it happened, and are, comparatively, put in affluence. It is all profft nearly. There is no middle man and no shaving. For instance, we might manufacture as much again beef here instead of sending our cattle to Chicago, where Pennsylvania and Ohio farmers select the best, carry them home, put on several hundred more pounds, return them to Chicago or take them elsewhere, and have buyers hunt them up instead of being hunted up. Were their values appreciated we could have for those vegetables a market right here at our doors; our fine stock men and those who feed for distant marts would gladly take all that are offered, and find it to their interest. There are men who, on their small places, raise such articles successfully and send them to St. Louis or Chicago, in order to get money enough to purchase a fine cow or a few calves, and often find all their profits absorbed by the time and expenses of transporting.

In this view, most important of all, is the encouragement given to enterprising young men who own but a few acres, of hill land perhaps. We should no longer see the owner of twenty acres in the bluffs plowing corn furrows as though his were a great valley farm. No wonder such men become discouraged and conclude that they and their belongings don't amount to much: but now see such men as horticulturists, employing brain and muscle on every square foot, and they soon begin to realize their own importance. And these men are the masses on whom rests the character and destiny of the States. These are they under whose ingenuity and labor every rough, barren hill top is to become a terraced blooming paradise. Inspired with the idea of the importance and capacity of an acre, and reformed from the foolish ambition of possessing nothing under a quarter section, we have seen many of these owners of a few despised acres roused up from a life of hopelessness and idling, to energy, industry and real manly pride. They find that Providence is kinder than they thought, and that they have, after all, as much clear money to spend as the man who is the

slave of his own large possessions, and who is only a steward to distribute their products while burdened under heavy and unpleasant responsibilities.

There is really a refinement begotten of employment in producing fruits and vegetables. It is a nice, cleanly occupation, and where the worker uses brains, education of course follows. Surely, if in the monotony of hammering stone, the man who uses the powers of observation and reason developed in him by the laws of the eternal, can become a Hugh Miller—one of these who create a science even though they may not prefix professor before their names; if the humble hammerers of lapstones may have in the same way become world-renowned botanists or linguists, and in that only real consist republic [of letters] are not only companions, but leaders; teachers of princes, honored as their guides, philosophers and friends. What may we not expect where men stand upon their own acres in commune with nature herself, through all her seasons, and employ the brain as a helm to direct the hand? The person who follows any hand-craft thoughtless, hopeless, must become boorish. The one who grows only potatoes as a reasoning, progressive being, will soon find an infinite world of startling facts. But men must be inspired with some hope, and see some goal possible to reach. The good market, the gradual loosening of restrictions, and increasing, though slowly, of means, these inspire the worker with hope. To see a whole community that has lived for years as though condemned to a life little above vagabondism, utterly without a hope or a thought beyond the poorest keeping of the body—to see such made to feel that their opportunity is even better than that of most, and to realize what they can do—perform—almost without limit, is one of the most inspiring facts that can be. And to create such spectacles is the grandest mission of horticulture, in its larger sense, as it passes beyond my lady's garden and my gentleman's orchards and hot houses, to enter the poorest cabin of the owner of even one rough acre and bids him stand up an independent freeman who may become the equal of the best citizens of any land.

I firmly believe that, while we inculcate proper views of feeling, and thus create a demand right at our own doors in "the rural districts" for the products of horticulture, we can do no greater good for our vicinages than by inspiring the numerous small holders with a true sense of their own importance, and of the entire sufficiency of their homes if they will but regard themselves as horticulturists.

P. S.—I might add that within my recollection, which goes back almost fifty years, every great land holder I have known of has become

utterly bankrupt. They were all inspired with that "vaulting ambition"

> "Which o'erleaps itself
> And falls on 'tother side."

The following officers were elected for the year:
President—J. C. Evans, Harlem.
Vice-President—J. A. Durkes, Weston.
Secretary—L. A. Goodman, Westport.
Treasurer—D. S. Holman, Springfield.

FRIDAY, 2 P. M.

Report on Botany by Prof. S. M. Tracy and Prof. G. C. Broadhead, Pleasant Hill.

DISTRIBUTION OF PLANTS IN MISSOURI.

BY G C. BROADHEAD, PLEASANT HILL.

1st. *Distribution of trees and shrubs.*—If we draw a line from the southwest to the northeast corner of Missouri, we will have two districts, which, as they became more remote, present a marked difference in the character of the flora. Northwest of this line we know of but three trees or shrubs not found eastwardly, viz.: The choke-cherry, Bartrain's oak and the aspen. But there are a good many east of this line which do not extend westwardly or northwardly. Among them we include (which do approach very nearly, and in some places passes that line) the flowering dogwood, huckleberry, sassafras, alder, seven-dark (*a spiræa*) trumpet creeper, etc.

The southwest part of Missouri is chiefly timber, while in the northwest we find that prairie land predominates. In northeast Missouri a timbered belt lies parallel to the Missouri river, from twelve to twenty miles wide, and extending from St. Charles to Glasgow. A similar strip also lies parallel to the Mississippi from Lincoln nearly to Lewis. Outside of this prairie land rules. In St. Charles and Lincoln there are wide low prairie bottoms adjacent to the Mississippi, and also similar flat lands occur north of Hannibal. Similar prairie bottoms are also found on the Missouri in the counties of Saline, Chariton, Carroll, Ray and Jackson, but they are higher above the water than those along the Mississippi.

On the south side of the Missouri river a line from near Arrow Rock to Seneca would nearly separate the prairie lands from the timbered. The counties in northeast Missouri, in the aggregate, would probably average not over one-third timbered land. Those in the northwest, although some of them are heavily timbered, would not probably average one-tenth timber. Clay and Platte are exceptionally well timbered, Ray and Carroll very well supplied with; Andrew originally about one-half. In others the amount of timber is limited. In the other counties, we would say that in the west half of the northwest quarter of the State, the timber is chiefly confined to narrow parallel belts along the streams, becoming sometimes a mere fringe, especially as we proceed northwestwardly.

There are a few prairies in the extreme southeast, but there are also very extensive forests of large timber, chiefly cypress, black walnut, sycamore, elm, poplar, gum, cottonwood and very large grape vines. Passing from the southeast we enter upon the uplands and approach the Ozarks. We here find chiefly oaks, the white, black and post. Associated with these in southeast Missouri we find the black gum often quite abundant. Further west, in central and southwest Missouri, on leaving the larger streams, we find that the country very often partakes of the character of the well known "Barrens," chiefly supporting a scrubby growth of black jack and post oak and black hickory, with tall grass. These may be considered as passage lands between well recognized woodlands and prairie, sometimes with good soil but more often poor. The extreme western counties of southwest Missouri consist nearly altogether of prairie lands, excepting the two extreme southern.

The pine is not found native north of the St. Louis and San Francisco railroad. It often abounds beyond thirty miles south of that railroad. It is not commonly found on limestone soils, but seems to prefer a silicious soil and is found on flinty or sandy soils, especially s

it found on soils based on disintegration of the second sandstone, and in south central and southeast Missouri the pine is often a guide to the underlying geological formation. The pine of Missouri is the *P. mitis.*

The following is nearly a complete list of trees and shrubs of north Missouri:

(I give common names chiefly.)

Crab apple, ash, prickly ash, blackberry, (3 species) *Rubus trivialis*, *R. villosus*, *R. canadensis*, bladdernut, box elder, wahoo, button bush, common wild cherry, cottonwood, *Amorpha funticosa*, *A. canescens*, (lead plant), bitter sweet, coral berry, *Cornis sericea*, *C. paniculata*, elder, red elm, American elm, *Smilax* or greenbrier, (several species.) hackberry, (2 species.) common hazel, *cassia*, (2 species.) *Crataigus*, (several species) pignut hickory, shellbark and thick shellbark hickory, yellow honeysuckle, iron wood, honey locust, white maple, mulberry, linden, burr oak, rock chestnut oak, laurel oak, pin oak, black oak, red oak, white oak, pawpaw, plum rose, (2 species,) *R. lucida* and *R. setigera*, raspberry, red bud, sumach, (several species.) poison oak, sarsaparilla, service berry, (rare) Virginia creeper, black walnut, willow, (about 4 species,) red root, (2 species.) buckeye, coffee bean, the latter two not always common. The bitternut hickory, rare. The pecan abounds in the Missouri and Mississippi bottoms, but I have not observed it west of Platte county, and on North Grand River I observed it as high up as Utica. It abounds on the Marais des Cygne and Marmaton in western Missouri.

The muscadine grape, (*V. vulpina.*) I have found in Montgomery, Maries and southwardly. The black hickory, (*Caya macrocarpa,*) abounds on some of the hills in the eastern and southern portions of North Missouri, but disappears in going west. It occurs in the southeast. Sugar maple occurs in most of the counties in North Missouri, but is quite rare in some. It chiefly abounds near the streams flowing into the Missouri and is found no further west than the Nodaway river. In Adair county we find the sugar tree and white walnut near the streams flowing into Chariton river, but they are rarely found upon the bottoms of the Chariton. *Cornus circinata* I have only found on bluffs of Missouri and Mississippi rivers in eastern Missouri.

The white ash is a common tree.

Two species of rose are common throughout north and also found in south Missouri, viz.: *R. setigena* and *R. lucida.* A smooth bark rose I have found in Warren county and in south Missouri. In St. Charles we may find *Vitis aestivalis*, *V. cordifolia*, *V. vulpina*, *V. riparia.* In western Missouri only *V. riparia*, *V. cordifolia* and rarely *V. aestivalis.* *V. indivisa* is found nearly throughout the State.

The red maple is found in Callaway county in and southeast Missouri.

Pin oak (*Q. palustus*) abounds on wet bottoms and near streams and near edge of prairies, but becomes rare in western Missouri.

Bartram's oak (*Q. heterophylla*) has been observed in Shelby, Sullivan and DeKalb counties. The young leaves appear like those of the laurel oak, but are lobed as they become older. Spanish oak occurs rarely only in eastern and central and more common in southern Missouri. Pawpaw is found nearly throughout the State, but chiefly abounds on rich lands near large rivers. The plum (*P. Americana*) is found throughout the State, but not so common in the southeast. It has many varieties, some of no use.

The *prums chicasa* is common in eastern and southern Missouri, but is not found in the northwest. I have observed it in Bates and Lafayette, which may be its western limit. It also has many varieties. Some are very fine. A smaller plum is found on Missouri hills in the northwest, which may be another species or probably only a variety of *P. Americana.*

The *P. texana* I have observed on Arkansas valley, in Kansas, and have it grown from the seed in my garden, but the fruit is nearly always diseased.

The seven bark (*neillia opulifolia*) is found near Kirksville, Linneus and Brunswick and southwestwardly, and is often found east of that line, but no further west.

The white oak is not found west of Nodaway river, and is also rare in the border counties south of the Missouri river and south of Jackson county. The swamp white oak (*Q. bicolor*) abounds in eastern Missouri, but is rarer in the west, and I have not found it west of a line through Albany and Savannah.

The black haw (*Viburnum prunifolia*) although very common in eastern Missouri has not been found beyond a line through Gentry and southwest to Buchanan.

Post oak and fragrant sumach (*Rhus aromatica*) I have not observed west of a line a little east of Liberty, thence to Maryville. But the fragrant sumach I have also found on head of Missouri river in Montana.

The red birch is confined east of a line through Maysville, thence to the mouth of Crooked river through Johnson and southwest through Bates. Black Jack oak I have not observed in north Missouri west of the last named line, but in south Missouri it occurs in probably all the counties and its last occurrence west I have seen on sandy soil in Woodson county, Kansas. In Kansas it invariably indicates the presence of sandy soil.

In south Missouri burr oak (*Q. macrocarpa*) is generally found on rich bottom lands. In northern Missouri, after passing north of Milan, Gallatin, Trenton, Maysville and St. Joseph, we find it very abundant on the hills. This fact we have observed as far north as Minneapolis, Minnesota, and it seems to be the prevailing tree on the hills throughout. On the hills the bark seems whiter than on lower ground and the tree is not so handsome.

The choke cherry (*cerasers virginica*) abounds in north Missouri but is found no further south of a line passing through Knox to the north of Medicine creek to Kingston and St. Joseph with one exception on Missouri bluffs, near Grand Pass.

The persimmon I have not found northwest of Liberty nor west of Linn nor west of north line of Wabash railroad. It abounds east and southward, and is abundant as first growth on prairies in Southwest Missouri.

The dwarf variety of chincapin oak abounds in Northwest Missouri.

Sassafras abounds in east and south Missouri, its northwest line passing through Shelbyville, Huntsville, Brunswick, Malta Bend, Cedar county, to southwest corner of Barton.

The red cedar may occur throughout, more abundant in southeast, but very rare in northwest.

The blue ash occurs in east Missouri, and is probably limited by a line through Palmyra, Glasgow and southwest.

The trumpet creeper, common in east Missouri, is also limited by a line through Hannibal, Mexico, Glasgow and Bates county.

The dogwood (*cornus florida*) abounds south and east of a line passing through Bowling Green, Danville, Columbia, Arrow Rock and southwest through Cedar and Newton.

Spice wood (*Benzoni odoriferum*) occurs on bottoms of large rivers within the same limit as the last.

Hornbean (*Carfrinus Americana*) is common in southeast Missouri and in the counties along the Mississippi and on the Missouri as far as Howard, thence it passes to the southwest.

In north Missouri white walnut is found as far west as Glasgow. South of the Missouri we find it on Tabbo creek, thence southwestwardly.

Alder (*alnus serrulata*) is accasionally found south of a line passing through Bowling Green and Danville, and southwardly through Cedar county. It is not found at all in northwest Missouri.

Leatherwood (*Dirca palustus*) is found on the creek near Fulton, on Lost creek in Warren and Leatherwood creek in Iron county and on Castor river.

The wahoo elm (*ulnus alata*) and bumelia occur in Missouri bluffs east of Jefferson City and abound on Magnesian limestone hills in south Missouri, but is not found in north Missouri.

The aspen (*populus treimboides*) is found in Adair, Chariton and a few other northern counties.

The cypress grows in the swamps of southeast Missouri.

The black gum is very common in southeast Missouri, growing chiefly on uplands. The sweet gum becomes common south of Madison county, and the sour or tupelo gum grows in the swamps of the southeast. The catalpa is found on St. Francois river in Madison county. Further south it is common. Hercules club (*Aralea spinosa*) is found in Madison county and southeast. The yellow poplar or tulip tree is not found wild north of Madison county. *Rhamnus Carolinians* is found from Jefferson county southwardly. The chincapin (*Castanea punula*) I have found growing wild in Benton county, Arkansas. It may therefore be looked for in extreme southern Missouri. Several species of huckelberry are found in southern Missouri, but are not found in northwest and rarely in northeast Missouri. In north Missouri it is found in Pike, Lincoln, Montgomery, and south of the Missouri river in Cooper, Henry and southwest, but not north or west of that line.

A species of Viburnum is locally found in Monroe and probably other counties of north Missouri.

Ptelea Trifoliata occurs in the woodlands of Eastern Missouri, but I do not know of its occurrence west of a line passing through Cole and Vernon, although there is an isolated occurrence of it at Lane, in Franklin county, Kansas.

The *Azalea nudeflora*, a beautiful early spring bloomer, is found in Southeast Missouri.

The witch hazel is only found in southeast Missouri.

I will now pass lightly over the occurrence of certain

SMALLER AND CHIEFLY ANNUAL PLANTS.

Of these a volume could be written.

Forty years ago there were no blue grass pastures in Missouri, and the grass was only seen in yards around dwellings, and did not spread. The wild plants had to be destroyed, which was only a gradual process. The prairie grass and associated plants could not stand the advance of civilization, their life was crushed out, the iron weed (*Vernonia*) took their place. The blue grass at first timidly appeared; soon boldly usurped the chief place, and its progress was made certain. In the woods the hazel and wild plants acknowledged its supremacy, and the blue grass was triumphant. The more the ground was trampled upon the more the grass spread.

Fifteen years ago it only grew in Western Missouri where it was sown, and was even rare in Saline county, and the wild grasses abounded upon the praries. Three years ago I found blue grass growing everywhere in Saline county, in the yards, by the roadsides and amid the hazel thickets. Although quite common in northeast Missouri, it is not in south Missouri. In western Msssouri the blue grass usurps the place of the blue stem (*Audropogon*).

In Kansas the *Audropogon* is moving west, and is usurping the place and driving westward the buffalo grass. Westward the grasses progress.

In 1870 the *Solanum rostratum* had just entered Missouri from the western plains. Now it extends across the State. At that time the *Helianthus lenticus laris*, so very abundant on the western plains, was scarcely known in Missouri. Now it abounds in Bates, Cass, Carroll and other counties, growing very luxuriantly on the Wakenda prairie.

The *Cleome integrifolia* has been also introduced from the west, but does not seem to advance.

There are many other plants peculiar to certain localities entirely wanting at other places. Only a few of which I shall notice.

The *Anemone Caroliniaum* is found in Bates, Cass and Vernon, but more common in Kansas. The *Vernonia Arkansana* has advanced from the south as far as Jasper county. The *Amphyachyus dracunculoides* and *Oenothera speciosa*, although common in a few counties on our western borders, are not found eastwardly, but range southwardly into Texas. The *Collinsia veolacea* coming from the south I have seen abundantly at Carterville, in Jasper county, and near Butler, in Bates county only. The *Oxytropus lamberti*, *Yucca augustifolia* and *Pentstemon grandiflora* have only appeared in Atchison county, but are common further west. The *Oenothera Missouriensis* is very common in Kansas and have only rarely been found in Bates and Greene counties. One of our most beautiful gentians, the *Gentiana puberula* has almost disappeared from our prairies. The *Gentiana quinqueflora* I have only found in Adair county. But I have said sufficient. There are several particular zones of plants in Missouri. Our western plants are many of them different from those of Eastern Missouri, and the flora of eastern and southeastern Missouri has a marked different type from that of the prairie counties.

REPORT OF COMMITTEE ON ENTOMOLOGY—BENEFICIAL INSECTS.

BY MARY E. MURTFELDT, KIRKWOOD, MO.

The agriculturist incurs so much loss and disappointment from the ravages of insects that he is very apt to include all the hexapod tribes in a general sentence of condemnation. In so doing, however, he is dealing very unjustly with a large number of species which are more or less directly useful to him.

It will not be necessary for me to more than allude to the few, though highly important species, whose products have a commercial value, such as the silkworm, the honey bee, the cochineal and like insects, and some others less generally known.

The value of insects in the fertilization and especially the cross-fertilization of many flowers is a comparatively recent discovery, for which we are mainly indebted to the keen observation and patient investigations of the late Charles Darwin. In this relation it is difficult for us to realize the extent of our obligations to the bees, butterflies, moths and flies that hover, a winged cloud, over our fields and gardens in summer. This discovery gives us the key to peculiarities in floral structure, in which earlier botanists could see no significance, and accounts for the presence of the otherwise useless nectar.

We gain an idea of our dependence on these small agents from such facts as the impossibility of producing the seed of red clover in New Zealand, owing to the circumstance that there was no native insect to perform for the flowers the service so perfectly rendered by our humble bee, of bringing the pollen to the stigmas. The soil and climate of the country were entirely favorable to the growth of this valuable forage plant, but as it required to be continually renewed with imported seed, it could not be cultivated with profit. The difficulty being finally traced to the absence of an insect adapted to the work of fertilizing the ovules, and the humble bee being known to do this in England, many unsuccessful attempts were made to introduce this insect into the distant colony. Very recently, however, I learn that a few queen bees have been safely transferred to that far southern clime, and it now remains to be seen whether they will thrive in their new

habitat and fulfil the task assigned to them. This is one of many instances where insects in pursuit of their own food or pleasure render us indispensable service.

Another class of beneficial insects are the scavengers. These are found mainly among the beetles and the two-winged flies. The office of these species is to clear from off the face of the earth all decaying and air-poisoning animal and vegetable matter. Summoned by their keen powers of scent, they come in swarms from their various retreats and set to work with incredible force and rapidity to remove the cause of offense. This is done in different ways, each species having a plan of its own. Should a dead animal lie unburied or unburned for a few hours, hundreds of flies, with gauzy wings and bodies of burnished green and gold, will be seen hovering about it and depositing on every part eggs already at the stage of hatching, and in less than a day countless larvæ will be engaged in absorbing and re-converting into living tissue that which defiled the earth and air. Meanwhile carrion and burying beetles are no less active, cutting off larger or smaller portions and interring them for the sustenance of their young, which considerately hold their unsavory banquets deep under ground, where neither human sight nor smell can be offended.

The decomposition of useless vegetable matter is hastened in similar ways by other species of insects. And there are water scavengers as well as those that operate on land, whose combined efforts greatly aid in keeping pure and sweet, many otherwise disease breeding pools and ditches.

The amount of food which insects furnish to fish and to birds, including many game birds and domestic fowls, is another not inconsiderable, though indirect, benefit which should be placed to their credit by man.

But the most generally recognized service for which the agriculturist is indebted to insects is from those species to which, in the perfect economy of nature, is assigned the task of keeping certain other species in check. These may be divided into two classes, cannibal or predatory insects and true parasites. All the orders of insects have representatives in the former of these classes and nearly all in the latter, but, broadly speaking, the predatory species occur among the beetles and true bugs while the parasites are mainly two-winged or four-winged flies.

The cannibal beetles include many of the most beautiful forms and colors to be found in the order of the *coleoptera*. At the head of this list may be mentioned the tiger-beetles, (genera *tetracha* and *cicindela*,) swift in running and flight, of medium size—from one-half to

three-fourths inch in length—graceful in form and movement, and, in many instances, richly colored and ornamented. These insects are not unworthy of their fierce and beautiful feline namesake. They prey indiscriminately on all other species that they are able to capture. The larvæ are as ugly as the perfect insects are attractive, characterized by enormous head and jaws, sprangling legs and various abdominal bristles and hooks. They bore vertical holes in the earth, sometimes to the depth of ten or twelve inches and about one-fourth inch in diameter. At the mouth of these holes they lie in wait for their prey. The passing insect is seized with lightning rapidity in the vice like jaws and dragged to the bottom of the tunnel and devoured.

Tetracha virginica, Hope, the largest of our native species, of a brilliant metallic green color, has been observed doing great execution among the larvæ of the Colorado potato beetle.

The ground beetles (*carabidæ*), with few and unimportant exceptions, are fiercely predaceous, and as this family includes a vast number of species, it follows that they destroy a proportionate host, most of which are destructive to field and garden products. The ground beetles seldom rise in the air—some species being actually incapable of flight—but their legs being long and strong they run with great facility, with motions very similar to those of a hunting dog. As their popular name implies, they are usually found on the ground, but occasionally on the trunks of trees which they have ascended in pursuit of their prey. Their larvæ are elongate, active, horny grubs that burrow in every direction under ground, devouring all soft-bodied larvæ that they may come across. The most conspicuous species are the Rummaging Ground-beetle (*Calosoma scrutator*, Fabr.), the Fiery Ground-beetle (*C. calidium*, Fabr.), the Murky Ground-beetle (*Harpalus caliginosus*, Say), the Elongate Ground beetle (*Pasimachus elongatus*, Lec.), etc. The first of these is a large and handsome beetle, over an inch long, with metallic green wing covers, and the remaining parts of the body glittering in blue, gold, green and bronze. The second is somewhat smaller, black in color, with three longitudinal rows of burnished, coppery impressed spots on each wing cover. The Murky Ground beetle is dull black, and almost regularly oval in form, while the Elongate species is polished jet black, margined with violet blue. These species are all easily recognized and should never be wantonly destroyed. They have been observed, either in their perfect or immature states, devouring many of the most destructive worms and grubs that infest our orchards and gardens, such as the canker-worm, the curculio, the codling moth and the larva of the Potato-beetle.

Another valuable group of beetles are the neat little Lady-bugs or Lady-birds (*Coccinelidæ*); rather small, smooth, oval or hemispherical beetles, of various colors, dotted or otherwise ornamented with black or with a black ground, dotted with red or yellow. The beetles are often found on flowers, but the larvæ are ferocious-looking, dark, humpy grubs, whose favorite diet seems to be plant-lice and scale insects, of which they are among the chief natural enemy.

We have our allies, too, in many common-looking and mal-odorous bugs. These do not tear their prey, as do the beetles, with sharply-toothed jaws, but impale it on a strong-jointed beak and extract the vital juices by suction. Among these are three or four species, popularly designated "soldier-bugs." They are distinguished from the vegetable-feeders chiefly by a relative stoutness of beak.

In the Order *Hymenoptera* the wasps kill great numbers of smooth caterpillars and other soft larvæ for food for their young. The large solitary Sand wasps, or Digger wasps, store their cells with locusts or cicadas, and one species even makes a specialty of the dreaded Tarantula of the South.

Among the predatory insects in other Orders may be mentioned the Preying Mantis or Devil's-horse (*Mantis Carolina*, Linn.), which is one of the few carnivorous *Orthoptera*. This large and uncanny-looking insect, which sits with its spiny fore-legs folded and elevated and moves its triangular head on the long prothorax with such wary and watchful movement, is well known throughout all the Middle and Southern States, where it is an object of interest and amusement to boys and of terror to nervous women and girls. It is, however, powerless to inflict a wound of any consequence in the human skin and is not in the least poisonous. But on members of its own class it springs with cannibalistic fury and in the course of its rather long life numbers its victims by thousands. For this reason it should never be killed.

Two or three tree crickets are the only other species in this Order which I have observed to prey upon their kind.

The Order of *Lepidoptera*, in which are found the chief beauties of the entomologist's cabinet, and which also includes a large proportion of the most voracious pests of the field, orchard and garden, contains a few species whose larvæ are partly or wholly predacious. These are found mostly among the *Tortricidæ* and *Tincidæ*, and are not especially noteworthy, save as exceptions to the rule.

The Order *Neuroptera* has its Lace-wing flies, Dragon-flies, Helgramites, etc., all greedy carnivorous species, but the Lace-wings alone

are entitled to prominence among the insects that assist man in reducing the numbers of plant lice and such small but noxious pests. It is unfortunate that in applying insecticides to infested plants we so often unavoidably destroy our small friends with our foes.

It is in the true parasites, however, that nature affords us the greatest aid in keeping in check the insects injurious to vegetation. These, as was remarked at the beginning of this paper, are mainly *Hymenopterous* or *Dipterous*. The species belonging in the first named Order are four winged flies, bearing a distant resemblance in form to wasps, but the females are usually provided with a conspicuous, excerted ovipositor at the tip of the abdomen, by which their eggs are inserted under or into the skin of the unfortunate caterpillar or grub, which they select as a nursery for their young. The latter are footless, maggot-like worms, which, upon hatching, burrow in the body of their victim, by a mysterious instinct avoiding the vital organs, so that their miserable host lives until their growth is completed. They are more especially the foes of caterpillars, but many boring beetle larvæ are also attacked. The larger species, like those that attack the Cicropia and Polyphemus moths are solitary. Others, like those often observed in the Tobacco or Tomato worm are gregarious and will exist in great numbers in a single individual. When ready to transform they make their way to the surface and attach their cocoons by one end to the skin, and we often see caterpillars entirely covered with these little snow-white cocoons. The worms thus infested live in a torpid state far longer than they would have done if healthy, but never have sufficient strength to enter the ground to transform.

Another group of very minute four-winged flies (*Proctotrypidæ*) are Egg-parasites, and destroy their victims in their earliest stages of existence. Other small species infest plant lice and scale insects, causing the bodies of the former to become rigid as the parasite develops. When the fly is perfected it cuts its way out through a small hole like that made by a fine needle.

The most important of the two-winged parasites are flies belonging to the family *Tachinæ*. They have the general appearance of the common house fly, some species being larger and some smaller than the latter, generally more bristly, and a few have brightly colored bands crossing the abdomen. Among the species of this group that have rendered the most important service to man are the Colorado beetle parasite, (*Eporista Ioryphoræ*, Riley), the army worm parasite, (*E. leucanæ*, Kirk), and the red tailed flesh fly, (*Sarcophaga carnaria*, Linn.), which feeds upon the eggs and young of the Rocky mountain locust.

Another group of two-winged flies, which should by no means be omitted from a list of beneficial insects, are the *Syrphidæ*. In the perfect state these are medium-sized, slender flies, usually having the body banded across with bright colors and are often found on flowers. The larvæ are disagreeable, slug-like maggots, which are among the deadliest enemies of plant lice, both of the root and leaf-feeding species, and it is incredible how quickly they will devour an entire colony of their "small game." They also feed upon the eggs of larger insects such as moths, beetles and bugs, thus exterminating in their incipiency a horde of pests.

From the few examples here brought forward—to which, had time permitted, I might have added as many more—it will be seen that we have numerous friends directly and indirectly in the insect world. And for the prominence of our foes among this class of animals we are, in a certain sense, ourselves responsible.

Nature's balances are well adjusted, but man, in providing for his necessities, according to the advanced civilization of the present age, destroys these adjustments. He replaces the varied indigenous vegetation by cultivating thousands of acres to a single food-producing plant. Very naturally the insects which this plant fosters multiply in proportion, and their natural enemies are for a time unable to keep them in check. But eventually the most serious pests become so reduced in numbers by parasites and predaceous foes of their own class as to render them comparatively harmless. This is illustrated by the case of the Colorado potato beetle, which, upon its advent into the more densely populated States east of the Mississippi, was almost exterminatingly destructive to the plants upon which it fed, but at the present time gives very little trouble to the gardener.

Insects introduced from foreign countries, for example the codling moth and the European cabbage butterfly, are more difficult to conquer, as their natural enemies are left behind, and it requires some years for indigenous parasitic species to develop the habit of preying on them. Efforts have been made—but scarcely with pronounced success as yet—to introduce the European parasites. This would certainly seem to be feasible if the task were intrusted to qualified collectors, and would be the surest way of obtaining the ascendency over this destructive pest.

In conclusion I must repeat, what every economic entomologist has so often urged, that the farmer and horticulturist should learn to discriminate between his friends and his foes among the flying and crawling myriads, and not ruthlessly crush with his foot the beetle that is busily searching for the larvæ of codling moth or curculio, or

beat to the earth the wasp or *Ichneumon* fly that chances to buzz near his ear while purveying for its young, or even to scald out or drown out too many of the pugnacious humble bees that fertilize the blossoms of his clover fields.

It is not always possible for us to distinguish at sight between useful and noxious insects, but where the distinctions are broadly marked it is to the interest of the tiller of the soil, especially, to make himself familiar with them, in order to preserve from destruction the species that are incapable of injuring him and which, as a rule, more or less directly serve him.

REPORT OF THE COMMITTEE ON NOMENCLATURE.

T. W. Gaunt, Maryville, reports a list very similar to that adopted by the A. M. Pomological Society and the names were amended to correspond with that list.

The following is the list of revised names:

APPLES.

NAME REJECTED.	NAME ADOPTED.
American Golden Pippin	American Golden.
American Summer Pearmain	American Summer.
Carolina Red June	Carolina June.
Chenango Strawberry	Chenango.
Cooper's Early White	Cooper's Early.
Coxe's Orange Pippin	Cox's Orange.
Danver's Winter Sweet	Danver's Sweet.
Duchess of Oldenburg	Oldenburg.
Early Red Margaret	Early Margaret.
Hubbardston Nonesuch	Hubbardston.
Jewett's Fine Red	Jewett's Red.
Kentucky Red Streak	Kentucky Red.
King of Tompkins County	Tompkin's King.
Kirkbridge White	Kirkbridge.
Large Yellow Bough	Sweet Bough.
Marquis of Lorne	Lorne.
Marston's Red Winter	Marston's Red.
Otoe Red Streak	Otoe.
Pleasant Valley Pippin	Pleasant Valley.
Pyle's Red Winter	Pyle's Winter.

NAME REJECTED.	NAME ADOPTED.
Striped Sweet Pippin	Striped Sweet.
Tewksbury Winter Blush	Tewksberry Winter.
Twenty Ounce Apple	Twenty Ounce.

CHERRIES.

Bigarreau of Mezel	Mezel.
Early Purple Guigne	Early Purple.
Empress Eugenie	Eugenie.
Knight's Early Black	Knight's Early.

CURRANTS.

Fertile d'Angers	Angers.
Fertile de Palluau	Palluau.
Knight's Large Red	Knight's Red.
La Versaillaise	Versaillaise.

GOOSEBERRIES.

Smith's Improved	Smith's.
Woodward's Whitesmith	Whitesmith.

GRAPES.

Hartford Prolific	Hartford.

FOREIGN GRAPES.

Calabrian Raisin	Calabrian.
Early Silver Frontignan	Silver Frontignan.
Lady Downes' Seedling	Lady Downes'.
Mrs. Pince's Black Muscat	Mrs. Pince's Muscat.
Wilmot's Black Hamburg	Wilmot's Hamburg.

PEACHES.

Amsden's June	Amsden.
Austin's Late Red	Austin's Late.
Cole's Early Red	Cole's Early.
Cook's Late White	Cook's Late.
Crackett's Late White	Crackett's Late.
Early Albert	Albert.
Early Beatrice	Beatrice.
Early Louise	Louise.
Early Rivers	Rivers.
Early Tillotson	Tillotson.
Harker's Seedling	Harker.

NAME REJECTED.	NAME ADOPTED.
Hoover's Late Heath	Hoover's Heath.
Van Zandt's Superb	Van Zandt.
Ward's Late Free	Ward's Late.

PEARS.

Belle Epine Dumas	Epine Dumas.
Beurre Bosc	Bosc.
Beurre Clairgeau	Clairgeau.
Beurre d'Amanlis	Amanlis.
Beurre d'Anjou	Anjou.
Beurre de Brignais	Brignais.
Beurre Diel	Diel.
Beurre Giffard	Giffard.
Beurre Hardy	Hardy.
Beurre Langelier	Langelier.
Beurre Superfin	Superfin.
Bonne du Puits Ansault	Ansault.
Dearborn's Seedling	Dearbon.
Doyenne Boussock	Boussock.
Doyenne d'Ete	Summer Doyenne.
Doyenne du Comice	Comice.
Dr. Bachman	Bachman.
Dr. Lindley	Lindley.
Duchesse d'Angouleme	Angouleme.
Duchesse de Bordeaux	Bordeaux.
Golden Beurre of Bilboa	Bilboa.
Jalousie de Fontenay Vendee	Fontenay.
Josephene de Malines	Josephine of Malines.
Knight's Seedling	Knight.
Louise Bonne de Jersey	Louise Bonne of Jersey.
Nouveau Poiteau	Poiteau.
Paradis d'Automne	Paradise of Autumn.
Supreme de Quimper	Quimper.
Triomphe de Jodoigne	Triumph of Jodoigne.
Vicar of Winkfield	Vicar.
Winter of Jonah	Jonah.

PLUMS.

Boddært's Greene Gage	Boddæri.
Denniston's Superb	Denniston.
Oullin's Golden Gage	Oullin's Golden.
Transparent Gage	Transparent.

QUINCES.

Rea's Seedling	Rea.

RASPBERRIES.

NAME REJECTED.	NAME ADOPTED.
Belle de Palluau	Palluau.
Belle de Fontenay	Fontenay.
Knevett's Giant	Knevett.
Merveille de Quatre Saisons	Four Seasons Red.

STRAWBERRIES.

Cumberland Triumph	Cumberland.
Hovey's Seedling	Hovey.
Miner's Great Prolific	Miner's Prolific.
Monarch of the West	Monarch.
Neuman's Prolific	Neuman.
President Wilder	Wilder.
Wilson's Albany	Wilson.

THE DRAG.

Wherever introduced the drag is taking the place of the roller. In almost every way it does better work. If the ground is uneven the roller will not smooth it; the drag will. If the clods are hard and dry, and the rest of the ground loose, the roller will often simply push them down without crdshing them; the drag grinds them fine. If the lumps are wet, the roller will be likely to press them into a solid mass, and while the drag will often tear them to pieces, leaves them loose to be dried by the sun and air. The best form of drag is made of oak plank two inches thick, and about a foot or fourteen inches wide. If for four horses, the planks can be about twenty feet long; if for only two horses, ten or twelve feet long. These are bolted firmly together, overlapping about two inches. About two feet from each end of the front plank, a strap clevis is fixed to receive the double-trees, and a team is hitched to each, the driver standing on the drag behind. If the driver's weight is not enough, stones or logs may be added. For a two-horse drag, a hole is bored in the front plank about two feet on each side of its center, and a chain is then passed through these holes, connected with a clevis in front, to which the double tree is attached.—*American Agriculturist.*

LESSONS LEARNED DURING THE YEAR.

Mrs. Burden plants roses deep.
Mr. Gilkerson plants no more King Apples.
Mr. Gaunt plants no more Maiden's Blush.
Mr. Lionberger got rid of the borer by cultivating better.

SECRETARY'S REPORT.

BY L. A. GOODMAN, WESTPORT, MO.

Again, dear friends and members of our State society, we meet to discuss our success and failures; to meet one another and form new acquaintances; to renew our old and to enthuse new life into our work.

I congratulate you that we find so many of our fruit men who are able and willing to help along this matter. Nothing succeeds like success, and all we want to know of any matter here in the west is, that it is going to be successful, and then we are willing to work, and work with a will. We found this the case in our society work. It was hard to convince the fruit growers of the State that we were in earnest and expected to do something. After two years of work we find the case changing, and now people are enquiring of us and seeking to become one of us, instead of being afraid to be called one of our members.

Our work is growing more and more, and spreading each year farther east. The lump of leaven from the west of the State is extending all over our great State. The only limit to our work and usefulness is the money we have given us to expend in the cause, and it is well for us to lay plans now for the increase of income

In all the realm of labor or professions there is nothing so fascinating as the study of horticulture. There is something so attractive in the work that very few ever give up the study when once well begun, and then we see every man who has made his thousands in the busy cities look forward to the time when he can enjoy himself on a farm or in the horticultural field. We have then a glorious and wide spread field open before us, one which needs investigation and study; one which presents the grandest opportunities for the student to enter; one which is just entering on the threshold of science; one which has few known laws and many chances for experiment.

In this grand work, then, we have nothing to lose and everything to gain; so that our greatest trouble in awaking enthusiasm in our State society was to do something so that our people could be satisfied that we are alive and not dead.

To accomplish this, then, was our first work, and this we did by making our successful show at the World's Fair at New Orleans. Our

success there was remarkable; in fact greater than that of any other State in the union. This brought our State and fruits into notice more than any other one thing, I believe, and to day we are reaping some of the benefits by the score of buyers all over our State.

Our next show of fruit was at Grand Rapids, and there the attention of those wishing to buy apples was most certainly attracted. More than a dozen apple buyers and packers were continually plying me with questions about where to buy, and I am sure that I speak within the limits when I say that a score of apple buyers came to Missouri as a result of that show of fruits; so that the money expended for this exhibit was returned to the State a thousand fold.

A display of fruits was also made at St. Louis, and probably the best collection of fruits were there shown that had ever been seen at the St. Louis fair. These exhibits, with others, have brought our society into notice much more prominently than any other one thing could have done, and in doing so has brought out a number of good workers all through our State.

In making these exhibits your secretary has to acknowledge many favors from members and especially our county societies in their generous assistance in these displays. They have all been a help to the society and I believe have helped themselves very materially also.

We have started in the right direction and all we need is earnest, hearty, united effort and we will show our sister States that Missouri has a society equal to any in the land.

Since our June report, which was given at our June meeting, we had an August report, and that report has been fully justified in its predictions.

The crop of apples has been good only in some very favored places, and there they have been very profitable. Some of the older parts of the State they have been very poor indeed, and in the newer portions they have been very good indeed.

Peaches have only been a success in the southern part of the State, on the Ozark Mountains and on the southern slope.

In this report a list of fruits adapted to each county was desired. They were given in many instances and will appear in their appropriate place.

STATISTICS.

The need of statistics of the amount of fruit grown in our State seems imperative, and, if possible, some arrangement should be made with the State Board of Agriculture to get them.

Our State is getting to be a wonder to the eastern people in the amount of fruit it produces, and it is going to be a still greater wonder. Not one-tenth of the fruit is grown that will be in the future. The great possibilities of our State are just beginning to be known. I believe that I am right when I say that our State will be the greatest fruit producing State in the union. I believe it possesses the soil and the climate for this very end.

The Ozark mountains and the southern slopes are to be a vast field for the orchardist. There we have the mild climate, the heighth above the sea, the protection of the pine trees and the higher points of the mountains from the north winds. The protection of the woods from the southwest "hot winds;" the best of water, the best of soil, the best of fruits, and consequently the best of health. The central has the river bluffs, the fine prairies, the rich bottoms, plenty of timber, plenty of prairie, to satisfy the most exacting agriculturist.

Here the apple is a success and the peculiar limestone formation gives us the brightest colors to our fruits. The northern has much of the warm soil and the climate just suited to produce many of those northern apples that are so justly celebrated all over the world. The small fruits also are a grand success all over the State, and it is a pity that we cannot know what the worth of this is, as well as the wheat or corn crop. I believe it is the duty of our State Board to help us in this and let us call on them for it. They are anxious to have all our resources known and they will help us.

The value of the apple crop alone in one of our counties, that of Bates county, will amount to over $1,000,000 this year. The apple crop of our State is worth as much as our wheat or corn crop this past year, and the whole crop of fruit would amount to much more. Estimates are not worth much, but when based upon some fact and reports that we are sure of, it comes very near the truth.

OUR COUNTY SOCIETIES.

Since our last meeting we have two or three new societies, and good ones, too.

The Lafayette county society, the Montgomery county society; both live and flourishing societies. Already they are being heard throughout the press, and a valuable help will they be to their members and the State at large.

When we can have fifty societies scattered over our State, all working in unison and to the same end, all helping one another and the State society, and the State society helping them, working mutu-

ally for each other, then we shall see a revival of our best efforts and a grand onward step will be taken by our State.

No State has greater opportunities and no State has better men to do the work if they will only unite and make one grand pull all together. Our county societies are one of the strongest helps we can get and it is a necessity that we should have them. If there is none in your county, go home and organize one.

A MISSOURI FRUIT SHOW.

This has been a subject that our executive board have long desired, and now it has been taken up by "Colman's Rural World," and the question is asked, "why not have one?" Surely, why not?

The time has come when we must take some steps in this direction. How shall it be? When shall it be? Where shall it be? These are the questions. I believe the key to the whole matter is given in that article in the "Rural World."

Missouri can make one of the finest shows of fruit that can be seen anywhere, and I hope we may have the opportunity to do so next year. The display should be made by counties and county societies as far as possible. Let each county collect all the fruit in its limits, place them in cold storage when they begin to ripen, and then about the time of our fairs make a general display at our great city, St. Louis. The St. Louis Fair Association would give us a good building and considerable help, and at the time of the immense crowds that visit the city during that time, many would be led to seek Missouri as their home.

A place in that large exposition building would be grand for a show of fruits, and in all probability space could be had. Let this be done under the management of the State society and success is assured, and you may be sure that the finest fruit show will we see that was ever made in our whole country.

Let a committee have charge of the displays and every opportunity given the counties to make a show. Let the judges pass on the merits of the fruits, awarding medals for their displays. Let the fair association set aside two thousand dollars or more for this work, and let it be divided among the counties making the displays, giving each an equal amount, provided the judges think the display worthy. Let this display not only be a plate display of the different varieties, but let some artistic work be done also. Let us give conspicuous place to a display as well as a collection.

If a certain amount of money be set apart for each county or

society, they will do their utmost to make a creditable display as well as to make a large collection.

If the executive committee will take hold of this matter and urge it forward there is no question about the success of the enterprise. If our county societies can be assured of some money to pay their expenses, they are willing to give their time and work for nothing.

NEW APPLES.

Again, I would call attention to some of our "new apples."

At the display in Michigan we had twelve new seedlings, very valuable, and at St. Louis, also, we had fourteen. Some of these are very promising and we trust will prove a permanent improvement on some of our old fruits.

In addition to those spoken of in the June report, namely:

The "Loy," a seedling, from Howell Co., Mo., which took the premium at New Orleans as the best new apple; propagated and for sale by M. J. Roundtree, Springfield, Mo.

The "Rankins," a seedling from Lewis county, which took the premium at our last winter meeting as the best new apple; propagated by Chas. Patterson, of Kirksville, Mo.

The "Gano," a seedling from Platte county, resembling the Ben Davis; propagated by Blair & Kauffman, of Kansas City, Mo.

We have now a few other very promising apples:

The "Luke's Silver," a very valuable apple, of good quality, hardy tree, very prodnctive, and a great keeper. Thos. Luke, of Trenton, Mo., is the originator and propagator. A sample is on the table, gathered last September, taken to Michigan and then St. Louis.

The "Shackleford," an apple propagated by Frank Harlan, Canton, Mo., resembles the Ben Davis, but of better quality; good, hardy tree, very productive and good keeper. A sample can be seen on the table. It seems to be one of the handsomest apples grown and hope it will be valuable.

The "Howell" apple, a chance seedling, found in Howell Co., Mo., by Levi Smith, of West Plains, and said never to fail to bear; good quality, fine keeper, large size and valuable. A sample is also shown but not of full size, as most of them were given away before I received them.

The "Freeman," a seedling, from Springfield, Mo., found by J. W. Freeman, of Brookline, and said to be larger than Ben Davis, of excellent quality, beautiful in color (equal to a Lawver), a regular bearer

and perfectly hardy. The sample shown was gathered on September 1st, before it was nearly grown.

The "Lucy Pew," a seedling, from F. Lionberger, of New Florence, Mo.; of beautiful color, fair size, good bearer and excellent quality.

The "Smiley's Red," another from the same party, and of very fine quality and size, but of their keeping qualities I know nothing. Samples of both are shown.

The apple called the "Fuqua," which was shown at our June meeting, seemed to possess valuable qualities and nothing seems to be against it but its color. Probably we shall have a report from it during this meeting by some of the members from Bates county.

A number of new seedlings are from F. Lionberger, of New Florence, Mo., and a report will be given on them as well as on that tree that is over eighty years old and still healthy.

I was in hopes that we could have good samples of each when they were of their best size and full growth, as then we could better judge of their quality.

These new apples, we hope, will be of some value to our State, and it is well for us to test them, and that carefully. It seems as it the apple should go out until it has had a test in more than one locality, but the time it takes to do this and the universal success of most apples in our State does not compel us to this exclusiveness.

I am satisfied that there are hundreds of new apples all over our State that are valuable and only need finding out to make a record for themselves.

Let us then watch this closely, and whenever or wherever we can find a new apple with a good record behind it, let it be brought out and tested. What we want is an apple of size equal to Ben Davis as productive, of as good color, as hardy in tree and of much better quality and a number one keeper. When we find this we may begin to examine the value of the apple. But if the apple has no decided advantages over others now known it is useless to multiply varieties; we have too many now.

ENTOMOLOGIST.

Again I call the attention of the Society to the need of an entomologist. It seems to me that if this matter was presented in the right manner to the State Board of Agriculture they would do something for us as well as the farmers in this cause. A few hundred dollars could at least be used to help some one of our students in the cause to prosecute their studies more closely and extensively. I hope some action will be taken in this matter at this meeting.

The insect depredations are the greatest drain upon our money matters of any other one thing, and a few thousands spent in this work would well pay.

PYRETHRUM.

In this connection I would again call attention of this Society to the use of this valuable insect destroyer. It will kill the cabbage worm and like insects more effectually than any other known remedy.

Mixed with five parts of flour it is a complete success used with the little hand bellows; mixed with water it can be used by spraying on the plants.

LONDON PURPLE.

From many reports of the use of London Purple we see that it is a complete preventive of the ravages of the codling moth. By using one pound to forty gallons of water, and the force pump to spray the mixture upon the trees, we find that we have a complete success.

Mr. Moody, of Lockport, says that he has gearing attached to the wagon wheel that runs the pump, and that it costs him very little to syringe his trees twice during the summer, and he says that we can form no idea of the benefit to the orchard in freeing it from insect life. He believes that the use of it in a whole community for three years will nearly exterminate the insect pests. It is well for us to try it.

TOBACCO.

For all small bushes and plants in the green-house this is one of the best and cheapest, and I believe will yet be found one of the best for out-door work also. I hope it will be put to this good use in the near future, where it may be a blessing instead of a curse.

REPORT OF THE EXHIBIT AT THE AMERICAN POMOLOGICAL SOCIETY AT GRAND RANIDS, MICHIGAN.

The work of making the collection for this society was put off until September 1st, except the summer fruits, so as to get as much size and color as possible on our winter apples.

A trip was made into south Missouri and a fine collection made at Lamar, through C. H. Fink & Son and M. M. Spear on one day, and the next I was at Springfield, and with the assistance of Henry Scholton, W. C. Freeman and D. S. Holman, a splendid collection of apples was made there. The next day I was in Howell county, and spending two

days there succeeded in getting the best apples in our collection. With the assistance of P. P. Dobozy, E. F. Hynes, Levi Smith and J. C. Richardson, of West Plains; Geo. Loy, of Moody, and G. L. Sessins, of Olden, a goodly number of varieties were collected. Besides these a collection was sent in by the Bates County Society, of Butler; Dr. Morerord, of Schell City; F. Lionberger, of New Florence; J. B. Wild & Bro., of Sarcoxie, and many others in smaller lots but none the less valuable.

The Missouri Valley Society also gave us a good collection for our use.

I can point with pride to our collection of 150 varieties of apples, 50 of pears, 26 of grapes, 3 of quinces and 3 of peaches as being one of the best in the hall, and to the success of the exhibit in receiving a medal for the collection.

Some of the northern and eastern men opened their eyes to the beauty of our apples, and the remark was true that "westward the star of fruit growing takes its way."

At this meeting I believe our fruits attracted more attention than did any other display, and I am sure it was the means of bringing more buyers into the western part of our State to buy apples than all other causes combined.

The expense of this show, all told, was $145.90, of which $25 00 will probably be returned by the express company. Our express charges alone were $50.00, and we are expecting a return of one-half.

The fruit shows are one of the best means of advertising our fruit crop, and always will pay.

ST. LOUIS DISPLAY.

The display made at the St. Louis Fair consisted of 180 varieties of apples, 80 of pears, 30 of grapes, 3 of quinces and 3 of peaches, probably the most complete collection of fruits ever shown at that fair. We received $55.00 in premiums and a diploma for the "best and largest collection of fruits by any society or club of individuals." The expense of this display was $65.00. Both of these expense accounts will be referred to the finance committee for approval.

The work of the Secretary is one that is growing all the time, and although one of pleasure and love to me, is one that takes more and more time each year, and will soon occupy his attention completely.

Last year I sent out 3,000 circulars, wrote 1,000 letters and 1,000 postal cards, named many varieties of apples, answered many hundreds of questions, and last but not least, enthused new life into many of our fruit growers and a few of our societies.

The reports of our fruit crops have been of value to every county that made one, and will hereafter grow to be more so.

MEMBERSHIP.

Our membership has grown since our last, and I would recommend that where the society has a correspondent in the county, who is not a a member, he be made one to recompense him for his trouble of answering questions.

I have sent all such the report for 1885, and believe it well sent.

Every effort should be made to increase our membership, and all it needs is the earnest co-operation of our members.

The experiment of placing all members of local societies as members of our State society is a good one to keep up the interest in them, and help us in many ways. But it makes a membership which does not pay anything into our society, yet I believe still that it is the best plan to awaken new interest.

The report for the last year has been well received, and the 1,000 bound copies are nearly all gone, only a very few remaining.

The 500 of those unbound, I will have bound according to the recommendations of the Society at the June meeting.

The next year's report will be bound by the State, and the number of copies will be governed by the Printing Commissioners, composed of Secretary of State, State Auditor and Register of Lands.

How many they will allow us, and when it can be done, will have to be attended to hereafter. It will be necessary for the Secretary to go to Jefferson City, make the necessary arrangements, and correct the proof as fast as printed.

THE WORK OF THE SOCIETY

For the year must still be the aggressive movement, one which will be an onward step and an upward step. We must have more county societies organized, so as to get new life in this work of horticulture in many parts of the State where there is no such thing as enthusiasm. It is astonishing how much can be accomplished by the banding together of a few men and women in this work. I will cite you a instance of it: The Missouri Valley Society has been a power among us. The Bates County Society has entered a new existence since our State meeting there. The Holt County Society has built up a record for good work, and enthused life into many a fruit grower, and are becoming known all over our State. The Montgomery County Society, only a few months old, has made itself heard, and has a number of earnest

workers. The Lafayette County Society, still young, has a good strong list of members, and already the papers are seeking to publish their reports.

Another item of importance is the visiting of these societies, and assisting in the work as well in instituting new work in the counties not organized.

Now, then, in conclusion, we are glad to meet one another here, and form these new acquaintances. We are happy that we are engaged in such a time-honored work—a work which we love above all others—which brings health, wealth and wisdom; a work which gives every opportunity to learn and grow. And in this great work if we can only pull together, and work together, and talk together, and reason together, we shall know no such thing as fail. Our cause will grow, and we shall all be enjoyers of this world. To this end we will always labor, and with God's blessing upon us we will continue until he call us hence.

TREASURER'S REPORT.

Date.		Amount.
June 1, 1885.	Received of J. C. Evans, Treasurer	$84 00
Aug. 31, "	" of State Treasurer	1,250 00
		$1,334 00
Dec. 12, 1885.	Warrant 72, premiums winter meeting	36 00
12, "	" 71, expenses of winter meeting	52 60
12, "	" 69, " of J. C. Evans, St. Louis	18 20
10, "	" 68, Six months salary of Secretary	250 00
1, "	" 67, H. N. Farey, printing	13 50
Nov. 1, "	" 66, Postage and express (bill)	12 87
Oct. 1, "	" 65, " " " (bill)	14 24
Sept. 1, "	" 64, cold storage, etc., (bill)	26 00
Nov. 30, "	" 63, Z. S. Ragan, expenses	11 30
Sept. 15, "	" 62, exhibit at Grand Rapids	145 90
Aug. 15, "	" 61, postage (bill)	7 26
1, "	" 60, H. N. Farey, printing and P. O. cards	18 75
July 1, "	" 59, postage (bill)	21 83

TREASURERS REPORT—CONTINUED.

Date.		Amount.
1, "	" 58, expenses summer meeting	$47 00
June 1, "	" 57, postage (bill)	16 88
1, "	" 56, H. N Farey, printing	15 00
	Total	$707 53
	Leaving balance in treasury Dec. 12, 1885	626 47

Z. S. RAGAN,
Treasurer.

Refered to the Committee on Finance, and returned approved.

J. A. DURKES,
W. B. STARK,
E. P. HENRY,
Committee.

A resolution was passed referring the places of the June meeting and of the winter meeting to the "executive committee" for their decision.

The resolution referring to a committee the matter of a plantation at Nevada, was reported upon by the committee as follows:

Your committee to whom was referred the resolution introduced by Mr. Kern requesting the influence of this society to secure an appropriation from the General Assembly for the planting or forest trees on the grounds of Asylum No. 3, beg leave to report the following:

Resolved, We invite the co-operation of the friends of horticulture, in annual meeting assembled, to assist the securing of an appropriation by our next Legislature sufficient for the improvement and planting of the grounds of Asylum No. 3.

We endorsed the resolution passed by the Commissioners of Insane Asylum No. 3, and will, as a society, make every possible effort to impress our legislators favorably with the necessity of a liberal appropriation for the improvement of these grounds, by which the usefulness of the future institution will be greatly enhanced, and an opportunity afforded to illustrate the modern modes of practical forest culture to the people of the southwest and State at large.

D. S. HOLMAN,
J. W. SANBORN,
J. A. DURKES,
Committee.

A resolution wes presented by G. W. Gano on the death of Chas. Downing, with a request that it be printed in our next report.

Adopted, and the following tribute from his old friend is presented:

Resolutions were adopted expressing sympathy with our treasurer, Z. S. Ragan, of Independence, for his affliction, and the Secretary ordered to notify him of the fact.

CHAS. DOWNING—A DESERVED TRIBUTE.

The following extract from the Presidential address of Hon. Marshall P. Wilder at the recent meeting of the American Pomological Society concerning one whose memory is preserved by all fruit lovers, will be of interest to Prairie Farmer readers. After speaking of various members, President Wilder continued: But he whom we could least spare has been taken from us. Charles Downing, our beloved friend, the upright man, and the great pomologist of America, is no more! The loss to our country and cause, seems now to be irreparable. But infinite Wisdom can not err, and we should be thankful that he has been so long spared to us. Mr. Downing was born in Newburg, N. Y., July 9, 1802, and died at his home in that city January 18, 1885. His death is to me a most afflictive event. We were associated for nearly half a century in efforts to advance the pomology of our country. Succeeding, as he did, his brother, A. J. Downing, whose eulogy it was my sad duty to pronounce thirty-two years ago, he became the editor of the "Fruits and Fruit Trees of America," all the editions of which have been dedicated to my name. These circumstances have drawn us more and more closely together by the ties of affection and friendly regard.

REPORT OF COMMITTEE ON FRUITS.

We, the committee appointed to report upon apples exhibited at the present meeting of the Missouri State Horticultural Society, return the following:

There were twenty-seven plates of apples entered for premiums, as offered by the society. The number of plates exhibited in all is two hundred and forty.

It is impossible for the committee to give praise to any one particular collection, as they do not know who the donors are, with one exception, which we know is from our friend, A. H. Gilkerson, of Warrensburg, Mo., and which is a credit to himself and to the society. In fact the whole collection is one that we need not be ashamed of. A great part of the collection has been presented by our worthy secretary, L. A. Goodman, who has gone to considerable pains and trouble to collect from all around, but as we do not know which they all are cannot make a distinction; four plates of pears that deserve mention; seven varieties of crab apples; two varieties of persimmons, St. Thomas and Ruby.

Of seedlings—Competing for premiums there were seven.

No. 50. Shackelford, a large showy apple much resembling Ben Davis in all respects, but not so highly colored.

No. 54. A handsome medium apple, or a little above in size, resembling the Minkler in every respect, but a little sweeter.

No. 63. A medium to large well formed dark crimson red, quality fair, a very handsome apple, resembling the Gano in size and color.

No. 64. A handsome pale yellow apple of medium size, fine in texture, with a peculiar cocoanut flavor, a quite fine apple, by Mr. N. J. Staley, of Warrensburg.

From Bates county, Mo.—A medium sized greenish yellow and shaded with red, promises to be a good keeper, and decidedly of good quality.

A plate of fine sized apples, of the form of Ortley Pippin, together with three other rather similar varieties. Most of these seedlings have been picked before their proper time and placed in cold storage, thereby detracting from their quality both in color and flavor.

A handsome collection of apples from Indiana, exhibited by W. A. Workman, are worthy of special mention.

A keg of cider from Wm. Beyers, Kansas City, Mo., which the committee deemed as falling under their care, not yet tested.

SAMUEL MILLER,
W. G. GANO,
J. B. DURAND.

PREMIUMS AWARDED.

Gloria Mundi, D. S. Holman, Springfield; Gold Russet, D. S. Holman, Springfield; Ingrahan, D. S. Holman, Springfield; Culp., N. F. Murry, Elm Grove; W. W. Pearmain, N. F. Murry, Elm Grove; Rox Russet, N. F. Murry, Elm Grove; Fall Pippin, N. F. Murry, Elm Grove; Wagner, N. F. Murry, Elm Grove; Missouri Pippin, H. Shepley, Nevada; Pennock, H. Shepley, Nevada; Ben Davis, H. Shepley, Nevada; White Pippin, W. H. Hollaway, Butler; Minkler, W. H. Hollaway, Butler; Willow Twig, W. H. Hollaway, Butler; Janeton, F. Lionberger, New Florence; Vandevere, F. Lionberger, New Florence; Pennsylvania Red Streak, F. Lionberger, New Florence; Northern Spy, F. Lionberger, New Florence; Wine Sap, S. Miller, Bluffton; Newton Pippin, S. Miller, Bluffton; Swaar, S. Miller, Bluffton; Gilpin, A. H. Gilkerson, Warrensburg; Huntsman, A. H. Gilkerson, Warrensburg; Grime's Golden, A. H. Gilkerson, Warrensburg; Rome Beauty, A. H. Gilkerson, Warrensburg; Lansingburg, A. H. Gilkerson, Warrensburg; Roman Stem, A. H. Gilkerson, Warrensburg; Fallawater, A. H. Gilkerson, Warrensburg; Baldwin, A. H. Gilkerson, Warrensburg; Lady, A. H. Gilkerson, Warrensburg.

BEST NEW APPLE.

1st. Mohler & Son, Warrensburg; apple resembles Gano.
2d. F. Harlan, Canton; apple resembles Ben Davis.
3d. P. P. Dobozy, West Plains; apple resembles Minkler.

REPORT OF THE COMMITTEE ON FINAL RESOLUTIONS.

Resolved, That the thanks of this society are due to the Mo. Pac., K. C., St. L. & C. B., Wabash, Memphis & C. & R. I. railroads for reduced rates over their lines to members and friends attending our annual winter meeting at Warrensburg, December 9, 10, 11.

Resolved, That the thanks of this society are due to the German Evangelical Church for the use of their house, and our only apology for removing our meeting to another place was want of room to accommodate those wishing to attend.

Resolved, That our thanks are due to the State Normal School for the use of their rooms, and many kind favors.

Resolved, That the thanks of the society are due to the local Horticultural Society, and the citizens of Warrensburg, for their kind reception and many favors in conveying the society in a body to visit mineral springs, and for the many kind favors and free entertainment of members in attendance.

Resolved, That the thanks of this society are due to R. S. Brown, F. D. Atkins, L. E. Bosley, of Kansas City; Hans Neilson, of St. Joe, S. M. Jordan and H. Michel, of St. Louis, for the presentation of many beautiful flowers which added much to the floral display and to the pleasure of those attending the meeting.

Resolved, That the thanks of our society are due to the local press of Warrensburg for favors shown us during our session.

Resolved, That our thanks are due to A. M. Gilkerson, who has rendered much valuable service to members and friends of the society.

Resolved, That our meeting has been one of interest, profit and pleasure to our society.

N. F. MURRAY,
H. E. VAN DEMAN,
D. S. HOLMAN.
Committee.

Geo. Van Houten, of Iowa Horticultural Society: Expresses thanks for favors, and invites the society to send a delegate to their society in January, 1886.

H. E. Van Deman, of Kansas: Expresses thanks for favors.

Samuel Miller: Has enjoyed the meeting more than any others, he believes.

N. T. Murray: Likes these meeting as well as any one could, and spoke of the officers and especially of secretary's work in approval.

Moved that Prof. Osborn be made a life member. Motion carried.

After which a few parting words were given, and the society adjourned.

MISCELLANEOUS PAPERS.

[*The following papers come under the head of Reports From Counties.*]

REPORT FROM ANDREW COUNTY FOR THE SEASON OF 1885.

BY G. SEGESSEMAN, AMAZONIA.

In spite of the preceding hard winter the prospect was for most of the fruits still fair till after the May frosts, which changed the aspect completely.

Small Fruits—Strawberries—Good crop, with prices reduced, yet with an advantage for the local market, where costs for picking, packing, shipping and commission could be saved. Some sold in this way at 10 cents, then down to 8⅓ cents a quart.

Raspberries—Half crop, at 10 cents a quart.

Blackberries—Almost none; only in a favored locality a patch of Snyder brought a good crop, selling in the home markets at 10 cents a quart (no boxing required). The same kind was winter-killed on other sites, as well as Kittatinny, etc. The trade in currants and gooseberries is not worth mentioning.

Apples—The poorest crop since 1875, with prices no better than the previous season. Quality was inferior also, more wormy than ever.

Pears—Comparatively better than apples, but a good many of ill-shape and stony; sold at two to four dollars per bushel.

Peaches—No kind of protection proved sufficient (tree protector or laying down). On over 1.000 trees I did not find a single specimen. Most of the trees are dead, or so crippled as to be of almost no value.

Plums—Chickasaw family good; others failed from insects.

Cherries—Half a crop, were in good demand; a few trees died.

REPORT FROM GREENE COUNTY HORTICULTURAL SOCIETY.

BY D. S. HOLMAN.

SPRINGFIELD, Mo., Dec. 5, 1885.

We desire ro keep our society on record by reporting to your body as a private society. Ours, as a county society, is yet small, but steadily growing; almost every meeting brings to our number additional workers.

Our meetings are monthly, also an annual meeting at the close of the year, when we elect officers for the ensuing year, etc. The society usually holds a semi-annual meeting in stawberry season, which we make as pleasant as possible, in the way of displays of flowers, berries, etc., and a strawberry festival. We usually have a fair or fall show of fruits. Last fall our agricultural friends gave us space in their new buildings, and the best workers of our society made a creditable display of the horticultural products of our county at the agricultural fair.

At our last meeting, on the 5th inst,, the society elected two delegates to this meeting, not so much to help here, as if possible to help ourselves by getting all the information, instructions and suggestions given by your society for the benefit of auxillary societies. The delegates are the Secretary and Mrs. Wade Buren.

By vote of the Secretary I am instructed to invite you to come to our city with your next summer's meeting, with the assurance of entertainment free of charge during your stay. Our society desire this, and ask it for our profit, which is sure to follow your meetings.

We propose to make the the incoming year one of work as well as pleasure. Our President-elect, and three other members who have come to us recently, are workers from the Missouri Valley Society, and we hope some of the elements of that old prosperous society's success may be brought by them to us.

We have no hall, but little money and no debts, and of the latter we mean never to have any. The field for horticultural work is large and good. We are resolved to occupy it, and till it in hope, till the workers so increase that we may rejoice in success together.

REPORT OF THE BATES COUNTY HORTICULTURAL SOCIETY.

BY HENRY SPEER.

In July, A. D. 1883, a call was publishad in the local papers for those interested in horticulture to meet at the court house, in Butler for the purpose of organizing a society, signed by E. P. Henry, L. P. Siceloff, C. I. Robards. J. B. Innis, Henry Speer and W. H. Halloway.

On August 11th, 1883, the first meeting under the call was held. Hon. J. B. Newberry was elected chairman, and Henry Speer secretary.

Committee on cosstitution and by-laws were appointed to report at an adjourned meeting in one month. Small meetings were held monthly with some interest, but a permanent organization was not formed till February, 1884, when J. B. Durand was elected president and Henry Speer secretary, who were re-elected at the next annual election, and still hold the same positions.

Owing to the inclement weather the society has missed a few, but very few, meetings since its organization. It meets on the third Saturday in each month, during the winter at Butler, and during the summer it holds picnic meetings with its members, which are always pleasant.

The June meeting of the State Society this year was held at Butler by invitation of our society, and the influence of that meeting has been of great and lasting benefit to our society. The papers read during the year have been varied and interesting, and the society has come to stay. We made a small exhibit at the Kansas City fair which paid all expenses, and left a neat little balance in the treasury, and as an advertisement of our fruits and county, did a vast amount of good. All kinds of small fruits made a fair crop with us. The apple crop was spotted; some orchards very full, others nearly a failure; shipping apples brought from thirty to fifty cents per bushel, and cider apples from fifteen to twenty. The full amount of apples shipped from the county has not yet been obtained, but will be in due season, and furnished to the Secretary of this society.

Trees and plants are at the present time in fine condition for a crop next year, and, upon the whole, we have no just grounds for discour-

agement, and horticulturists are generally hopeful for the future, and next season more fruits will be planted than ever has been in any one year in the history of the county.

REPORT OF LAFAYETTE COUNTY HORTICULTURAL SOCIETY.

BY CHAS. TEUBNER, SECRETARY.

This society organized at Lexington, Missouri, August 3, 1885, with a membership of nine.

Its officers are: President, Dr. W. A. Gordon; Vice-President, N. G. Phetzing; Secretary, Chas. Teubner; Treasurer, Geo. M. Catron.

The constitution is paterned after the one published in the reports of the State Horticultural Society. Meetings are held on the second Tuesday in each month, during winter, in the court house, and in summer at the residences of the members. At each meeting new members were added to the list, which now contains twenty-one, three of them being ladies. Members in turn furnish an essay or lecture for each meeting, the subject of which is then discussed. A blackboard 3x4 feet is used for illustrating the essays and lectures. Geo. F. Maitland gave an essay on strawberry culture in the last meeting, and Chas. Teubner one on grape culture in the November meeting. At the latter meeting an apple exhibit was held, in which twenty five varieties were represented. Specimens of this exhibit were sent to the Secretary of the State Horticultural Society, for the meeting of that society at Warrensburg in December. The proceedings of our society are published by the Lexington papers, so that non-members as well as members may be benefited by our efforts. The apple crop in this county was less than a half crop. Eary varieties, inferior in size, imperfect and wormy. Maiden's Blush good; Jonathan, Huntsman, Rome Beauty, Janeton, Willow Twig and Ben Davis, being the varieties which did best, the latter especially. Young orchards had the most fruit, some three-fourths crop. Old trees, as a rule, had but little fruit. Most of the Janeton trees bore little or no fruit. Four Janeton trees

in a yard where the soil was not cultivated bore a full crop; in a neighboring field fifteen Janetons (cultivated on one side and a hedge on the other) of same size and age as the former, and in similar soil, had no fruit. Many trees, (generally those which had made a strong growth the previous season), were injured by the last winter, the bark bursting and peeling off on the southwest side of the tree.

Trees planted last spring did well. Little complaint of the borer. Peaches, of course, none, and trees badly winter killed. Pears, especially Seckel, had a fair crop. Cherries, mostly Early Richmond and common Morello, full crop. Plums, Chickasaw, in some localities had a fair crop. Gooseberries, heavy crop. Raspberries, three fourths. Blackberries, one-fourth. Currants, one-half. Strawberries, better than ever before. Grapes, about one-fourth crop, rot the cause. Leading fruit crop of the county is apples. All other fruits not grown sufficient to supply home consumption, excepting strawberries, of which some twelve acres were planted during the past and previous season Spring and fall planting both practiced and successful. Matted row system. Leaf roller in some old beds. Not much damage done. Plants this season made an excellent growth and show strong fruit crowns. Varieties: Crescent, Chas. Downing, Triumph, Sharpless, Capt. Jack, Kentucky, Wilson, James Vick.

WHY HORTICULTURISTS DISAGREE.

The old saw that doctors disagree applies equally to horticulturists, and while in all probability a difference of opinion will exist among them, in the future as in the past, yet there might and should be more concurrence of opinion, if not in all matters pertaining to horticulture, at least in some. I have reference now more especially to the difference of opinion given upon the merits and demerits of certain varieties of fruits, and of the small fruits in particular, in horticultural papers by horticulturists.

Testimony upon a certain variety often widely differs, even from horticulturists living in one neighborhood. The tyro in fruit growing is no doubt often perplexed by the conflicting statements regarding varieties of the kind of fruit he may want to plant. Take the strawberry for instance. One grower will give the Wilson the preference, while another equally high authority says the Wilson is unprofitable with him. Both are trustworthy and give their honest opinions, no doubt. With other varieties it is the same. Had each informant, however, explained the nature of his soil, mode of cultivation, climatic influence with special reference to dry or humid atmosphere, or rainfall, then the tyro would be enabled to form an intelligent and satisfactory

opinion as to whether the variety in question would suit him or not. The Wilson is a variety which needs rich soil and good cultivation. Certain varieties will succeed on moderate soil, as the Triumph, others will do well on sandy soil, some succeed on clay. Others again will do well in a moist soil or season, while still others will do fairly well on a dry soil, or in a dry season. Some, like the Crescent, often yield well under indifferent treatment, while others require the very best of care and cultivation. Some varieties will yield several years in succession while others will not.

If, therefore, horticulturists in sending reports to their papers, or giving their opinions on certain varieties of fruits at the meeting of horticultural societies, would also give their mode of cultivation, time of planting, condition and quality of soil and plants, location, climatic influence, etc., taking also into considerationthat the results of a single season is no test. Then, I take it, by comparing such reports, the needs of each variety would become apparent, and the testimony seem less conflicting.

It is much the same in regard to preventives or remedies against diseases of trees and plants, and insect depredations. Too many are apt to theorize or jump to conclusions regarding the efficacy of such remedies. To illustrate: Some time ago I saw a statement in a paper that some one who was in the habit of using calomel for certain ills to which his system was subject, tried the same remedy on one of his trees which seemed ailing, introducing the dose through a hole bored into the tree! The tree recovered, and of course the calomel rose in his favor. Similar cases might be cited by the score.

I submit, therefore, that in order to enable a horticultural jury to form an intelligent opinion, we should present all the facts in the case.

SPECIAL REPORT OF A CERTAIN APPLE TREE BORER AND STRAWBERRY INSECT.

BY F. GUTMANN.

[This report was written in German and has been translated by F. Lionberger.]

I have discovered a destructive apple tree borer in my orchard this summer and have given the matter a great deal of study by trying to find out its habits and to have it identified.

The borer works upwards out of the roots, and I found where it

commenced ten inches under ground in the largest roots. It works upwards until it reaches the surface of the ground when the tree begins to wilt, and as soon as touched by some one or a little of the earth is removed it falls to the ground. The borer eats all of the wood as it goes, so that the stump, in many cases, forms a shell. Only one and two year-old trees have been attacked. No borers have been found since the middle of August and no trace whatever can be found of them. I have examined the roots and the earth very carefully in search of them but to no purpose. A full grown borer is from two and a half to three inches long and very thick; its head is brown with two horn-like, crooked pinchers, like horns or fangs, under which very sharp teeth can be seen. The head seems to run away back into its body. The body is thick next to the head but is smaller a little further back; the back, or main part, is very thick; the tail end is slightly flattened but is not black; the color of the whole borer is nearly white.

I send sections of roots that have been infested, showing where the borer had commenced its destructive work and how it worked its way up.

A strange strawberry insect, at least a strange one to me, has also been closely watched. It exactly answers the description of an insect described by Prof. Riley in the July number of the American Agriculturist (German edition). Its scientific name is *Anthonomur musculus*.

The insect first attacks the flowers and afterwards the berries. It has a very offensive smell, of which all of the fruit partakes that it comes in contact with. As soon as the plants are disturbed the insect runs off remarkbly fast. It seems to me that they first work on the pollen of the flower because the pistilate varieties have not been molested to any extent.

I have not heard of any one else that has noticed the little pests except Mr. Hermann Willi, of Montgomery City, who says that they infested all of his plants; however, he did not study their habits any.

The following paper was given by delegate of Indiana State Society,

WALTER A. WORKMAN, OF GREENCASTLE, IND.

I am here to bring the cordial greetings of the Indiana State Horticultural Society, and to express to you our interest in your continued prosperity and welfare, and as Secretary Hobbs remarked, "gather the good points of your meeting and bring them back for the edification of my home society." However, I will give you the result of some jottings made at our recent meeting, held at Purdue University, our agricultural college, located at Lafayette. The place is most appropriate

for such a gathering, furnishing inspiration to us in our laudable work.

The campus and gardens contain about twenty acres and is beautifully laid out in walks and drives—a regular object lesson. Any lover of the beautiful is filled with admiration as he beholds the graceful winding hedges and well-kept lawns. Until this recent visit I didn't appreciate the value of the hemlock as an ornamental hedge plant. I doubt if there is anywhere to be found a prettier evergreen hedge than is here seen of the Hemlock Spruce.

The most instructive as well as one of the most interesting exercises of our meeting was the address of Prof. J. L Budd, of Iowa, on "Fruits of Northeast Europe." He had much to say of the cherries of that country east of Moscow, which by the way must be their principal fruit. From the fruit is made a sort of wine, and they have a great surplus at times, since he spoke of seeing a whole train loaded with cherries. The street shade trees are of cherry and the State lines are marked by a row of the same tree. In one place was to be seen a row of cherry trees 200 miles long. They have several thousand young trees from that cold country on the experimental grounds at Ames, Iowa, and since they stood the terrible cold of last winter it seems no longer a question as to their perfect hardiness.

Barnabas C. Hobbs, a veteran in horticulture, and many other good things, added his testimony as to the value and hardiness of many of the fruits grown in Russia.

Mr. Tuttle, of Wisconsin, remarked that he remembered a few years ago when people were alarmed on the question of light for their houses because whales were becoming scarce. Since that problem seems forever settled by coal oil and electricity, so he thinks fruits will be found to meet the exigencies of a Wisconsin climate. And we agreed with him perfectly when he said he didn't want to live in a State where fruit could not be grown.

New and old varieties of strawberries were discussed somewhat at length.

Crescent still held its accustomed first place as a market variety and for general cultivation, but Chas. Downing, in one section (about New Albany), was more generally planted than any other, it being estimated by one grower that nine-tenths of all the strawberries of that region were Downing.

The Parry and Cornelia received favorable mention. One grower got doubly as much for the Mount Vernon as he obtained for Crescent, since it came in later.

Cumberland was by many considered the best companion for the Crescent, while others placed Capt. Jack and others Sharpless as second best on the list.

Among raspberries, the first place is considerably disputed with the Gregg; it is falling short of the expectations of many the few past seasons, being badly damaged by winter and often setting more fruit than was ripened.

One gentleman thought Mammoth Cluster was worthy as good a place as Gregg, but he had very few to agree with him.

Hopkins, however, was well liked where known for its hardiness and great bearing qualities.

But if I would tell you which of all the rest received most flattering notice I would say Shaeffer's Colossal, being considered ordinarily hardy, wonderfully prolific and the very best for all culinary purposes and canning.

Of the red varieties Turner and Cuthbert had very many admirers; also, the Crimson Beauty and Marlboro were well liked where tried, but Hansel was not well liked because of its feeble stalks.

Among blackberries, Snyder was still generally considered best—some even thought it the only kind needed. But the latter remark was not well received, since the Stone's Hardy and Taylor are equally hardy, and being later were considered valuable, thus extending the blackberry season several weeks.

Ancient Britton (new to many of us) was highly recommended because of hardiness, large size and good quality of its fruit.

The grape and its culture received some attention at our hands, but our State not being so well adapted to the vine as is yours the interest was not lively. I noticed, however, that Worden was very favorably mentioned and the opinion expressed that it would eventually take the place of Concord as the best for general cultivation.

The question of how to deal with injurious insects was well handled by Prof. Webster.

Pyrethrium or insect powder dusted on the infested plants was considered the most effectual remedy. Some objected to this treatment since they found it did little more good than flour.

Prof. Webster then explained that it was a substance easily ruined by being kept in an open drawer, as is usually the case at drug stores. He said that a pure article ought to be mixed with an equal part of flour and blown on with a small bellows or dusted through a muslin sack. In the south it is used to kill house flies, and very effectually rids the house of these pests when blown among them early in the morning while they are huddled on the ceiling and walls of the kitchen.

Inhaling the powder by the operator doesn't seem to injure him in any way.

The paper by Prof. J. C. Ridpath, of Depauw University, on Hor-

ticulture in History, was one of the most delightful excercises of the whole meeting, and was received with much enthusiasm, even if it was more literary than horticultural.

When and how to plant was thoroughly discussed, and a casual observer might have said that we agreed on nothing, but I think we did generally agree on a few things, viz.: that in the latitude of 40 and further south trees are usually better dug and planted in the fall, and that in the extreme north trees should be dug in fall and well heeled in till the buds begin to swell in spring. This heeling in, however, is of great importance. Trees should be placed in a slanting position on well drained land and covered with earth up to the branches.

When and how to prune likewise absorbed a good share of our attention, and was discussed with animation. However, nearly the same criticism might have been indulged in as in the planting question concerning our disagreement. I will say, though, that there seems to be a growing conviction with many that in time past we pruned too much.

It was urged that we should shape our trees while young, and afterward, or when they come into bearing, only take out such sprouts and limbs as seems absolutely necessary.

And that fruit trees be pruned when the trees are in full leaf since then the wounds heal more rapidly, are less likely to throw out sprouts, and the tendency is to check the too rapid grawth of trees, thereby causing it to form fruit buds. But if the object be the formation of compact, well rounded heads so much admired in street shade trees, that this class of trees should be pruned or shortened in about the time buds begin to swell, the effect at this season being that the end of every branch cut off throws out two or more sprouts.

MILTON, WIS., December 10, 1885.

L. A. Goodman, Secretary:

DEAR SIR: When this reaches you you will have had your 28th annual meeting of State Horticultural Society.

Your circular programme is certainly the best I have seen lately, and if carried out in spirit and letter you must be having a very profitable session. I only regret that I could not be there to learn the "ins and outs" of your horticulture as well as to make the personal acquaintance of your convention-going fruit growers.

By the way, is it not remarkable that every horticulturist of broad, progressive views loves to meet others of his class in conclave, and can always be found—providence permitting—in such gatherings, while the mere mercenary and fraudulent of our profession are conspicuously

absent from the great gatherings of horticulturists. Such has been my observation these many years in the northwest. I am glad to see your efforts to bring out your new fruits. It is found that every distinct locality will have its varieties which prove of especial value. Your State will not be an exception, and by bringing out new and adapted fruits you will greatly add to your already famous productions in that line.

Your hospitality to delegates is a good example, and you are fortunate in not being located, as are some of the State's societies, so that you can "pass it around."

Your manner of grouping topics is most commendable, for by it you save time and center greater interest on the general questions under consideration.

I congratulate you on the accession of such a helper as Prof. Wm. Trelease, and I will say further that he is "all gold" in his profession, and will grapple some of your fungoid and insect problems with a vigor that may astonish the southern mind.

I would also say "our loss your gain," but we will hold on to him for a part of the year, when your summer heats drive him and family northward.

Well if you were on my parallel, I might be able to instruct you somewhat, but as it is I will only say that insect and fungoid enemies are to be the greatest obstacles to success, and will demand your best efforts to overcome.

It looks now as if your grand State was to be the "Meca of apple growing for the west, and indeed for fruit growing in general. Your spacious valleys, and high table lands; your sunny slopes and airy heights, and above all your highly organized mineral soils and central locations give you advantages which are combined in no other State so widely as in Missouri.

Hoping to be with you at your next annual meeting, I am,

Fraternally yours,

J. C. PLUMB.

SIBLEY, OSCEOLA COUNTY, IOWA, Dec. 8, 1885.

Mr. L. A. Goodman, Secretary:

DEAR SIR: I inclose a representation of an "insect destroyer," patented Nov. 10, 1885. It has been my business the past season to fully test its practical working, and it is a most wonderfule success for the catching of destructive insects of nocternal habits, beer, moths,

and the long list of moths, bugs and beetles so destructive of fruits, vegetables and other farm products. I had hoped to exhibit one of the "destroyers" at your convention, either myself or through Mr. G. S. Downend, one of your members from this vicinity, but he is detained, and as I did not know of his inability to go until yesterday, I cannot so arrange my matters as to be present.

I inclose statements from of our most respectable citizens who have seen its working; in most cases it was put directly under the care of the parties subscribing. I am soon to have it illustrated by a cut, which will appear in the *Scientific American*. Munn & Co. were my agents in procuring the patent. They are to be from twelve to fifteen inches in diameter; the light inside of the glass cone is the attraction; flying to the light they strike the glass cone and are thrown down into the water in the bucket, or other vessel below which is nearly full of water. A little kerosene oil upon the surface soon kills them all. I ask no better recommendation than the results as shown each night by the catch. I caught thousands of noxious insects in my one little garden though they were attracted doubtless from a distance of from twenty to forty rods. I have already arranged to introduce them extensively in the coming spring and summer. Single ones, twelve inches in diameter, will retail at $5.00 each. A liberal deduction will be made to the trade or any associations that may order them in numbers. I should be glad to have you interest your convention so far as practicable, for it is to be the coming method of destroying the numerous destructive pests, small and large, of fruits, vegetables, flowers, etc.

What is your membership fee? and when will the next meeting be held? Should be glad to hear from you at your convenience.

Most truly yours,

DUDLEY H. MANNING.

LIST OF VARIETIES OF FRUITS TO PLANT.

GIVEN BY COUNTIES.

The following questions were addressed to all counties of the State and the answers are given from one party of each county. This list will be a good guide to any one wishing to plant for profit.

Wishing to make a list of varieties adapted to every county in the State, will you please give a list of the *best*, *hardiest* and *most profitable varieties* of the following for your county:

Apple.....
Pear.....
Peach.....
Plum.....
Cherry.....
Grapes.....
Raspberries.....
Blackberries.....
Strawberries.....

Please answer and return to me before June 1st.

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

ANDREW COUNTY—G. SEGESSEMANN, OF AMAZONIA.

Apple—Stark, Ben Davis, Haas, Wealthy, Grimes, Duchess, Romanite, W. W. Pearmain, Willow Twig.

Pear—Sheldon.

Peach—Thurber (early and late), Crawford, Amsden, Honest John and Heath Cling.

Plum—Wild Goose and Damson.

Cherry—Early Richmond and May Duke.

Grapes—Elvira, Concord, Norton, Cynthiana and Goethe.

Raspberries—Shaffer's Colossal, Turner and Hanseil.

Blackberries—Snyder, Kittatinny and Lawton.

Strawberries—Crescent, Capt. Jack, Manchester, Prince of Berries and Sharpless.

AUDRAIN COUNTY—B. F. WYLDE, OF BENTON CITY.

Apple—Early Harvest, Duchess, Maiden's Blush and Ben Davis.

Pear—Bartlett.

Peach—Alexander, Foster, Crawford's, Stump, Heath's Cling and Byllen's Late.

Plum—Wild Goose and Lombard.

Cherry—Early Richmond and English Morello.

Grapes—Concord.

Raspberries—Turner, Thwack, M. Cluster and Gregg.

Blackberries—Kittatinny and Snyder.

Strawberries—Wilson and Downing.

BUTLER COUNTY—JAMES F. TUBB, OF POPLAR BLUFF.

Apple—Ben Davis, Winesap, York Pippin, Red June and Early Harvest.

Pear—Bartlett.

Peach—All do well.

Plum—Wild Goose and Chickasaw.

Cherry—May Duke.

Grapes—Concord.

Raspberries—Grow wild.

Blackberries—Grow wild.

Strawberries—Wilson and Crescent.

BARTON COUNTY—C. H. FINK, OF LAMAR.

Apple—Ben Davis, Willow Twig, Janet, Grimes' Golden Duchess and Red Astrachan.

Pear—Seckel, Buffun and Bartlett.

Peach—Amsden, Early York, Early Rivers, Stump, George IV., Reeves Yellow and Shipley Late.

Plum—Wild Goose, Weaver and Miner.

Cherry—Morello varieties.

Grapes—Concord and Martha.

Raspberries—Reliance.

Blackberries—Snyder and Early Harvest.

Strawberries—Crescent, Chas. Downing, Capt. Jack and Sharpless.

BUCHANAN COUNTY—J. W. FLEEMAN, OF ST. JOSEPH.

Apple—Ben Davis, Red Davis, (a sport) Huntsman, Jonathan, Janeton, Rome Beauty, Duchess, Summer Queen and Maiden Blush.

Pear—Bartlett, Duchess, B. Clarigeau, Bonne de Jersey and Seckel

Peach—The kind that will make the most firewood. Alexander, Hale and Stump have been best with me.

Plum—Wild Goose and Newman.

Cherry—English Morello, Early Richmond, Late Richmond and common varieties.

Grapes—Worden, Concord, Cottage, Moore's Early, Champion, Victor, Pocklington and Martha.

Raspberries—Gregg, Hopkins, Shouhegan, Turner and Cuthbert.

Blackberries—Snyder and Taylor.

Strawberries—Crescent, Windsor Chief, with Jack and Downing to fertilize with.

BATES COUNTY—J. B. DURAND, OF PRAIRIE CITY.

What are the prospects for a full crop?

Apple—Ben Davis, Jonathan, Janeton, Winesap, Willow Twig, Rome Beauty and Maiden's Blush.

Pear—Bartlett.

Plum—Wild Goose and Damson.

Cherry—Morello and Early Richmond.

Grapes—Concord.

Raspberries—Gregg, Mammoth Cluster and Turner.

Blackberries—Kittatinny and Snyder.

Strawberries—Not acquainted enough to answer.

CARROLL COUNTY—W. CRANCH, OF CARROLLTON.

Apple—Ben Davis, Rome Beauty, Huntsman, Willow Twig, Janet, Winesap, Red June, Early Harvest, Maiden Blush, Rambo and Fulton.

CLAY COUNTY—J. C. EVANS, OF HARLEM.

Apple—Ben Davis, Winesap, Jonathan, Maiden Blush, Porter, Stark, Janeton.

Pear—Bartlett, Seckel, Sheldon.

Plum—Wild Goose, Chickasaw.

Cherry—Early Richmond, English Morello.

Grapes—Concord, Ives, Telegraph, Martha, Elvira.

Raspberries—Hopkins, Gregg, Turner, Thwack.

Blackberries—(I give it up)

Strawberries—Wilson C., Crescent, Downing, Capt. Jack.

CASS COUNTY—G. C. BROADHEAD, OF PLEASANT HILL.

Apple—Ben Davis, Early Harvest, Maiden Blush, Winesap, Nonesuch.

Pear—Bartlett.

Peach—Early Amsden, Excelsior, Early Crawford, Stump-the-World, Heath Cling.

Plum—Only Wild Goose.

Cherry—Early Richmond, Morello.

Grapes—Concord.

Raspberries—Miami Black Cap.

CEDAR COUNTY—E. LISTON, OF VIRGIL CITY.

Apple—Ben Davis, Red Romanite, Winesap, Missouri Pippin, Pennsylvania Redstreak, Jonathan.

Pear—Lawrence; (pears blight); no good.

Peach—Smock, Heath Cling.

Cherry—Early Richmond.

Raspberries—Mammoth Cluster.

Blackberries—Snyder.

Strawberries—Charles Downing, Crescent Seedling.

COLE COUNTY—FRED. YOST, OF JEFFERSON CITY.

Apple—Winesap, Ben Davis.

Pear—Seckel.

Peach—Crawford's, Heath Cling; most any variety does well.

Plum—Wild Goose only do well.

Cherry—Morello, only variety that bear well.

Grapes—Varieties that have been tried here generally fail.

Raspberries—Mammoth Cluster, Turner, Brandywine.

Blackberris—Lawton not so apt to rust as other varieties.

Strawberries—Wilson's, Green Prolific, Kentucky and Cumberland Triumph.

CALDWELL COUNTY—WILLIAM McCRAY, OF GLASSVILLE.

Apple—Rawle's Janet, Willow Twig, White Pearmain, White and Yellow Bellflower, Golden Sweet, etc., etc.

Grapes—Concord.

GREENE COUNTY—D. S. HOLMAN, OF SPRINGFIELD.

Apple—Astrachan, Harvest, Maiden's Blush, Grimes, Porter, Ben Davis, Willow Twig, Minkler.

Pear—Duchess, Sheldon, Seckel, Bartlett.

Peach—Amsden, Troth, Haines, Stump, Mixon, (free and cling) Smock, Heath Cling and Excelsior.

Plum—Wild Goose.

Cherry—Richmond and English Morello.

Grapes—Concord, Moore's Early.

Raspberries—Mommoth Cluster, Turner.

Blackberries—Snyder, Kittatinny.

Strawberries—Jersey Queen, Crescent, Cumberland, Mt. Vernon, Captain Jack.

GENTRY COUNTY—C. G. COMSTOCK, OF ALBANY.

Apple—Ben Davis, Janet, Winesap, Willow Twig and W. W, Pearmain.

Pear—Bartlett.

Plum—Miner.

Cherry—The Morellos.

Grapes—Concord.

Blackberries—Snyder.

Strawberries—Crescent, Forest Rose and Windsor Chief.

GASCONADE COUNTY—JACOB ROMMEL, OF MORRISON.

Apple—Ben Davis, Winesap, Janeton, Jonathan, Rome Beauty, M. H. Pipin, Rambo and E. Harvest.

Pear—Seckel, Bartlett and Duchess.

Peach—Amsden, Hale's Early, Heath Cling, Baltimore Beauty and Crawford's Late.

Plum—Wild Goose, Weaver and Damson.

Cherry—Early Richmond, May Duke and Early Morello.

Grapes—Concord, Ives, Elvira, Norton's, Cottage, Moore's Early, Lady, Early Victor and Pocklington.

Raspberries—Cellosal, Greek, Centennial, Davison Thornless and Turner.

Blackberries—Snyder and Wilson.

Strawberries—Iron Clad, Capt. Jack, Cumberland, Manchester, Sharpless and James Vick.

GRUNDY COUNTY—E. B. COOPER, OF TRENTON.

Apple—Ben Davis, Janeton, Smith, Cider, etc.

Pear—Anjou and Bartlett. My trees are too young to give a full report.

Peach—Amsden, Alexander and Crawford's Early and Late. Out of about 600 trees and 20 varieties I have not had one for four years.

Plum—Wild Goose, Yellow Egg, Damson and Weaver.

Cherry—Early Richmond and Morello.

Grapes—Worden and Concord.

Raspberries—Souhegan, Gregg and Tyler; Turner is all the red I have tried.

Blackberries—Kittatinny and Snyder. When cut back and well manured Snyder is excellent.

Strawberries—Crescent, Bidwell, Iron Clad, and Capt. Jack.

I am trying Piper, Lacon, Windsor and Crescent, and all promise well; have discarded about 20 kinds, among them Sharpless, Glendale, Wilson, Col. Cheny, Chas. Downing, etc.

HOWELL COUNTY—E. F. HYNES, OF WEST PLAINS.

Apple—Ben Davis, Winesap, Rome Beauty, Seek-no-further, Rambo and Maiden's Blush.

Pear—Seedlings and Bartletts.

Peach—Early Canada, Musser, Early York, Early Lydia, Surprise, Nectar, Pennsylvania, Troth and seedlings.

Plum—Wild Goose and native seedlings.

Cherry—Early Richmond and seedlings (sour).

Grapes—Concord and native seedlings.

Raspberries—Turner, Doolittle, Mammoth Cluster and Gregg.

Blackberries—All kinds do well.

Strawberries—Crescent Seedling, Chas. Downing and Glendale.

HARRISON COUNTY—I. M. NEFF, OF BOLTON.

Apple—Ben Davis, Johnathan, Janeton, Willow Twig, Rambo and Codlin.

Plum—Wild Goose and native wild.

Cherry—Richmond and English Morrello.

Raspberries—Ohio Ever-bearing, Mammoth Cluster and Turner.

Blackberries—Snyder.

Strawberries—Capt. Jack, Monarch, Wilson and Crescent.

HOWARD COUNTY—A. S. WOLCOTT, OF FAYETTE.

Apple—Ben Davis, Winesap, Willow Twig, Janeton, Missouri Pippin and Rome Beauty.

Pear—Seckel, Buerre de Anjou and Flemish Beauty.

Peach—Seedlings.

Plum—Wild Goose and Damson.

Cherry—Early Richmond and Morellos.

Grapes—Concord, Brighton, Talmage, Virginia Seedling and Worden.

Raspberries—Gregg, Mammoth Cluster, Turner, Brandywine and Davidson Thornless.

Blackberries—Kittatiny and Snyder.

Strawberries—Manchester, Crescent Seedling, Capt. Jack and Chas. Downing.

HOLT COUNTY—N. F. MURRY AND DR. GOSLIN, OF OREGON.

Apple—Early Harvest, Caroline Red June, Red Astrichan, Early Pennock, Rambo, Aut. Strawberry, Ben Davis, Jonathan, Grime's Pippin, Willow Twig and Winesap.

Pear—Seckel, Bartlett, Duchess and Sheldon.

Peach—Amsden, Hale's Early, Stump, George IV., Ward's Late Free, Heath Cling, Shipley's Late Red and Smock Free.

Plum—Wild Goose and Miner.

Cherry—Early Richmond and English Morello.

Grapes—Concord, Martha, Norton's Virginia, Cynthiana, Niagara, promising.

Raspberries—Sauhegan, Hopkins and Gregg, Cuthbert, Hansel and Turner.

Blackberries—Snyder and Taylor.

Strawberries—Crescent, Chas. Downing, Miner's Prolific, Sharpless, Duchess and Bidwell.

JACKSON COUNTY—L. A. GOODMAN, OF WESTPORT.

Apple—Ben Davis, Willow Twig, Huntsman's Favorite, Early Pennock, Sops of Wine, Porter, Grime's Golden and Smith's Cider.

Pear—Bartlett and Duchess.

Plum—Wild Goose and Miner.

Cherry—Early Richmond, Lieb and English Morello.

Grapes—Martha, Gœthe, Nortons, Ives and Worden.

Raspberries—Hopkins, Gregg and Thwack.

Blackberries—Snyder and Taylor's Prolific.

Strawberries—Crescent, Downing, Fink's Prolific and Capt. Jack.

JASPER COUNTY—JAMES B. WILD & BRO., OF SARCOXIE.

Apple—Red June, Astrachan, Grimes' Golden Pippin, Lowell, Maiden Blush, Rambo, Jonathan, Ben Davis, Winesap, Missouri Pippin, Willow Twig.

Pear—Bartlett and Duchess.

Peach—Amsden, Early York, O. M. Cling, Heath C,, Salway, Stump, Smock free, Picquett, Goethe.

Plum—Wild Goose, Miner.

Cherry—Early Richmond, English Morello, Olivet.

Grapes—Concord, Ives, Diana; for wine, Cynthiana, Norton's.

Raspberries—Black Cap varieties.

Blackberries—Kittatiny.

Strawberries—Crescent, James Vick, Wilson. Kentucky, Capt. Jack, Jersey Queen.

JOHNSON COUNTY—A. H. GILKERSON, OF WARRENSBURG.

Apple—Ben Davis, Huntsman, Janeton, Willow Twig, Rome Beauty, Little Romanite, Lancingburg G. Pippin, Red Astrachan.

Pear—Duchess.

Plum—Wild Goose.

Cherry—May Duke and Morello.

Grapes—Concord.

Raspberries—Black Cap and Gregg.

Strawberries—Capt. Jack, and varieties that are grown in this county.

LINN COUNTY—J. W. TURNER, OF MEADVILLE.

Apple—Willow Twig, Red Janet, Missouri Pippin, Lawver, Maiden Blush, Haas, Carolina Red June, Sops of Wine.

Pear—Flemish Beauty, Seckel's, Keifer.

Peach—Early Crawford, Heath Cling, Hale's Early.

Plum—Wild Goose, Weaver, Blackman, Wayland.

Cherry—Early Richmond, Belle, Magnifique, English Morello.

Grapes—Concord, Pocklington, Martha, Moore's Early, Worden, Elvira.

Raspberries—Doolittle, Early Ohio, Gregg, Tyler, (Red), Turner, Cuthbert.

Blackberries—Snyder, Taylor.

Stawberries—Cescent, Glendale, Phelps, Bidwell.

LEWIS COUNTY—W. H. THOMAS, OF LaGRANGE.

Apple—Ben Davis, Maiden Blush.

Plum—Wild Goose and Damson.

Cherry—Early May, or (Early Richmond).

Grapes—Concord, Moore's Early, Ives and Janesville, not much profit in any.

Raspberries—All the Black Caps and all Reds as hardy as Turner.

Blackbesries—Snyder, or all others, if as hardy.

Strawberries—Crescent, Wilson, Sucker State and Capt. Jack.

MONTGOMERY COUNTY—F. LIONBERGER, NEW FLORENCE.

Apple—Ben Davis, R. Beauty, Janetons (for home use), Huntsman's, Missouri Pippin, Maiden Blush, and a few others.

Pear—Bartlett, Duchess and Louise Bonne de Jersey for dwarf.

Plum—Wild Goose.

Cherry—Early Richmond, Late Duke.

Grapes—Elvira, Martha, Ives, Lady Washington; think Concord about as good as any.

Raspberries—Cuthbert, Turner, Thwack, S. Collossal, Gregg and Caroline.

Blackberries—Kittatiny and Lawton.

Strawberries—Cumberland, Jersey Queen, Daisy Miller, Iron Clad, Crescent, Capt. Jack and James Vick are all good.

MILLER COUNTY—N. J SHEPHERD, OF ELDON.

Apple—Janeton, Winesap and Ben Davis.

Pear—Bartlett and L. B. de Jersey.

Peach—Crawford, Amsden and Alexander.

Plum—Wild Goose and Damson.

Cherry—Common Red.

Grapes—Concord is the leading variety here. I have Martha, Hartford and Niagara that stand the winter well.

Raspberries—Gregg and Cuthbert.

Blackberries—Snyder.

Strawberries—Wilson, Albany and Capt. Jack.

MONROE COUNTY—J. D. HAWKINS, OF PARIS.

Apple—Ben Davis, Janeton, Willow Twig, Winesap, Rambo and Summer Queen.

Pear—Doyenne, Seckel and A. Seedling.

Peach—Hale's Early, George IV., Crawford's Early and Late of the old; Amdsden June, new.

Plum—Wild Goose, Miner and Coinmon Damson.

Cherry—Eary Richmond and May Duke.

Grapes—Concord, Elvira, Delaware, Goethe (when protected), Martha and Clinton.

Raspberries—Mammoth Cluster, Gregg, Thwack, Cuthbert and Turner.

Blackberries—Taylor and Snyder.

Strawberries—Crescent, Windsor Chief, Cumberland and Chas. Downing.

MORGAN COUNTY—CALEB GUNN, OF VERSAILLES.

Apple—Ben Davis, Rawles' Janet, M. Blush, Rome Beauty, Red June and Winesap.

Peach—Crawford's Early and Late, Mixon (free), Heath (cling). The Amsden is a short life tree.

Plum—Wild Goose, Damson and Chickasaw.

Cherry—Early Richmond, May Duke and English Morello.

Grapes—Concord.

Raspberries—Gregg, Mammoth Cluster, Turner and Philadelphia.

Blackberries—Snyder, Lawton and Kittatinny.

Strawberries—Sharpless, Kentucky, Bidwell, Prouty and several others.

McDONALD COUNTY—S. G. WELBORN, OF PINEVILLE.

Apple—Ben Davis, Winesap, Arkansas Black, Lawver, Maiden's Blush and Red June.

Pear—Seckel, Bartlett and De Anjou.

Peach—Seedlings are most hardy and profitable; Crawford's Early and Late Mountain Rose and Heath's Cling.

Plum—Chickasaw, Wild Goose on plum stock.

Cherry—Early Richmond and English Morello.

Grapes—Concord, Brighton and Worden.

Raspberries—Turner, Gregg, Souhegan and Doolittle.

Blackberries—Kittatiny.

Strawberries—All kinds.

PUTNAM COUNTY—JAMES T. SCOTT, OF ST. JOHN.

Apple—Ben Davis, Limber Twig, Jonathan, Janet, Red Astrachan, Benoni Milam, Kirkbridge, White and Orange Pippin.

Pear—Bartlett.

Peach—None but seedlings.

Plums—Lombard's Black and wild.

Cherry—Early May and English Morello.

Grapes—Concord and Ives' Seedling.

Raspberries—Black Cap and Mammoth Cluster.

Blackberries—Wild and Kittatiny.

Strwberries—Wilson, as good as any I have tried.

PETTIS COUNTY—PHIL. PFEIFFER, OF SEDALIA.

Apple—Ben Davis, Janeton, Huntsman's Favorite, Winesap, Newtown Pippin, Rome Beauty and Maiden Blush.

Pear—Seckel, Keiffer's Hybrid, Duchess, Red June, Early Harvest and Rambo.

Peach—Alexander, Crawford's Early and Heath Cling, but I would not plant another peach orchard here.

Plum—Wild Goose, Marianna (new), and Damson.

Cherry—Early Richmond, May Duke and Montmorency.

Grapes—Concord, Moore's Early, Champion, Missouri Riesling, Pocklington, Ulster Prolific and Niagara.

Raspberries—Marlboro, Gregg and Souhegan.

Blackberries—Snyder and Kittatiny.

Strawberries—Wilson, Manchester, Parry, Monarch, Downing's Prolific and James Vick.

RIPLEY COUNTY—J. G. HANCOCK, OF DONIPHAN.

Apple—Ben Davis, Winesap, all the pippins—about all that have been tried here—Early and Red June and Horse Apple.

Pear—Bell, Bartlett and LeConte.

Peach—Amsden June, Alexander—in fact all kinds do well here—full crop every year, early and late.

Plum—Wild Goose, Chickasaw and Damson.

Cherry—Early May, Richmond and Black Heart.

Grapes—Concord and Delaware; most all varieties do well.

Raspberries—All varieties.

Blackberries—All varieties.

Strawberries—Wilson, Vick, Sharpless and Jumbo; all far as tried.

SALINE COUNTY—WASH. FOLCK, OF MARSHALL.

Apple—Early Harvest, Red June, Astrachan, Maiden's Blush, Snow, Rambo, Ben Davis, Mo. Pippin, Janeton, Huntsman, Willow, Winesap and Jonathan.

Pear—Keiffer and LeConte.

Peach—No good.

Pear—Wild Goose.

Cherry—Early Richmond.

Grapes—Concord, Moore's Early and Seedling.

Raspberries—Mammoth Cluster, Gregg and Turner.

Blackberries—Snyder, Mo. Mammoth and Kittatiny.

Strawberries—Mt. Rose, Miner, Golden Defiance, Crescent, Wilson and Capt. Jack.

VERNON COUNTY—JACOB FAITH, OF MONTEVALLO.

Apple—Winesap, Ben Davis, Little Red Romanite, Red June and Maiden's Blush.

Pear—Duchess, Bartlett and L. B. de Jersey.

Peach—Smock Free, Heath Cling, King of Earlies and Alexander.

Plum—Wild Goose, Miner and Golden Beauty.

Cherry—Early Richmond and E. Morello.

Grapes—Concord.

Raspberries—Centennial, Taylor, Mammoth Cluster, Gregg and Brandywine.

Blackberries—Snyder, Taylor and Kittatiny.

Strawberries—Chas. Downing, Crescent Seedling, Miner, Capt. Jack and Glendale.

WAYNE COUNTY—H. GRIFFING, OF PIEDMONT.

Apple—Early Harvest, Janeton, Winesap, Smith's Cider, Ben Davis and Willow Twig.

Pear—Duchess and L B DeJersey.

Peach—Early and Late Crawford.

Plum—Wild Goose.

Cherry—Early Richmond.

Grapes—Concord.

Raspberries—Doolittle and Gregg.

Blackberries—Snyder.

Strawberries—Wilson, Albany and Crescent.

WASHINGTON COUNTY—P. RUSH, OF MINERAL POINT.

Apple—Ben Davis, Northern Spy, Janeton, Winesap, Prior's Red, Maiden's Blush and Rambo.

Pear—Bartlett, Osborne and Summer have done the best.

Plum—Wild Goose.

Cherry—Gov. Wood, May Duke and Morello.

Grapes—Virginia Seedling.

Raspberries—Kittatiny and Snyder.

Strawberries—Wilson Albany. There are plenty of others that would do well here if urged.

WEBSTER COUNTY—J. B. BANNING, OF MARSHFIELD.

Apple—Early Harvest, Red Astrachan, Horse, Rambo, Ortley and Ben Davis.

Pear—Bartlett.

Plum—Chickasaw and Wild Goose.

Cherry—The old sour variety.

Grapes—Dracut Amber, Concord and Clinton.

Raspberries—Turner, Thwack, Doolittle and Gregg.

Blackberries—Kittatiny. (Rusting some.)

Strawberries—Crescent, Downing and Wilson.

NEW ORLEANS PREMIUMS AND MEDALS.

For the information of those exhibitors who received rewards of gold and silver medals, I will state that the Committee on Awards have decided adversely to the issue of the same, to only pay the cash premium awards. Those exhibitors desiring to secure the medals can do so at a cost of $7.50 each for the silver medals and $72 each for the gold medals.

As some premium exhibitors have expressed doubts about the proper meaning or construction of a circular lately issued by Col. G. A. Breaux, Chairman of the Committee on Awards of the World's Exposition, I will say this, that it simply means what I have stated in my various circulars to premium creditors, viz.: that the only resource that will be available for the payment of premium creditors will be the purchase money realized from the sale of the buildings and property of the World's Exposition Company to the new American Exposition Company, the conditions of which sale have been heretofore explained.

Yours, etc.,

WM. H. JUDSON.

Comment is unnecessary.

L. A. GOODMAN, Secretary.

SECRETARY'S BUDGET.

The *Budget* consists of clippings from the following papers mostly. They have kindly furnished a copy of their papers for the year to the Secretary's office free of cost:

American Agriculturist,
Rural New Yorker,
Prairie Farmer,
Western Rural,
Farm, Field and Stockman,
Colman's Rural World,
Journal of Agriculture,
Kansas Farmer,
Western Agriculturist,
Home and Farm,
Farm, Field and Fireside,
Live Stock Record,
American Garden,
Ladies Floral Cabinet,
Orchard and Garden,
Small Fruit Recorder.

Also some clippings from other papers. The credit is given to all, I believe.

The thanks of the Secretary and the society are tendered to those publications who have so kindly furnished their papers for file with the society.

Our *Budget* is arranged under the following heads:

1. Grapes.
2. Birds and Bees.
3. Literary.
4. Vegetables.
5. Ornamentals.
6. Flowers.
7. Manure.
8. Receipts.
9. Miscellaneous.
10. Marketing.
11. Small Fruits.
12. Scientific.
13. Forestry.
14. Stone Fruits.
15. Canning, etc.
16. Orchards.
17. Insects.
18. Papers.

L. A. GOODMAN.

GRAPES.

GRAPES ON TREES.

The grape rarely fails when allowed to climb over trees. It matters not what kind of trees, or whether they be living or dead, if they only have branches that the tendrils can take hold of. Astonishing crops are produced in this way, even on vines that receive no care. The most successful planters in the world plant trees and vines together so that the latter may have a suitable support. Many unskilled farmers have blundered into the same method and have had abundant success. A vine will make twice the growth in a tree that it will on a trellis, and where an effort is made to have it occupy both, it is always found that its main energies are expended in the tree. A newly planted vine should have brush instead of a stake, as it has no means of clinging to the latter. If the tendrils can find nothing to take hold off, they continue in motion for a time, reaching in all directions, and this is exhausting to the vine. For this reason skilled gardeners often cut off the tendrils. When growing vines on stakes I have often driven lath nails in convenient places for the accommodation of the tendrils.

Although grapes do so well on trees without much care, let no one suppose that he can accomplish anything by planting vines at the roots of established trees. The soil being pre-occupied, the vine will not have a fair chance. Plant it at a distance from the tree to be covered, and after it has made some growth it may be brought to the branches, where it will take care of itself. On nearly every farm there are worthless trees that might be made to carry bushels of grapes.

MATTHEW CRAWFORD.

GRAPES FROM GREEN WOOD CUTTINGS.

A Canadian correspondent says: "Being interested in grape growing the question has come up, are vines grown from green wood cuttings in all respects as good as when grown from ripened wood?"

[Years ago when the public first became aware of the great march taken in the progress of improvement of grapes, the demand was enormous, and propagating from green wood resorted to in order to meet the great demand. In a few years disease and disaster followed, and it became clear that the vital power of vines, so raised, was not equal

to that raised from matured wood. The practice was abandoned, and since then but very little difference has been found in the supposed hardiness of one kind more than another. Florists are now learning the same lesson over again in the case of the verbena and carnation. They are coming to the conclusion that the susceptibility of these plants in modern times, to various diseases they were exempt from years ago, comes from weakened vital power through continuous propagation from immature or green wood. All the facts tend to confirm this view, and though we do not suppose there would be any great injury result from one generation of grape propagation from green wood, it is dangerous to follow it through several.—Ed. G. M.]

GRAPE ROT is proved to be a purely local infection, caused by the growth of a parasitic fungus, and not a disease pervading the circulatory system of the plant. The fungus has been identified, and its life history traced; clusters of grapes protected by enclosure in bags of paper or of cloth remain undiseased, while all the unprotected clusters upon the same vine will rot; individual berries, upon perfectly protected clusters, have been successfully inoculated with the disase. Those to which the spore of the *Phoma* was introduced rotted; the remaining berries of the cluster were unaffected.—*Gard. Monthly.*

WORDEN GRAPE.

We have raised this grape for many years, and have found it uniformly at least a week to ten days earlier than the Concord, the slight variation here mentioned resulting from hot weather succeeding cool, and vice versa. The Prairie Farmer gives the experience of W. K. Munson, of Grand Rapids, who had in his five-acre vineyard an acre each of Worden and Delaware, two acres of Concord, and the remainder of Martha and Brighton. He said that the one acre of Worden has paid as much each year as all the rest of the vineyard. He had found it ten days to two weeks earlier than the Concord, with a better bunch, and larger and better berries. It sold for eight cents a pound, Concords four and a half cents. He began picking September 8th, Concord September 22d.

TRAINING THE GRAPEVINE.

Prof. L. H. Bailey, discussing in the Philadelphia Press methods of traning grapevines, says: "Most vineyardists along the older portions of the favored east shore of Lake Michigan have given up all elaborate methods of training. The vines are pruned as soon as the wood thaws out in the spring, and the canes are then twisted around

a post four or five inches in diameter, and secured by a four or six-penny nail. The vines are twisted in such a manner that one or two nails holds them securely. This method of training has the advantage of cheapness. It requires little labor, no wires or boards, and no large and expensive posts. In large vineyards the outlay for twine for tying vines to trellises is considerable. This method is exceedingly expeditious. It renders cultivation much more easy also. Vines trained in this manner are easily laid down for winter protection. In this northern climate it is important that pruning be done in spring, as by that means all winter killed wood is removed without extra labor. The best and most productive vineyards that I have seen in Michigan are upon light, sandy soils, even very poor soils. Growth is not large, but it ripens well; fruit buds are formed in abundance.

GRAPE ROT.

Who can estimate the value of a remedy for grape rot?

At the late meeting of the Ohio State Horticultural Society, F. C. Miller, of New Philadelphia, Ohio, reported that no rot had appeared in his vineyard for three years, although grapes had rotted in his neighborhood. All he does to prevent it is to sow about a quart of copperas to the square rod early in the summer.

At the same meeting, Geo. W. Campbell read a paper showing that a solution of sulphate of copper and lime sprinkled on the foliage had prevented grape rot and mildew in France. One of the professors in the State University told me that neither the iron nor the copper would do any good, but that it must be the sulphuric acid.

M. CRAWFORD.

SOME GRAPE MISCONCEPTIONS.

Messrs. Bush & Son & Meissonier, the well-known Missouri vineyardists, send to the *Prarie Farmer* this clipping from a prominent paper of that State:

"It is reported in the East that Austro-Hungarian grape growers are importing American vines to replace their plants destroyed by the oidium. European and American agricultural papers have for the last few years claimed that the American grape vine is so robust that it defies both the oidium and the phylloxera. As a matter of every-day fact, no grapes are at present procurable for the St. Louis market, owing to the ravages of the oidium, which destroyed almost the entire crop of the year."

Commenting upon this, the gentlemen remark. "Every line is untrue! No Austro-Hungarian grape growers are importing American vines—they at most intend to import them next winter, provided permission can be obtained. So far it is prohibited, and none can be sent before late in November. Their plants are not destroyed by oidium' and if they were, American vines would be no remedy. Ours are used as a remedy against phylloxera. And thus we could show that every line, from beginning to end, is erroneous. No respectable agricultural journal ever published claimed that the American grape vine defies oidium, but simply that this kind of fungus does not exist here—while the American fungi—mildew of another kind, 'Peronospora' and 'rot,' are much worse than oidium. Furthermore, grapes are and will be procurable for the St. Louis market; if not as abundant as in some years, it is not owing at all to oidium, which, as said, does not exist here, but to rot, and the late season."

GRAPE MILDEW REMEDY.

I am well aware of the difficulty in dealing satisfactorily with a fungus which may in a single night, with scarcely any warning, manifest itself all over a vineyard, but it is a great point gained to know how to check it, even if the knowledge may at times be of little practical avail in large vineyards. I would strongly recommend, therefore, the use of the ordinary milk kerosene emulsion prepared after the formula given in my late official reports as U. S. Entomologist, with from two to five per cent. of carbolic acid and the same percentage of glycerine, and then diluted in twenty to fifty parts of water to one of the emulsion, and sprayed upon the under surface of the leaves by means of a cyclone nozzle of small aperture so as to render the spray as fine as possible. A soap emulsion made with cresylic soap, and the glycerine subsequently added, would doubtless prove an excellent substitute. PROF. C. V. RILEY.

THE BEST GRAPE VARIETIES.

We were shown over the vineyard of about five acres, consisting of an acre each of Worden and Delaware, two acres of Concord, and fifty vines each of Martha and Brighton. Replying to a question Mr. M. stated: The one acre of Worden has paid as much each year as the balance of the vineyard. I consider it the best blue grape grown. It has all of the good qualities of the Concord, is from ten days to two weeks earlier, of better bunch, which is very compact with larger berries of better flavor. Our crop was contracted before picking, at

these prices: Delaware, Brighton and Martha, at 10 cents, Concord at 7½ cents, and Worden at 8 cents per pound. The earliness of Worden is shown by the fact that we began picking them September 8th, and Concords on the 22d, and even then the grocers complained so much of the greenness of the latter, that we nid not pick any more of them for three days."—*Prairie Farmer.*

OUT AMONG THE GRAPES.

The past has been a very favorable season for grapes at Monmouth; and if our readers will accompany us on a walk through our specimen vines, of which we have a great number, we will point out the good qualities and defects of the better known sorts. In order to cover the ground we are under the necessity of making our remarks very brief:

WHITE GRAPES.

Duchess.—Vine good, a strong grower and productive; one of the best in quality; clusters large. Here we have a really valuable grape.

El Dorado.—See description by Mr. Parsons in this number. It fits the grape to an iota.

Francis B. Hayes.—Vine equals Concord. For description of fruit look on "Our Fruit Table."

Grein's Golden.—Vine good and productive; cluster of good size and showy; berries large; it is a poor grapefor the table, and valuable for wine only.

Jessica.—Very early and of splendid quality. The fruit is all that can be desired for an early white grape, but the vine mildews very badly.

Lady.—Vine good and productive; ripens early; desirable for home use, but cracks so badly as to impair its value for market.

Lady Washington.—A rampant grower with good foliage and very productive, but ripens late and is lacking in quality; may be profitable for market, but cannot be recommended for the table.

Martha.—Vine good and productive; clusters handsome; fruit foxy and inferior in quality; profitable for market only.

Naomi.—Vine a strong grower, but mildews badly and fails to ripen its fruit.

Niagara.—Fulfills the claims made for it, save that it proves unusually susceptible to rot and mildew. We think this is a hybrid.

Pocklington.—Vine sturdy and productive; clusters very large and handsome, but foxy, hard and cracking badly; quite subject to rot.

Prentiss.—Mildews badly, and failed to ripen its fruit; not recommended.

RED GRAPES

Agawam.—Vine good; clusters of good size and good quality.

Berckmans.—Vine almost identical with Clinton; fruit almost identical both in appearance and quality with Delaware, but ripens late and is apparently a shy bearer.

Brighton.—A noble grape; vine fully equaling the average, although somewhat subject to mildew; clusters of a good size, handsome and of unsurpassed quality; valuable for all purposes.

Catawba.—Mildews and does not ripen well with us.

Delaware.—Vine poor grower and mildews; fruit unsurpassed.

Jefferson.—Vine a poor grower and mildews very badly; fruit of of excellent quality, but ripens too late to be valuable.

Norwood.—Almost identical in fruit with the old Catawba, which it equals in quality, but ripens early; vine less subject to mildew, although not so strong a grower; valuable.

Perkins.—Vine free from midew and productive: bunch and berry of good size, handsome, foxy and of poor quality; ripens early, but is valuable for market only.

Poughkeepsie Red.—Vine very like Delaware; clusters large and equally good.

Salem or Rogers' No. 22.—Berry like Agawam in all respects.

Ulster Prolific.—Vine sturdy and mildew resisting for a good grape; see "Our Fruit Table."

Vergennes.—Vine good and productive; cluster of good size and form and well filled; quality very good and ripens early; a valuable grape.

Wyoming Red.—Vine of iron-clad properties and very productive; ripens among the earliest; sweet, foxy, with hard pulp, hence not recommended for the table, but profitable for market.

BLACK GRAPES.

August Giant.—Vine mildews badly; berries very large and showy; clusters poor and of poor quality; ripens early.

Bacchus is an improved Clinton and very much more productive; for wine.

Champion.—The earliest to ripen; vine unsurpassed and very productive; a profitable market grape, but too poor to eat.

Clinton.—Free from mildew; a strong grower; recommended for wine only.

Concord.—Still holds its own; has as yet very few superiors, all things considered.

Early Victor.—In this we find the finest qality of all early grapes; to our liking it is hardly surpassed by any; bunch of medium size; vine in strong growth and mildew resisting paoperties nearly or quite equals the iron-clad Champion; very valuable.

Hartford Prolific.—Vine good and productive; would be very desirable for market if it did not drop so badly; superseded by Early Victor.

Herbert or Rogers' No. 44.—Fruit almost identical with Wilder, but vine mildewed badly, hence not so valuable.

Highland.—Clusters enormous; vine good, but too late and of poor quality.

Ives.—Vine equals Concord in growth and productiveness; fruit of inferior quality until very ripe; it colors early, but ripens in mid-season; quite free from rot; recommended only for market and wine.

Montefiore.—Vine a strong grower, mildew-resisting and very productive; here we have apparently a very valuable grape for wine.

Moore's Early surpasses its parent, the Concord, in resisting mildew, but is not so productive; one of the earliest grapes; it is very valuable for table and market; larger in berry than the Concord.

Telegraph.—Vine good, very productive, early and handsome, but of inferior quality; much pulp; superseded by Moore's Early and Early Victor.

Wilder or Rogers No. 4.—Vine good and productive; clusters large and showy; quality excellent; ripens about ten days after Concord and has but few equals.

Worden is an improvement on the Concord, being earlier, larger, of better quality and fully equaling it in all other respects.—*Orchard and Garden.*

BIRDS AND BEES.

BEES ARE POMOLOGISTS.

Not a few believe that bees injure fruit. They are frequently accused of injuring peaches, apples, berries and even grapes. I do not believe this. But though it be correct the bees are the best friends of the horticulturist. Did you ever think why? Sex is not confined to the animal kingdom by ony means; plants are sexual. The sexual organs are in the blossoms. For the blossoms to produce fruit the ovules must be fertilzed by the pollen from the anthers at the summit of the stamens, which falls upon the stigma and traversing the style of the pistil reaches the ovary.

In this process of fertilizing, insects are important aids and in quite a large number of cases are essential aids; and of all insects bees are the most important workers. They seek the honey to be found in the blossoms; and while on this quest they disturb the anthers, knocking the pollen upon their wings and bodies and in this way conveying it to waiting stigmas. In a large class of flowers the work of insects is essential to fertilization either because the stamens and pistils of the blossom do not reach maturity at the same time, or the pistils are turned away from the stamens, preventing the pollen from falling on the stigmas, or else the anthers are below the stigmas, having the same effect; while other blossoms have no pistils or else no stamens; in all these cases self fertilization is impossible.

To fertilize such blossoms it would seem that the creation of the bees had been especially designed, so well do they perform their work. First, the bees are formed just right to accomplish it. Then the flower has the honey to attract the bee. And when the conditions are most favorable the flower sends out a fragrance to yet further attract the bee. Prof. Gray calls this fragrance the flower's advertisement. But it may occur to the mind of the reader that the bee would visit flowers of different species and thus occasion the greatest confusion. Not so. The bee has a keen sense of taste and never mixes its nectars, but as the nectar of all blossoms of each species tastes alike it confines each vist to one species. Aside from this, having found nectar in one blossom it would naturally seek in others having the same appearance and fragrance. To get at the honey the bee must twist itself into all possible shapes and positions, a wise provision of nature to secure the dislodgment of the pollen; and she also doles out the nectar in small

quantities that the bee may be compelled to make frequent visits. It is also a fact worthy of note that the blossom does not yield nectar until it is ready for its part in fertilization.

This phase of the phenomena is curious enough to be interesting, but there is an intensely practical aspect of the case. Nature would not go to so much trouble for nothing, and if there was not an important work for the bees to perform, there would not be these provisions made for it. We are forced to the conclusion that where there are no bees many blossoms will fail of being properly fertilized and hence fail to mature fruit.

How much the fruit grower would lose by the total destruction of bees it would be hard to estimate even approximately, but probably it would far exceed any damage the bees will do by occasionally puncturing a grape or peach. It is said that in a town in Massachusetts, so strong was the belief that bees injured the fruit, that an ordinance was passed obliging the bee-keepers to remove their bees to another locality. After a year or two the fruit growers decided to have the bees brought back as so little fruit set upon the trees in proportion to the blossoms which appeared. When we consider the work done by bees, we are justified in calling them pomologists.

I am certain that bees injure fruit very little, if at all. Most of the destruction blamed upon them is the work of other agents. The jaws of the bee are too weak to puncture the skin of the most delicate grape. Only after it is pierced does the bee harm the fruit.

JOHN M. STAHL, in American Garden.

SOME PUGNACIOUS SPARROWS.

We may be pardoned for again calling the attention of *Prairie Farmer* readers to the much talked of English sparrow, long enough to quote the following interesting and phathetic incidents from a letter to Science written by G. C. Henning, of Louisville, Ky. It gives some positive evidence as to whether or not these feathered intruders molest our native song birds, that the few remaining sparrow advocates would do well to ponder upon. Mr. H. writes:

We had provided at my home in Hudson county, N. J., numerous boxes for nests of blue birds and wrens in the trees, and before the introduction of the English sparrow in New York in 1864, these were invariably occupied by the same family each spring; additional nests were always soon occupied. Any one acquainted with these pretty little singers will understand the peculiar charm they lend to a country home. During the summer time the grove would be full of thrushes, who would build their nests in the underbrush and fill the morning

and evening air with their melodious song. Within four years after the introduction of English sparrows they had found their way to our home, and immediately began harassing the blue birds, sometimes destroying their nests. As soon as we noticed this we took the part of our pets and fought the sparrows at every point. This was soon noticed by the blue birds; and it actually happened that when hard pressed by the sparrows they would fly close to the house to attract our attention to their trouble by plaintive cries. We succeeded in protecting them for a few years; but with the rapid increase of the sparrows, the blue birds have left their former abodes never to return to them except as travelers.

TRAGEDIES IN BIRD LIFE.

When we noticed that the wrens were harassed in a similar manner, we made the entrance holes to the boxes so small that the sparrows could no longer enter. We then found that the wily sparrows would take turns sitting on the perch in front of the opening until the old wrens had left, or until the young ones had starved. In two cases we found that the old wrens had been kept imprisoned until starved to death. We tried to drive the sparrows off—shot them with guns, caught them in traps, destroyed their nests, etc., etc., but all in vain. The best way to drive them away seems to be to destroy their nests without tiring; then they will partly leave. They would fight the brown thrush and scatter its eggs whenever opportunity presented itself, and seemed to take particular delight in pulling their nests to pieces to build their own with the debris.

FRUIT DESTROYING HABITS.

Mr. Henning adds: In spring they destroy the strawberries to begin with, and attack every variety of fruit except currants, gooseberries and apples. They do not feed on cherries to make their living like native birds, but merely take a bite of each berry, and destroy it wont-only. When pears are ripe they will peck large holes in them to drink the juice. They generally appropriate half of our vineyard, and cannot be frightened by "scarecrows." They invariably keep themselves busy when not hungry, by picking off young sprouts, especially of fine plants and rose bushes, though they do not spare trees. In addition to the above they do not destroy worms which build a web, though they probably destroy chrysalids or open cocoons in winter time when they can find no other food. We have never seen them destroy worms in summer time when grain, seeds and other food are plenty.

LITERARY.

LET US SING.

O. Painter of the fruits and flowers,
We own thy wise design,
Whereby these human hands of ours
May share the work of Thine!

Apart from Thee we plant in vain
The root and sow the seed;
Thy early and Thy later rain,
Thy sun and dew we need.

Our toil is sweet with thankfulness,
Our burden is our boon;
The curse of Earth's grey morning is
The blessing of its noon.

Why search the wide world everywhere
For Eden's unknown ground!—
That garden of the primal pair
May never more be found.

But blest by Thee, our patient toil
May right the ancient wrong,
And give to every clime and soil
The beauty lost so long.

Our homestead flowers and fruited trees
May Eden's orchard shame;
We taste the tempting sweets of these
Like Eve without her blame.

And North and South and East and West,
The pride of every zone,
The fairest, rarest and the best,
May all be made our own.

Its earliest shrines the young world sought
In hill-groves and in bowers,
The fittest offerings thither brought
Were Thy own fruits and flowers.

And still with reverent hand we cull
Thy gifts each year renewed;
The Good is always beautiful,
The Beautiful is good.

—*J. G. Whittier.*

MANHOOD.

The most profitable industry the farm affords is the development of character, of manhood in your boys and womanhood in your girls. No farmer ever raised a crop half so valuable as a large number of sons—honest, intelligent, industrious, fond of home and all its endearing associations, avoiding, as though a crime, the race-course, the dram-shop, the gambling den and allied places of infamy. The richest mother is the one that has the largest number of affectionate daughters—daughters that know of no place so dear as home and no name so sweet as that of mother. Here let me say that I am a farmer simply because the farm affords more real pleasure than any other pursuit for which I am fitted. My pleasures do not evolve from what I make from the farm but from what the farm makes of me. I do not cultivate cereals, vegetables, fruits or flowers wholly for what they will bring in the market, but rather for what they will make me worth in the market. It is not the number of gladioli, the bushels of corn, or the barrels of apples that I have harvested in the year, but it is the crop of manhood, the yield of domestic happiness, that shows the true productiveness of the farm.

C. L ALLEN, in *Ladies' Floral Cabinet.*

BOOK OF NATURE.

The book for every farmer's boy to read is the open book of nature. There was none ever written that contains one-half of the information, none other half so facinating, none so perfect and pure. Nature teaches us to dwell as much as possible upon the beautiful and good, and to ignore at all times the evil and the false.

Let us take a single tree for an object lesson and see what it will teach us. Time will not permit of our discussing the phenomena of plant life, and we will only say that vegetable and animal lives in no way differ in principle: there is a perfect analogy between the two. But in order to show you the pleasure there is to be derived from the study of the tree, we would say that all plants possess a real life—they eat, drink, feel and think; they sleep, breathe and secrete—in short, perform all the functions of supply, repair, development and reproduction. The intelligence they manifest in searching for food is simply wonderful, while the actions of climbing plants in search of supports are equally strange. All these wonderful peculiarities of plants are but little seen or appreciated. In fact, not one man in ten ever saw the true roots of a tree, or knows that they are put forth in spring simultaneously with the leaves and are shed with them in autumn.

To make the farm attractive, show the child its attractions; how plants know when there has been a storehouse of food placed within their reach, and will immediately turn their attention to it. Show how each and every plant takes from the earth and atmosphere different elementary substances, and how they are stored up for our use. Show the child the plants' adaptation to the necessities of other living organisms in the localities where they are indigenous; how that in every locality the animal and plant support and sustain each other and in the end consume each other. The breath of the ox is the food of the plant upon which he fattens.

How interesting it is to watch the plant industries as they are carried on side by side, each doing its own work wisely and well and without exciting in the least the envy of its neibhbor, and without contention or strife. We see the maple collecting saccharine juices; the pine, rosin; the popy, opium; the oak, tannin, and so on through the list. In our gardens the aconite collects a deadly poison which it stores up in its tubers, and by its side the potato gathers in starch for the sustenance of man. The plant's adaptation to the soil and climate in which it is to grow is one of the most beautiful and useful studies for the old as well as the young.

C. L. ALLEN, in *Ladies' Floral Cabinet.*

A DAY OF JUNE.

I could write such a beautiful poem
About this summer day,
If my pen could catch the beauty
On every leaf and spray,
And the music all about me
Of brook and breeze and birds—
But the greatest poet living
Cannot put them into words.

So I may not write down the poem
As it came from the hand of God
In the wonderful worldless langnage
He writes on sky and sod,
In words that we tell *our* thoughts in,
That will make you feel and see
The beautiful, beautiful poem
This day has been to me.

If I might, you would hear all through it
The melody of the breeze,
Like a fine and far-off echo
Of the ocean harmonies:

You would hear the song of the robins
  Aswing in the apple tree,
And the voices of running waters
  In their search for the great gray sea.

You would breathe the fragrance of clover
  In the words of every line,
And incense out of the censers
  Of hillside larch and pine;
You would see through the words the roses,
  With, deep in their hearts of gold,
The sweets of a thou and summers—
  But words are so weak, so cold!

If I only could write the color
  Of the lilac's tossing plumes,
And make you feel, in a sentence,
  The spell of its sweet perfumes;
If my pen could paint the glory
  Of the blue and tender sky,
And the peace that crowns the mountains,
  My poem would never die!

—*Eben E. Rexford in American Garden.*

VALUABLE.

The best poems are a legacy to the world of untold value. It is so with the poetry of the farm. It not only brings comfort and happiness to others, but possessions. Every dollar or day's work expended in trees, flowers, lawns or hedges, is invested for the whole country about. More than this. The value is not lost when we leave these improvements, but with all the added increments of the years of pleasant thought and labor, they are handed down to futurity. How I honor and bless the lady who planted the beautiful trees that now grace my yard and shade my house. Her memory is renewed with each unfolding leaf and growing bough. She has left me that which I could not purchase with money or secure with my labor.

Whittier most appropriately puts the value of this entail into rhyme:

"For he who blesses most is blest;
  And God and man shall own his worth,
Who toils to leave as his behest,
  An added beauty to the earth."

THE REAL HOME.

What makes home is the light of love kept constantly burning on its altar, and which welds the tender, sacred ties of the family. Persons who are too busy with the daily affairs of life to find time to adorn and beautify their homes will soon permit the lamp of love to burn low and dim on the altar of their hearth-stones, and then, blindly ignorant of the cause of their unhappiness, they bewail at their lot and marvel at their own wretchedness. The way to be happy is to make your home beautiful and attractive, within, of course, the limit of the means at your command. Intelligence, love and refinement cannot be found in a home where there are only bare walls and floors, where there are no books or papers on the table, no flowers in the yard and no music in the hearts of its inmates.

J. G. HOLLAND.

A FEW FACTS FANCIFULLY FORMULATED.

SILENT PLEADERS.

While trav'ling o'er the prairies wide,
We see along the highway side
Poor beggars ranged; though not a word
They utter, yet our hearts are stirred
With tales they tell in mute despair.
They lift their shattered arms in air,
And tell of ills which they have known,
Of scathing blasts so often blown;
Of piercing cold, of dearth and flood,
Which chill, or dry, or taint, their blood.
Their mangled trunks and broken limbs
A sight presents which well nigh dims
Our eyes with sympathetic tears;
For sweet Pomona, many years
Hath nurtured with unsparing hand
These once fair products of the land,
Which now stand stark and almost bare
Of the rich dress they used to wear.
The luscious fruit they yearly bore,
Is found not now as 'twas of yore.

As human beggars on the street
Placard their woes—as seemeth meet.
In printed words hung on the breast,

So these mute pleaders plead the best
In picturing sorrows to the eye.
These are the words they seem to cry:

THE FRUIT TREES' PRAYER.

"O Master, we appeal to you;
For many years we've thrived and grew
Upon the food dame Nature gave,
But, this exhausted, now we crave
The aid that you alone can give—
The food without which none can live.
Too long you've starved us in your greed,
You've cropped our ground, nor given heed
To Nature's fixed eternal laws;
That ends result from equal cause.
That constant cropping must exhaust
The food stored up at endless cost;
The grass, with myriad mouths, devours
The food which justly should be ours.
Root out, destroy this thieving foe!
And, if you'd have us thrive and grow,
And give you fruit as once we gave,
And like good Christian trees behave,
Feed us from yon cattle yard;
Stir us the soil, now stiff and hard,
Prune off our limbs, that now are dead,
And paint their stumps with oil and lead;
From off our trunks the roughest bark
Scrape well; and we will here remark—
A wash of soap or alkali
With a stiff brush if you'll apply,
'Twill brighten our complexion much,
And drive away the insects—such
As lay the eggs whose larvæ bore
Our vitals through; and what is more,
Thus weakened, we cannot withstand
The freezing grip of Boreas' hand.
Cut out these grubs; for now they sleep
Pent up within our bodies deep.

"Do all these things and you shall see,
Tho' man to man ungrateful be—
Pomona pours her richest gifts
On him who cares for and uplifts
Her feeble children from death's door,
And thus befriends them *con amore*.

"Now listen to our final call;
We speak to farmers, one and all,

In these terse, emphatic words:
Plant evergreens to shield your herds,
Your orchards and your homes from cold,
These beauteous trees outweigh your gold;
Enhance your pleasures every year,
And when the close of life draws near,
Your children's gratitude will fill
Your hearts with the prophetic 'Peace, good will.'"

—A. M. N.—*From Western Rural.*

FARMERS AND BOOKS.

The world teems with books on orchard management, and on every other department of husbandry. Is it wise to spend a lot of money on buying trees and planting an orchard, when a dollar is begrudged for some useful work on fruit culture? The prejudice against book-farming seldom voices itself nowadays; but it may be seen plainly enough in the scarcity of good books on agriculture and horticulture in farmer's houses. It is the minority still who take a rural paper. "Read and you will know," is as true about farming and gardening as any other department of human knowledge. The accumulated wisdom of ages on all subjects is embodied in good books and scattered broadcast in useful periodicals. If a man shuts and bars his doors against these, he metaphorically closes his windows to the light of day, and must sit or walk in darkness.—*Cor. Rural Canadian.*

This is a race track
Rounded and smoothed with care,
Thronged with horses and people
Every day of the fair.

o o o

These are the farmers' products,
Few and far between,
Viewed by reporters and committeemen,
Cared for by farmers green.

—*Stoughton Sentinel.*

Here is a little piece of poetry that seems to me pretty good. There is great deal of truth in it, if it is short. Just think what a difference there is between bread and liquor, and yet both come from the same thing. There are a great many other things that we meet with in every day life that will produce good or bad results—just as we choose:

A VOICE FROM THE CORN.

I was made to be eaten and not to be drank;
To be husked in a barn, not soaked in a tank.

I come as a blessing when put in a mill.
As a blight and a curse when run through a still.

Make me up into loaves, and your children are feed;
But into a drink, I will starve them instead.

In bread I'm a servant, the eater shall rule,
In drink I'm a master, the drinker a fool.

Then remember my warning! my strengtn I'll employ,
If eaten to strenghten, if drunk to destroy!

FRUITS.

Think once more, my friends, of the great blessings which you may confer on mankind by the multiplication of good fruits. Next to saving the soul is the saving of health, and I know of no better means than an abundant supply of ripe fruits.

Fruits are the overflow of nature's bounty; gems from the skies which are dropped down to beautify the earth, charm the sight, gratify the taste, and minister to the enjoyment of life; and the more we realize this, the more shall we appreciate the divine goodness to us, and the duty of providing them for others.

Like morning's first light, that gladdens the sight,
So may the best fruits spread over the earth.
And when we shall reach that still fairer land,
And round the life-tree in mercy shall stand,
May each pluck its fruit, and nevermore feel
The serpent's sharp tooth, once close at his heel.

—*Extract from an address by the Hon. Marshall P. Wilder.*

VEGETABLES.

A POTATO TRIAL AND EXHIBIT—BY THE EXPERIMENT DEPARTMENT OF HOUGHTON FARM.

The best method of cutting potatoes for planting has been long disputed and a variety of conflicting opinions have been made public.

In 1884 it was decided to try and contribute something to the knowledge of this subject, by making comparative plantings at Houghton farm and instead of reporting the result in figures, exhibiting at various fairs, the pototoes themselves, just as grown, with such marks and explanations as would enable everyone to judge for himself as to the facts.

Accordingly, at the New York State Fair of 1884, the well known potato grower, Mr. N. F. Pierson, of Seneca Castle, Ontario county, was engaged to make up a collection of a few pounds each from 100 to 150 varieties successfully grown by him, to include a number belonging to all the established classes or families of potatoes. Mr. Pierson kept the seed through the winter very successfully and sent the collection to Houghton farm in the spring of 1885. As received on the first of May, the potatoes were in excellent condition, and represented 130 varieties, divided as follows: eight new, early varieties, 32 approved early varieties, 24 new late varieties and 60 approved late varieties.

The place selected for planting was part of an old garden, cropped for two or three years with onions and cucumbers for seed. The soil was similar to the black soil so well-known in the onion growing districts of Orange county. It was not first-rate potato ground, but was convenient for the purpose and well protected from interference and accidents, which was an important point. The land, after being put in a good mechanical condition, received a moderate and very even dressing of muriate of potash and phosphatic lime, harrowed in.

The land was carefully laid out in squares, a space nine feet square being allowed for every variety. It was decided to plant the potatoes in three different ways as to form of seed, and with three hills in each way, to guard against accident. This gave nine hills of every variety, and the whole field was planted three feet apart both ways. A large stake marked with the number of the lot, was set at the middle of every square. It would have been difficult to find anywhere a piece of land more uniform in every respect throughout its area, and less liable to affect single hills of potatoes from local causes.

The potatoes were planted on the 20th of May, (the ground not being suitable earlier), and as I selected and cut all the seed, while my principal assistant, Mr. Emery, planted every hill, I am certain that in this part of the work, all were treated exactly alike, and there was no possibility of error. The squares of different varieties were so placed that the hills of like seedings formed rows across the field, and the different kinds were planted in the same order as that in which they were exhibited at the fairs. The earliest varieties were together

at the left, and so on to the right, where the latest varieties were placed. Of every variety, three hills were planted with one fair whole potato, about the size of a hen's egg; three others had in each hill one good-sized piece of a good-sized potato, the piece having three or four eyes on it; and the three remaining hills were planted each with one eye upon a rather small piece cut from a good sized potato. It is needless to add that throughout the growing season the hills of the whole lot were treated exactly alike; no operation was performed which would affect the produce of one hill that was not applied to all the hills, the same day. The usual culture of field potatoes was followed, but very little hilling was done.

The season was extremely unfavorable for the crop. During the months of June and July the rainfall was less than four inches, instead of from ten to twelve inches for the same months in several previous years. At the time, therefore, when the young plants most needed water to make their growth, they got none, but were, instead, subjected to most intense dry heat. It soon became apparent that this would tell disastrously upon the productiveness of the crop, but as all varieties and the different ways of seeding fared alike, it was felt that the experiment might be profitably completed. The early varieties naturally suffered most, and this was apparent to every one who saw the exhibit. Abundant rains in August were of great benefit to the late varieties, and these were mostly in vigorous growth when it became necessary to dig them for the fairs. All were dug between the first and the twelfth of September. At this time one of the early kinds (the Bermuda Pink Blossom, an imported potato), was still green and growing, and of the 88 late kinds, 50 were ripe, while 38 were more or less immature.

The harvesting was carefully supervised by Mr. Emery, one hill at a time, and everything half an inch in diameter was saved. The total product of every hill, when dry and clean, (but not washed), was weighed, all the tubers counted, the number merchantable counted, and then the whole put away in a stout paper bag plainly marked, all the facts being carefully recorded.

Exhibits of the products from these plantings were made during the autumn at the New York State fair, Albany, the Orange county fair, Newburgh, N. Y., the Deerfield Valley fair, Charlemont, Massachusetts, the Hampshire, Franklin and Hampden counties fair, Northampton, Massachusetts, and at the Virginia State fair, Richmond. The method of display at all these places was substantially the same. On the exhibit table the potatoes were arranged in three rows according to the different methods of cutting and planting the seed. One

hundred and twenty-eight (128) varieties were shown, and the whole product of the three hills of every variety, that of each hill in a small wooden tray by itself. There were thus 384 trays in all. The back row of 128 were from the whole potato as seed, the middle row from the usual cutting and the front row from the single eye planted. Every hill or tray was plainly marked with the name of the variety and the method of seed planting. Examined from left to right, every row showed the effects of the same way of cutting upon different varieties. From back to front, in sets of three, the same variety in different ways. As a whole, the potatoes were inferior in quality, although in several cases, single hills produced from three to five pounds. But that was immaterial, the exhibit was not intended as a show, but as an object lesson, giving at a glance the results of these three ways of planting. Large cards accompanying the exhibit, gave the average results in figures. These may be condensed as follows:

AVERAGE OF 128 VARIETIES OF POTATOES.

Method of cutting seed.	Whole number of potatoes per hill.....	Number of merchantable potatoes per hill	Average weight per hill. Oz..	Average weight of the tubers. Oz.....	Computed product per acre. Bushels.....	Area required for 100 bus. Square rods.
Whole potato (back row)	28	9¼	48	2.4	316	51
Usual cutting (middle row).....	13	6⅔	33	2.5	215	74
Single eye (front row).....	10	5⅓	28	2.8	185	86

One set of these figures may be deceptive; although it appears that the average weight of the potatoes in the front row (single eye planting), was the greatest, the number of large potatoes was greater in the back row, and the largest potatoes were there also. Therefore in every way of viewing it, so far as this one trial is concerned, the planting of the fair-sized whole potatoes was the most satisfactory in result. And this was not the result with a single kind, but the average of 128 different kinds, treated exactly alike in every respect except the form or cutting of the seed. HENRY E. ALVORD,

—*Rural New Yorker.* Manager.

WHOLE *versus* CUT TUBERS FOR SEED.

The results of numerous experiments in this direction may be summed up briefly: as a rule, the more potato we have planted the

larger has been the yield. Large tubers have yielded more than small ones. Large cuttings have yielded more than single eyes. When it is remembered that usually but a single eye develops, it appears that practically the chief difference between whole and cut tubers is in the amount of potato used. The question as to how small the cuttings may be safely made, appears to depend upon circumstances that the potato grower cannot foresee.—*Rural New Yorker.*

MODERN GARDENING.

The old plan of having a little garden spot, spading it up and tending it by hand, is the plan that presents itself to many a man's mind when he is urged to have a good garden. Naturally he thinks this is a great deal of bother and it is. We do not blame a farmer for not wanting to enter upon such a work. But that is not the way gardening is now generally done on a farm. The garden is more like a field than it is like the garden of our younger days. It is laid out so that there may be long rows. The ground is plowed, and the horse is brought into requisition to cultivate. In this way the garden is little more trouble than the corn field. Hand labor is tedious and it is always expensive. We would advise a farmer to have a good garden even if he must cultivate it by hand, but the way to do it is to plant in long rows and cultivate it with horse power. If the tillage is by hand by all means have the most improved implements. Speaking of sowing seed, perhaps this would be a good place to give the quantities of seed to sow a single row of one hundred yards. The following table will show:

Asparagus	8	oz.	Lettuce	2	oz.
Beans, Bush	3	qts.	Melon, Water	2	"
" Lima	3	pts.	" Citron	1	"
" Pole	1	pt.	Mustard	4	"
Beet	5	oz.	Okra	12	"
Broccoli	½	"	Onion	2 oz. for large bulbs	
Brussels Sprouts	½	"	Onion	8 oz. for sets	
Cabbage	1	"	Parsley	2	oz.
Carrot	3	"	Peas	3	qts
Cauliflower	½	"	Pepper	½	oz.
Celery	3	"	Pumpkin	2	"
Collards	½	"	Radish	6	"
Corn	1	pt.	Rhubarb	4	"
Cress	4	oz.	Salsify	4	"
Cucumber	4	"	Spinach	6	"
Egg-Plant	½	"	Squash	3	"
Endive	2	"	Tomato	1	"
Leek	2	"	Turnips	3	"

Persons not accustomed to handling sweet potatoes sometimes find that they rot very freely. A sweet potato to keep well must be

handled as carefully and tenderly as winter apples. They bruise easily and wherever bruised they will surely and speedily decay. They must have a cool, dry place and it should also be dark. By cool is meant a point below that which produces vegetable decay but not so cool as is necessary for apples, that temperature would chill and rot them. It is not necessary that they should be packed in leaves or anything of that kind but they must be dry. They should be dried before being put away, but the drying should be done in the shade as much as possible. Sweet potatoes should never be piled up in any great heaps; they keep better when spread out a little so as to avoid heating.—*Journal of Agriculture.*

TOMATOES ON POLES.

It is said that training tomato vines to poles is at least a pleasurable undertaking. Its profitableness we have not seen any mention of, though the *Rural New Yorker* says that the fruit will be very fine which would be expected. Ordinarily the tomato grows well enough in the old way and for domestic purposes it takes but a few hills to supply the largest demand. The paper referred to, however, advises people as a matter of pleasure to set poles twelve feet high and train the vines to them. It says that if lateral shoots are pinched off, confining the vines to a single stem, and securing it loosely to the poles by loops, it will reach the top of the poles. As a diversion at least such things are worth trying.

HISTORY OF THE TOMATO.

According to Dr. Sturtevant, of the New York Experiment Station, in relation to the history of the tomato, it was described by European botanists in the tenth century, and was probably grown as a fruit at that period; but in the seventeenth century it was as yet grown in England merely as an ornament. In the early part of this century it was grown for the Rome and Naples markets; the Anglo-Saxon race was, probably, the last to receive it as a food, and they gave it the name it bears. In the seventeenth century Spaniards, Portuguese and Italians used it very abundantly.

To this we may add, the tomato was introduced into the United States early in the century as an ornamental plant, under the name of Love apple. In the larger cities of the New England and Middle States, and especially in the south, the tomato gradually found its way into kitchens as an esculent. The taste increased under improved methods of cooking. In 1831, the father (then of Newark, N. J.) of one

of the editors of the *Farm, Field and Stockman*, received an improved variety from Italy in connection with seeds of the Spanish melon, and was the first person in that city who used the tomato as a food. The children soon learned to eat the fruit in its natural state; a fruit now more universally used and appreciated than any other. As a boy the writer remembers being carefully warned by a good old aunt "not to touch the 'love apples'—they are poison." The child had already eaten the forbidden fruit at home.—*Farm, Field and Stockman.*

THE VEGETABLE GARDEN.

Where plenty of garden vegetables are required, frequent sowings or plantings should be made. The "spring fever" of vegetable gardening is generally of short duration, and is at its height when the attack first comes on. The owner of a small garden is apt to have it so seriously that undue haste is made in all the operations; plowing or spading is not half done, the surface is barely stirred up enough to show that some one has been over the whole ground; fertilizers are improperly supplied, and plantings are made with hands unguided by experience or judgment. All the seeds are put in on the same day, and the work finished up as rapidly as possible. The result is, in some cases, a surplus of vegetables for a short period, and none thereafter; in other cases, at no time does the garden afford vegetables worthy of the name.

For the best success a series of plantings should be made, commencing with radishes and lettuce; plant as early in the season as the weather will permit, always bearing in mind that it is folly to put seeds in the ground when it is cold and wet. A planting of radishes should be made every ten days until the first of June, after which time do not plant again until September, as in this climate radishes in midsummer are worthless. Peas should also be sown in succession until the first of June. Plant a few at a time, in order that the whole crop may be consumed when in the best possible condition; it is far better to eat canned peas than half ripened ones from the vines. A planting of peas can be made to advantage after early potatoes, if the proper kinds are selected, and for this purpose "Henderson's First of All," or others of that class are the best. It is folly to plant so late the large, wrinkled varieties, as a crop of mildew would be secured in September instead of a delicious vegetable. Two plantings of beets in spring and one in August will keep up a succession of this vegetable, tender and sweet. Sweet-corn should be planted every week, say twenty hills at a time, from the first of May until the middle of July; this will afford an ample supply for nearly three months. Beans should be planted

at intervals of three weeks, the last planting to be made about the middle of July. This crop, if not wanted for snap beans, can be used to good advantage for pickling.

A small planting of strap-leaf turnips should be made as early as possible in the season, and another on the ground where the early peas were grown. A later planting can be made, as well as one of rutabagas, where the early potatoes were grown. In any vacant places, if such there are in the garden, a small patch of spinach should be cultivated, if for no other purpose than to turn under as a vegetable manure. It is of the greatest importance to make an early and late planting of tomatoes. For the first, put out strong, stocky plants; for the second, drop a seed or two in each hill of early corn, and as soon as the corn is done cut the stalks to the ground, and a splendid crop of tomatoes will be secured, which will be very useful after the first has ripened its best fruits.—*From American Garden.*

NATURE OF THE DISEASE.

The potato rot is a contagious disease which often spreads from plant to plant and field to field with great rapidity. The disease attacks the tops as well as the tubers, and is due solely, or primarily at least, to the presence of a minute parasitic fungus, phytophthora infestans. The life history of this parasite was carefully investigated many years since by De Bary and other botanists, and is now well known. The destructive effects of the fungus are generally first observed upon the tubers late in the fall, but the disease is present much earlier in the season, and may be recognized on the tops by a certain characteristic blotched, black or brown-spotted, dead appearance. A more critical inspection of the diseased tops would show numerous small white spots scattered over the leaves and stems. When highly magnified these spots are found to be minature forests of slender stems growing up out of the surface of the leaves and stems of the potato. These tiny stems commonly branch and swell out at the ends into ellipsoid or oval bodies, known as summer spores. These little spores are produced by millions and are so small that a million could easily lie side by side on a square inch without crowding. When ripe they separate from the stem by a joint and fall. Under the influence of water the living, jelly-like contents of the spore may push out a long, slender tube, capable of growing down directly into any part of the potato plant to begin a new cycle of growth, or may separate into several distinct portions (swarm spores) which, being endowed with life and motion, burst through the wall of the mother spore, swim about actively for a few

minutes, and then either die or thrust out a slender tube, capable, as in the other form, of becoming a mature plant inside of the potato plant. All this wonderful vital activity, so readily observed under the microscope, takes place, as we have seen, in bodies small enough to rest easily on the poin of a pin and light enough to be readily blown from field to field.

The mature fungus lives in the tops or tubers of the potato, and is also a minute affair. Its presence can only be detected by the microscopist, but its capacity for mischief bears no relation to its size. It consists of very numerous, colorless, irregularly branching, tube like threads. These threads grow through the tissues of the potato more or less rapidly, appropriating to their own use the nutrient juices of the vegetable, and impoverishing its tissues so that they either break down directly or are invaded by bacteria and other low forms of life which induce putrefective decomposition. It is this mature fungus which sends to the surface the white forests of tiny stalks bearing the summer spores already mentioned. These spores live only a short time, but the mycelium (the internal tube-like threads of the fungus) is perennial and hardy. There is little, if any, differentiation of parts or distinction of function in the internal portions of the fungus, and consequently, unlike the higher plants, a new plant may, under favoring conditions, arise from any least portion of it. In fact, any portion of it is a complete plant in itself, being capable of growth and reproduction.

There appears to be some hope of successfully combatting this fungus more than in the case of almost any other similar plant parasite which is equally widespread. The important facts to be considered in devising preventive measures are (1): The fungus spreads from one plant to another during the growing season by summer spores, rain-washed or wind-blown; and (2) it depends, primarily, for its spread the following season upon its perennial mycelium (the tube-like threads), always to be found in the diseased tubers and tops. It may, also, possibly grow from resting spores found in the same situations, although the existence of the latter is not settled beyond dispute.

PREVENTIVE MEASURES.

1. From what has been said it follows that the parasite may often live over winter in the tops of decaying tubers left in the field after harvest. Prudence would, therefore, dictate the complete removal and destruction of such refuse. It should be buried or burned. It should not be used for compost.

2. Store the harvested crop in dry cellars, and sort over several times, at short intervals, carefully removing from the bins every tuber which shows the least sign of decay. Remove, also, to a separate pile, those tubers which have been lying in contact with the diseased ones. The sorting will be facilitated and the decay hindered by storing the tubers in casks, barrels or small boxes. Potatoes buried in quantity in fields will be likely to rot in toto during the coming winter if, by chance, any infected tubers were buried with the sound ones.

3. Plant next season only tubers which are entirely sound, outside and inside. The black spots contain the fungus. Some tubers may appear sound on the surface and be diseased within. Determine the soundness of the tubers by cutting at planting time. To plant diseased potatoes will insure a continuation of the rot.

4. Even if direction No. 1 has been followed, more or less of the potato fungus will probably remain over winter in the fields ready to grow if there is an opportunity. Do not, therefore, plant in the same fields as last year, nor in adjoining ones, nor near fields planted by neighbors if some more remote locality can be found.

5. Take advantage of the prevailing direction of the wind. Our summer and autumn winds are chiefly from points between south and west. There is, therefore, a chance of escaping wind-blown spores by planting to the southwest of other potato fields, or to the northeast of woodlands or other large uncultivated tracts.

6. The growth of the parasite is favored by moisture and stopped by drouth. It is rapid in rainy weather and when there are heavy dews. Usually the rot is much worse upon clay land or other soils which retain moisture. Choose, therefore, a light and dry soil for planting.

It has been shown experimentally that, with only moderate watering, the summer spores will penetrate the soil to a depth of several inches, consequently "hilling up" will not protect. The probabilities are, also, that no substances can be dusted upon or otherwise applied to the growing plants with much benefit. If some varieties of the potato are less subject to the rot than others, a thing not improbable, the present state of our knowledge does not enable us to say positively which they are.

HISTORY OF THE POTATO.

The early history of the potato is involved in obsurity. It has been supposed that the plant was first found by Europeans in Virginia, and that Sir Walter Raleigh carried it thence to England in the year 1586. Raleigh never visited Virginia. He only furnished ships and means

to aid in planting a colony there. The most probable theory to my mind is, that Sir Francis Drake, returning from explorations in the Pacific Ocean, coasted along the western shores of South America, one of the native habitats of the potato, and while in that region procured some of the tubers which he carried with him to England. On his homeward voyage, he touched on the shores of Virginia, and took off the discouraged colonists and conveyed them back to the mother country. If this is correct, then this introduction probably occurred as early as 1565, this being the date of Drake's return from the west. The potato was doubtless known to Europeans at an earlier date, as Columbus, during one of his voyages, found a root cultivated on the island of Cuba, that was used for food by the natives, and this was no doubt the potato.

Early European voyagers and travelers found the potato growing in the Andean forests and along the Pacific coasts on both sides of the equator, through several degrees of latitude. It was also found in cultivation, the natives testifying that it had been in cultivation as an article of diet from time immemorial. Spanish and Portuguese adventurers probably introduced the potato into those countries at a very early day, whence it probably made its way into Italy. It is quite certain that it was cultivated in Spain as early as 1550. The time of its introduction into Ireland, where it has become so important as an article of food that a general failure of the crop results in a famine, is in dispute, some claiming that it was from Spain by a sea captain in 1565, others that it was procured from Raleigh in England.

Germany received the potato in 1710. The government gave great encouragement to its culture, even using compulsory means in some instances, to promote its cultivation. Its importance in Germany as an article of diet is second only to what it is in Ireland. In France, where the potato was introduced at the beginning of the 18th century, it had to fight its way to popularity against great opposition. The National College of Physicians pronounced it poisonous. The Catholic priests pronounced it an evil root because it was not mentioned in the Bible.

Through the address of a courtier King Louis XIV. was interested in the plant, and it was introduced into the royal gardens. The example of the sovereign was followed by the nobles and thus it soon became popular.

It seems strange to us that a plant that has so many qualities to commend it should have required 250 years to make its way to general popularity, but such is the case; and it was not till the beginning of the present century that it came to be appreciated as its merits deserve.—*Rev. L. J. Templin in Rural New Yorker.*

The nature and causes of the potato rot now so prevalent in Michigan have been carefully investigated at the botanical laboratory of our State University by Prof. V. M. Spalding and Erwin F. Smith, of the University of Michigan, and the latter gentleman has kindly furnished the following article for publication in this report:

THE POTATO ROT.

The rot which has this season destroyed nearly one-third of the potato crop in Michigan, and a still larger per cent. in New York and neighboring States is identical with that which caused the great famine in Ireland in 1847. Michigan annually raises about 9,000,000 bushels of potatoes, and though we are in no danger of starvation should the entire potato crop be destroyed for a series of years, the loss of even a third or a quarter of the crop bears heavily on the prosperity of the farming community. The importance, then, of the potato crop, and the probability of the return of the rot next year with increased destructiveness should the season be wet, makes it desirable to give the widest possible currency to sound knowledge of the nature of the disease and the measures which can be used to check its spread.

Now, if I am to rely upon my own observations, instead of on the theory that a potato, being a cutting, cannot improve or deteriorate by selection or cuttting, I should say that the potato is greatly modified in quantity of yield and quality of product by conditions of soil culture and by the season. A variety may do remarkably one season, or under certain conditions, and be almost worthless another season or under different conditions, and the different varieties vary greatly in their susceptibility to such modtfications and to get the best possible result we must uot only have a variety which is good, but which will respond most readily to the most favorable conditions; but such a variety will almost invariably be subjected to corresponding deterioration, if it has to contend with unfavorable conditions; so the ideal potato of experts in different locations or circumstances would not be ths same, and would be sure to be different from the ideal potato for general culture.— *W. W. Tracy in Rural New Yorker.*

ORNAMENTALS.

PECAN CULTURE.

Mrs. Shrewsbury, of Sherman, Texas, writes the following to the *Home and Farm:*

There are twenty or more varieties growing here, about four of which comprise the best, and all that is desired. To grow these it is necessary to secure fresh nuts, as they cannot be relied upon to germinate after being thoroughly dried; they should be planted as soon as received. Plant shallow—say three inches—in open ground; this for the Southern States. In more northern latitudes I would recommend putting the nuts in boxes of moist sand. Freezing is not necessary, as with the walnut. The continued moisture will open the shell, and if transferred in the early spring to open ground a few warm days will cause them to germinate. When convenient they had better be planted where they are to remain; or if planted in nursery rows they should be reset in permanent position after the first season's growth; they will then be ten or twelve inches high, and if the soil was loose and deep, the tap-root will probably be longer than the top. The second year they will grow three or four feet, and the third year from seven to ten feet. They will then be nicely branched and well established. After this they will require very little care; in fact, it has been my experience that they do as well, and bear sooner, when the land is sown to pasture than when continued cultivation is given, for their long tap-roots seem to render them independent of the seasons, and of surface scratching. I have found that good mulching for the first two or three years is about all these require, and the best way to treat them. Any one who has grown a walnut, a hickory or a peach pit, will have no difficulty in growing the pecan.

The cultivation of the pecan is not a new enterprise by any means, nor is it confined to as narrow limits as many suppose. It is found growing naturally in the Indian Territory, Kansas, Missouri, Illinois, Kentucky, Tennessee, Arkansas and Louisiana. During the past two or three years I have sent nuts and trees to nearly every State and Territory in the Union.

It has been repeatedly suggested that the pecan should be grafted on the hickory. While it is well enough to experiment we should bear in mind the fact that this being a success has not been demonstrated, and in the absence of more reliable methods, planting the nuts will be

the main dependence for some years to come. Again, seeing is believing, and when one gets the nut he knows exactly what it is, and when he plants that nut he can reasonably expect a tree that will produce, under favorable conditions, as good fruit as he planted. Variations no donbt do occur, but it has been my observation and I have repeatedly demonstrated that the pecan reproduces its kind with remarkable uniformity.

The questions are frequently asked, on what kind of soil should they be planted and at what age do they bear? They succeed here on all kinds of soil; in the rich, moist creek bottoms they grow faster and larger, while on the dry, poor, sandy uplands it bears a year or two earlier, though there seems to be no difference in the quality of the nuts. On ordinary uplands they usually bear in six or seven years.

What are the prospects and profits of the business? is asked by some. Well, there are trees here fifteen years old that will shell out eight bushels this year (forty-four pounds per bushel), or 352 pounds per tree. There are usually forty trees planted per acre; the timber is used for all purposes for which the hickory is adapted, and is equally good for fuel. There are many pecan groves being planted in various States. The oldest effort of which we have any knowledge was made by a gentleman in Alabama more than fifty years ago. He carried nuts to the vicinity of Mobile and planted them; last year his daughter stated in the columns of the *New York Sun* that from these trees she had repeatedly gathered three barrels of nuts (145 pounds per barrel) from a single tree in one season; this would pay over $1,000 per acre. While we do not wish to awaken unreasonable expectations, we confidently believe that pecan culture would pay handsomely anyone who owns a farm or only a few rods of land. When not crowded by close planting, it is naturally of a spreading habit and makes one of the most beautiful and symmetrically formed trees we have, and is frequently planted in yards for this purpose. Many persons hesitate to plant the pecans of this State in the North, but to such we would say the (Maclura) Osage Orange is also a native of Texas, and yet the seed have been shipped to the bleak and cold prairies of Nebraska, Iowa and Minnesota, and the industrious, enterprising farmers of those sections have made themselves hedge fences that will last longer than the present generation.

SCHOOL GARDENS.

Is it not high time that our teachers were required to pass some kind of an examination upon topics connected with every-day life in the country? Children who grow up in the country and settle down

into rural life have some rights which the managers of our schools should respect. What will a knowledge of permutations in arithmetic or quadratics in algebra do for them in getting satisfaction out of farm life? Not one teacher in five in the rural schools knows the names or habits of the commonest plants or insects about the school house. They notice a single specimen of the former only when possibly the hand has passed over poison ivy, or samples of the latter in mosquito and fly time.—*Michigan Horticulturist.*

A BIT OF LANDSCAPE GARDENING.

Eds. Country Gentleman: There are two common extremes of sentiment in regard to the value of forest and ornamental trees which are always opposed to rural beauty. The one extreme has to do with the immediate neighborhood of the residence, the other with more distant views of landscape.

It is certainly the common fault with country homes where any attempt is made toward ornament, that too many trees and bushes are allowed to grow. It is perfectly proper, indeed highly necessary, that in the first days and years of ornamenting a barren home, one should plant thickly of a variety of trees and shrubs. There should be small groups of spruces and deciduous trees of the rapid growing sorts, which will soon afford shelter and privacy. But it is none the less important that those clumps should be thinned just as fast as the individual trees begin to crowd each other. To be sure one loves the trees which he has planted and nourished, but it must be borne in mind that sentiment should never stand in the way of beauty and utility. I do not like the hackneyed advice which urges us to plant ornamental trees at such distances as will be proper for them to occupy twenty years hence. Such advice is discouraging; we must live in large part for the pressing present. Moreover, twenty years hence is but a point of time, and it does not pay to forego the pleasure of nineteen years in order to enjoy the perfection of the twentieth. What I always recommend to owners of unadorned places, is to plant thickly; get an immediate effect. And immediately thereupon I urge the injunction, strongly underlined—*do not neglect to thin out as soon as the trees begin to crowd.* One symmetrical and vigorous tree is worth three one-sided, stunted ones. Clumps of trees soon grow into tangled thickets, the delight of mosquitoes, moulds and vermin. They shut out sun and health, and shut one in from enchanting glimpses of distant views. The attractive clump has become an unsightly tangle, and soon all the trees will have become so lop-sided that one cannot be removed with-

out laying bare an unsightly side of its neighbor. This is no exaggeration. The most difficult matter to press home to most people, in the way of ornament, is the fact that there should be constant and systematic thinning. It is a mistake to suppose that the surroundings of a home should be fixed. The universal law of exchange applies to the private grounds, as well as to the orchard or garden.

L. H. Bailey, Jr.

LAWN BEDDING—W. K. GIBSON, JACKSON, MICHIGAN.

The first requisite is a good lawn, with a strong, well enriched and porous soil, capable of enduring the hot and dry periods, so common during the summer months. This is especially necessary where trees are to be planted, for the grass is sure to die out under the trees if the ground there is hard and dry.

Before grass is sown, or sod laid, the ground should be deeply plowed and enriched with plenty of well rotted manure, the surface made even, stones and roots removed, and the soil thoroughly pulverized.

If the lawn is a small one, avoid planting many trees which grow to a large size; one or two may be set, if desired, on the sides, or in the corners, at a distance from the house. In front of the house keep the lawn open and clear; never plant evergreen trees at intervals over a small lawn; always mass them in groups of not less than three or four, where they will least obstruct the view from the house; one such group will be enough. What is true as to trees is equally true as to shrubbery; do not scatter them, for in so doing you destroy the beauty of the lawn, and also lose the effect gained by grouping them. In lawn bedding and planting, two questions continually present themselves: How can I preserve the beauty of an open lawn, and not have it appear too bare? How can I have my tree and shrub planting most effective, and not destroy the beauty of the lawn? The answer to both is obvious. The results sought can only be obtained by the proper grouping of the trees and shrubs, and by a judicious selection of varieties suitable for the places they are to occupy.

RED CEDAR.

It is the opinion of too many whose opportunities should have taught them better, says a writer, that it requires nearly a century for a red cedar to grow from the seed large enough to make a fence post; but there is abundant evidence to prove that it requires but from thirty to forty years for a tree to grow large enough, to be worth

for this purpose, one dollar. As 500 trees can be grown on an acre of land, it is evident that on land that can be bought for ten dollars per acre it would be a profitable tree to grow simply for posts.

LAWN EMBELLISHMENTS.

Shrubs are valued for their bloom as well as for form and foliage. Each variety will serve some special end. As a rule plant in irregular groups as directed for trees. At projecting points in shrub masses, plant some hardy herbaceous perennials. Use vines for porches or for covering a half dead tree-top or rubbish pile. Plant flowers mostly at the side of the house in irregular but gracefully-shaped beds, and about the trunks of trees when they are young, perhaps. No special paths are needed about flower or shrub groups. Rock work is seldom satisfactory, and is only appropriate in a retired portion of the grounds. A pile of shells, rocks and scoria in the front yard is sadly out of place. Heap them in some back and shady corner and you will find great delight in transplanting from the woods and meadows an assortment of hepaticas, spring beauties, blood root, trilliums, bellworts, phloxes and ferns. If you have a pond near by, introduce some water lillies, cat-tail flags, pickerel weed, arrow head, and near by set some weeping willows and birches and ashes. Do not despise flower, shrub or tree because it is native or "common." As a rule the best known is better than the imported variety. Give thought and attention to all the details of making a pleasant home. It is a worthy work. You will be surprised to find how much beauty can be attained at little cost, and how rapidly everything hastens forward to the completed plan in your own mind. You will have a constant comfort and a fresh hope realized every year as the trees grow, and transformation follows transformation toward the fulfillment of your original design.

PROF. W. J. BEAL.

HARDY FLOWERING PLANTS.

In a paper before the Massachusetts Horticultural Society, Mr. E. L. Beard recommended herbaceous perennial plants as being handsomer, cheaper and more reliable than such bedding plants as require wintering within doors and annual setting out. He named the following as the most desirable: The Funkias, of which there are several species; several of the Hemerocallis; Jackman's clematis; the Campanulas, including carpatica and persicifolia; the double and single pyrethrums; the red and white Dictamnus; the several species and many varieties of Phlox; the white, martagon, and Japan lillies; the white

and rose-colored Japan anemones; the many irises, with their various colors; the several herbaceous pæonies; the bracteate, oriental and other poppies; the columbines; the scarlet Lychnis; some of the finest hardy asters; dicentra, coreopsis, rhexia, adonis, etc. Such bulbs as hyacinths, squills, crocuses, tulips, snowdrops, daffodils, etc., will not be overlooked.—*Country Gentleman.*

THE HANGING GARDENS OF BABYLON.

An authority says: The hanging gardens of Babylon were built by Nebuchadnezzar to gratify his wife, Amytia. The gardens were over 400 feet square, built terrace upon terrace until they were twenty-seven feet higher than the walls, or 400 feet. The top was sustained by a series of arches one above the other, and each terrace was bounded by a solid wall twenty-two feet high. On the top arches were first laid flat stones, sixteen feet by four feet; over these weeds and bitumen; then two rows of cemented brick covered by sheet lead, upon which was laid earth sufficiently thick to nourish large trees. The gardens were thick with the blooming plants and shrubs which were admired by Queen Amytia in her native Media. The different terraces and groves contained fountains, parterres, seats and banqueting rooms; in fact, all the splendor and magnificence of Eastern art seems to have lavished upon these gardens by King Nebuchadnezzar in order that his Median bride should be happy in her new home. Pen cannot picture the grandeur of the conception or the perfection of the execution, of these gardens, which have been, and are the wonder of all ages.—*Western Rural.*

FLOWERS.

A NEW RACE OF VERBENAS.

The handsome cut shows the new verbenas offered by Messrs. Henderson & Co., who thus describe them:

"In 1883 we found among a bed of seedling verbenas one seedling which was entirely distinct from the others, and which was vastly superior in size, substance and brilliancy of color. The foliage was also entirely distinct, being larger and heavier than the ordinary varieties, and the plants of wonderfully vigorous growth. In 1884 we succeeded in getting a few hundred seeds from it, which "broke" into nearly

every shade of color, nearly every plant having the peculiarities of the parent variety."—*American Florist.*

THE PERFUME OF ROSES.

In roses there are seventeen different sorts of scent. "Sweet Briar scent, as in the garden variety; Moss Rose scent, as in Common Moss and family; Austrian Briar scent, as in Copper Austrian and family; Musk Rose scent, as in Narcissus, old Musk and family; Myrrh scent, as in Ayrshire splendens; China Rose scent, an astringent refreshing scent, as in old Monthly China and many others; Damask perpetual scent, as in Rose du Roi, etc.; Scotch Rose scent, as in the early double Scotch; Violet scent, as in White Banksia; Old Cabbage scent, as in the well-known double Provence; Otto perpetual scent, as in Charles Lefebvre, Madam Knorr, etc.; true perpetual scent, as in Chabrilland, Pierre Notting, etc.; Old Tea scent, as in the old yellow Tea or Magnolia Rose, and others almost unpleasantly strong for some tastes; Sweet Tea scent, as in Goubalt, Marechal Niel, etc.; Hybird Tea scent, as in La France; Nectarine, or fruit scent, as in Socrater, Jaune Desprez, Aline Sisley, etc.; and the Verdier scent, represented more or less by all the Victor Verdier hybirds, such as Eugenie Verdier, Castellane, Countess of Oxford, Marie Finger, etc. The petals of the highly scented varieties have on their inner surface minute perfume glands or vesicles, containing the highly volatile essence, under the microscope distinctly visible. Those on the petals of Sweet Briar and Moss are almost visible to the naked eye. Mr. Curtis concludes that the following are the most deliciously and powerfully-scented varieties: La France, Goubault, Devoniensis, Marechal Niel, Bessie Johnson, Madame Knorr, Pierre Notting and Charles Lefebvre."—*Tosarian.*

THE VIRGINIA CREEPER (*Ampelopsis quinquefolia*)

Is one of the most popular and best adapted for general uses; it has a dense and richly colored foliage; the dark, glossy green of the older leaves is relieved by the light green of the young shoots, with their gracefully curved tips. It is adapted to all good soils, and is perfectly hardy in any exposure, even to the salty wind and spray from the ocean. The long, graceful stems are rapid-growing and easily trained in any direction, and it will cover a large surface with a dense screen of foliage. The flowers are not very conspicuous, but the loose clusters of blue fruit, with their scarlet stems, are quite attractive for some weeks after the foliage has fallen. This plant has two distinct

varieties; one clings by viscid disks, as does the Japan woodbine, and will cling to smooth surfaces tenaciously, is slender-growing, with reddish bark, while the other climbs by simple tendrils like the grape, and cannot be attached to smooth surfaces except artificially, and is stouter-growing, with gray bark.

The brilliancy of the autumn foliage of the Virginia creeper is unexcelled; even among the brilliant colors of the maples and oaks it is conspicuous, the intense scarlet in dark and light shades is beautifully blended with yellow. Many a hard, rough wall and ugly stump is transformed into a thing of beauty with the graceful festoons of the Virginia creeper.

Another valuable climber is the "bitter sweet" (*Celastrus scandens*) and its chief attraction lies not in the foliage but in the fruit, for as soon as the frost has given the yellow clusters a severe pinching the berries burst open their hard little coats, throw them back, and disclose their bright orange lining and seeds within: and these cling to their stems for a long time in the winter, and make a brilliant display when their surroundings appear dull and sombre.

This plant, like the Virginia creeper, is a rapid grower and adapted to a great variety of soils and situations. It does not festoon so gracefully as the last, and has a foliage of a lighter shade of green, that turns a uniform bright yellow shade in autumn.—*Ladies Floral Cabinet.*

GRANDMOTHER'S GARDEN.

I've been back to grandmother's garden,
  Where the dear old flowers grow
That she planted there and tended
  In the summers long ago—
The sweet, old-fashioned flowers
  That used to delight her so.

There are lilacs by gate and doorway,
  And lillies, all in a row,
Whose blossoms we fancied trumpets
  For fairy bands to blow;
And southern-wood, spicily fragrant,
  By the door-stone, worn and low.

Pinks that are rich with odors
  Of clove and myrrh are there,
And I seem, when I smell their fragrance,
  To be in the house of prayer
In grandmother's pew, on Sunday,
  Close by the pulpit stair.

I can see her there with her hymn-book
Open at "Wells" or "Mear,"
With a bunch of her garden "posies"
Between the leaves, and hear
The voice that has sung in heaven
For many and many a year.

Grandmother gave her flowers
To crown the maiden's head
When she stood at the marriage altar
And a wife's "I will" was said;
And they came to her for blossoms
To shut in the hands of the dead.

I remember the summer morning
When grandmother heard the call,
Of the angel of death whose summons
Will some day come to us all;
The June's first roses were blowing
Down by the garden wall.

"How sweet they are," she whispered,
"What dear things God has made:
I am going to dwell in His country,
Where the roses never fade."
Then she folded her hands on her bosom
And it seemed as if she prayed.

She looked so peaceful and happy
With her hands clasped on her breast,
Holding the flowers we brought her
That we fancied her taking a rest;
'Twas the rest that's forever and ever,
Of all, the sweetest, best.

Over her grave in the churchyard
Her dear old flowers grow;
But I think of her out in the garden
Of God, where His lillies grow;
And I fancy she tends His flowers
As she used to here below.

—*Eben E. Rexford in Ladies' Floral Cabinet.*

ARRANGING CUT FLOWERS.

An article in *St. Nicholas* on arrangement of flowers contains the following directions, which may be read by all who love flowers, and have not the knack of arranging them to the best advantage in bouquets and vases on the table:

The color of the vase to be used is of importance. Gaudy reds and blues should never be chosen, for they conflict with the delicate hues of the flowers. Bronze or black vases, dark green, pure white, or silver, always produce a good effect, and so does a straw basket; while clear glass, which shows the graceful clasping of the stems, is perhaps prettiest of all.

The shape of the vase is also to be thought of. For the middle of a dinner table, a round ball is also appropriate, or a tall vase with a saucer-shaped base. Or, if the centre of the table is otherwise occupied, a large conch shell, or shell shaped dish, may be swung from the chandelier above, and with plenty of vines and feathering green, made to look very pretty.

Delicate flowers, such as lillies of the valley and sweet peas, should be placed by themselves in slender tapering glasses; violets should nestle their fragrant purple in some tiny cup, and pansies be set in groups, with no gayer flowers to contradict their soft velvet hues; and (this is a hint for summer) few things are prettier than balsam blossoms, or double variegated hollyhocks, massed on a flat plate, with a fringe of green to hide the edge. No leaves should be interspersed with these; the plate should look like a solid mosaic of splendid color.

Stiffness and crowding are two things to be specially avoided in arranging flowers. What can be uglier than the great tasteless bunches into which the ordinary florist ties his wares, or what more extravagant? A skillful person will untie one of these, and adding green leaves will divide the same flowers into half a dozen bouquets, each more attractive than the original.

Flowers should be grouped as they grow, with a cloud of light foliage in and about them to set off their forms and color. Don't forget this.

FLOWERS IN PERFUMERY.

In an elaborate paper on perfumery, furnished by Mr. Eugene Rimmel to the Society of Arts, London, and published in No. 391 of its journal, scents in general use are classified in eighteen groups, and the vegetable products used in this art are arranged in ten divisions, as follows:

1. The floral series; namely, jasmine, rose, orange flower, cassia, tuberose, violet, jonquil and narcissus; the attar, or otto, of roses is the most valuable product of this division.

2. The herbal series, comprising all aromatic plants, such as lavender, spike, peppermint, rosemary, thyme, marjoram, geranium, patchouli and winter-green, which yield essental oils by distillation.

3. The *andropogon* series, which furnish the lemon-grass, citronella and ginger-grass oil.

4. The citrine series, comprising the bergamot, orange, lemon, citron and lime, from whose rinds an essential oil is obtained by expression or distillation.

5. The spice series, including cinnamon, cinnamon leaf, cloves, mace, nutmeg and pimento.

6. The wood series, consisting of sandal wood, rose-wood, rhodium, cedar and sassafras.

7. The root series, comprising orris-root and vetiver, called by the Hi ıdoos kus kus.

8. The seed series, composed of anise-seed, dill and caraway.

9. The balm and gum series, including balsam of Peru, balsam of Tolu, camphor, myrrh, benzoin, storax and other gums.

10. The fruit series, including bitter almonds, Tonquin beans and vanilla.

The artificial preparations and the animal perfumes make two more series. The greatest number of the materials, amounting to twenty-eight, is obtained from the south of France and Italy, which is the chief centre of manufacture for perfumery materials. The East Indies and China furnish about twenty-one; Turkey, two; Africa, two; North America, six; South America, six, and England four. The only articles named from the United States are peppermint, sassafras and wintergreen.—*Ladies' Floral Cabinet.*

GROWING PANSIES.

This one of the most popular flowers, and though it is popular, and to be found in most gardens, comparatively few people understand its cultivation with a view of obtaining the finest flowers. They will go into the grounds of the florist and express amazement at the great size and beauty of the pansies they see there, will forthwith purchase a supply for their own planting, and will be charmed with them, and be determined to grow the same on their own premises, though their previous efforts have so singularly failed. When asked how they had been growing them, they often reply: "I got some from a neighbor, who has large beds of them, but they are all so small." When told that they should sow the seed of the finest of those obtained from the florist as soon as the seed was matured—say some time in August—and that was the only way to have fine, large flowers, the idea was jumped at. That is the way to get them. Every August the seed of the largest and most desirable should be sown, and the old ones dug up and thrown away. And we should say that this is easy enough to do when

it is once known. In the winter the plants should be lightly covered. There are new pansies advertised every year, but any one growing them carefully, and taking, as we say, the seed from the best every year, will be as likely as anybody to have large, new kinds, and will thus save the expense of purchasing them, which, at most, last only for a single blooming.—*Planter and Stockman.*

PROTECTING ROSES IN WINTER.

My rose plants are in straight rows, four feet apart, and three feet apart in the rows. Before it is time to cover them for winter (which is usually from the 10th to the 15th of November), and while the plants are free from frost, I bend them down near the ground in the direction of the rows and fasten them there. I then place a row of boards about eighteen inches wide (mine were made of three six inches wide fence boards) on each side of the rows, and nine or ten inches from the plants, thus, | | and let them stand until I wish to close them for winter. I have a lot of leaves gathered and in a dry place, and after the ground has become frozen and winter liable to set in, I put a good body of the dry leaves on the plants, and bring the tops of the side-boards together thus, Λ. I then throw some cow manure between the rows, to be worked in in the spring; but before putting on the manure I throw a little dirt on the lower edges of the boards, then close up the ends of the rows with boards or dirt and all will be well. If I fear danger from mice I put some poisoned meal into an old fruit can, and place it on its side among the plants. My roses are planted where the snow does not blow off, hut drifts over them more or less, which of itself is a great protection. In the spring, before it is time to remove the covering fully, I open the boards at the top, giving the plants air; but should a cold spell occur, it is but a few moments' work to close the tops of the boards again, when all is safe. Cared for in this way, I hardly ever lose a plant, and they come out in the spring looking as fresh and green as when put to bed in the fall.

M. L. Higgins, Minneapolis, Minn.

HANGING BASKETS.

There are a great many positions, both in greenhouse and parlor, where hanging baskets make beautiful ornaments. How attractive a hanging basket looks suspended from the centre of a large window, when well filled with good healthy plants and vines drooping over the edge. Not only is it enjoyable to the occupants of the house, but from the outside it betokens love and comfort within. A few hanging

baskets suspended during summer along the front of the veranda are always beautiful. In the greenhouse or conservatory there are a good many places where they do well, especially in partially shaded spots.

In positions where the sun shines very brightly there are few plants which succeed well hanging close to the glass. There are some, however, which are at home in just such a situation, requiring considerable sun to insure a good supply of flowers, such plants as *Epiphyllum truncatum*, *Cereus flagelliformis* and some of the bright flowering *Sedums*. I may add another beautiful plant for the position, *Crassula lactea*, which during the winter months produces from the point of every well matured shoot a spike of beautiful star-shaped pink flowers. The above plants do best when growing in baskets alone, without any other associates; they look better, flower more freely and show their distinctive characters only when grown alone.

In pictures we often see fine looking terra cotta baskets filled with ferns. I am led to believe from experience with ferns in terra cotta baskets that the only place to see them looking well is in pictures; but in rustic baskets made from wood and in wire baskets lined with moss some kinds do well, especially as individual plants; best for this purpose is *Nephrolepis exaltata*, which, if grown in wire baskets, sends its fronds from the bottom and sides through the meshes of the baskets and forms a large ball of beautiful and graceful appearance suitable for either window, greenhouse or veranda. *Davallia Tyermannii*, *Goniophlebium*, *subauriculatum*, *Platyloma rotundifolia*, *Platycerium alcicorne*, and many others of a hardy nature succeed well in baskets if regularly supplied with water.

Hanging baskets of all kinds should be constructed to hold a large body of soil, which is a necessary requisite to maintain for any length of time food and moisture for the plants. Shallow terra cotta baskets are poorly adapted for the well-being of plants. They easily dry out and unless extra labor in watering is given, the plants will soon look sickly; there is also not enough soil in them to supply sufficient food for succulent growing plants; only the cactuses mentioned above and some of the oxalis do well in them. There is, however, a form of terra cotta baskets which holds a reasonable amount of soil, looks attractive, and plants do well in them for a longer period than in any of the shallow kinds. It is made in the imitation of a log of wood, and having the color of the wood burned in, keeps unfaded as long as the basket lasts.

Wire baskets are the best for plants generally. If lined with a good thickness of moss they retain the moisture for a long time. When they get thoroughly dry the best way to wet them is to immerse in water and allow to remain until the soil is moist clear through.

Some of the best plants for culture in baskets, especially when grown as individual plants, are *Fuchsia procumbens*, *Begonia glaucophylla scandens*, the beautiful pink blossoms of which drooping over the edge of a basket are remarkably beautiful; to fully show its beauty it should be grown as a basket plant. English Ivy, trained all around a basket, is excellently adapted for the parlor, enduring with impunity the dry air of the room. For mixing with other plants, begonias of all kinds, including the Red section, fine-leaved Dracænas, Maurandias, Vincas, Ivy-leafed Geraniums, Thunbergias, Tradescantias, *Peperomia prostrata*, and any easily grown drooping plants are suitable.

M. MILTON.

THE SYMBOLISM OF FLOWERS.

In all ages, and among almost every people, flowers have been adopted as symbols, types and emblems of human combination, affection and loyalty. The reader need scarcely be reminded of the red and white roses which were the badges of Lancastrian and York rivals to the English throne.

But this symbolism of flowers dates back to periods far older than the time of the Wars of the Roses. The ancient nations had their emblematic flowers. The special flower of the Hindoo, for instance, has always been the marigold. The Chinese display as their national flower the gorgeous chrysanthemum.

The Assyrians, for ages, proudly wore the water-lily; Egyptians delight most of all in the helliotrope, though the papyrus leaf, used by the ancient Egyptians in place of paper, may also be regarded in a high sense as the symbolic plant of the land of the Nile.

Even the days of the week, as we use them now, are named from deities who had each his special flower: The Sun (Sunday), the sunflower; the Moon (Monday), the daisy; Tuesday (the god Tui's day), the violet; Wednesday (the god Woden's day), the blue monkshood; Thursday (the god Thor's day), the burdock; Friday (the goddess Frea's day), the orchis; and Saturday (Saturn's day), the horse-tail.

We also find that in our time the sacred days in the calendar of the English church have all their flower or plant emblems, the principal of which are the holly for Christmas, the palm for Palm Sunday, and the amaranth for All Saints' Day.

Monarchs and nations have often had their symbolic flowers. The thistle is the emblem of Scotland and the shamrock of Ireland. The *fluer de lis* is the badge of the royal house of France, and the amaranth of that of Sweden. The rose blooms forever on the royal coat-of-arms of England.—*Farm and Fireside.*

PRUNING.

Shorten the shoots of young Fuchsias, Lemon-scented Verbena and other plants that are likely to become too long and spindly; a short, stocky growth is more to be desired than long slender shoots. In shortening the shoots of plants do not merely pinch off the tips, as that is apt to cause the next end eye to grow out without inducing the lower ones to start; but, instead, shorten the shoots well back, and that will tend to cause all the lower eyes to grow out together.

REPOTTING PLANTS FOR FALL.

Plants that we have kept for winter blooming as Carnations, Chinese Primroses, Cyclamens, Callas and Libonias should not now be repotted; but young plants of Fuchsias, Lady Washington Pelargoniums, Scarlet Geraniums, Petunias and Marigolds that we desire to come into bloom between now and next June may be repotted Young plants of Geraniums, Coleuses, Ageratums and other summer garden flowers that have been wintered in small pots, or several in a pot, may now if we have room for them, be shaken out and ropotted.

In repotting summer garden plants the ball of roots should be unravelled, else in after months the matted ball will check the vigorous root action of the plants and render them an easier prey to drouth than would be the case were the roots disentangled.

Young plants raised now from cuttings or seeds should be grown along unchecked till they reach their desired proportions, hence should be repotted as often as necessary.

Ferns should be repotted. If their present pots are large shake out the Ferns and put them into smaller pots; if too small change into one size larger only.

Over potting is very injurious to plants. Many plants will not need repotting, but all need seeing to that the drainage is good, and there are no worms in the soil. Camellias and Azaleas do not need repotting every year, in fact, after they become large plants, once in three or more years is enough. In repotting quick growing plants that are to remain in the pots only a few weeks as "bedding" plants in spring, or free-rooting plants in small pots at any time, draining the pots is needless; but in the case of Cyclamens, Pelargoniums, Cytisus and other plants that we bloom in pots, draining is an advantage.

The drainage may consist of broken pieces of pots, pounded bricks or rotten stone or similar material, and over that some half rotted leaves, dry chaffy manure, or rough soil, but the common plan of a

bunch of sphagnum moss is not to be commended unless the moss is chopped up fine.

SOWING SEEDS.

If you have a greenhouse you can sow at any time; if a hot-bed, after the middle of February; if only a cold frame, then not before April; if a window only, it depends on the warmth of the room whether you sow at once or wait till the end of the month. Seeds require heat and moisture to induce them to vegetate, and light to develop healthy seedlings.

For the window use pots, pans, boxes, plates, saucers, or anything that will held a little soil and let surplus water drain off readily. Light sandy soil as old leaf mould or fine wood soil mixed with sand is good; fill the vessel nearly to the brim, firm the soil by giving the vessel a sharp tap on the table but don't pack the soil with your hand, sow evenly over the surface and cover very thinly with fine earth. Then water gently through a fine spray rose, and place the vessels near the light but shade them from sunshine, and protect from draughts and drip.

Remove each and every bit of mould-fungus as soon as you see it, and when the seedlings come up, prick them off as soon as you can handle them, into other pots or boxes. The great thing to guard against in the hot-bed is "damp." Hot-beds must be ventilated else the germinating seedlings are apt all to mould off.

Centaureas ("Dusty Millers"), Vincas, Verbenas, Globe Amaranths, Cockscombs, Celosias, Golden Feather Pyrethrum, Lobelias and other plants that take considerable time before they become large enough to set out should be sown as soon as possible. Stocks, Asters, Marigolds, Zinnias, single Dahlias and other rank and quick growing plants are time enough in April. There is nothing gained by raising plants so early that we have to keep them in stunted condition till we can find room for them; from the moment a seedling is started till it attains its full proportions we should be ready to grow it along unchecked, else we had better delay its existence till we can give it the room and attention it requires.

RAISING PLANTS FROM CUTTINGS.

Soft wooded plants like Coleuses, Iresines, Verbenas, Ageratums, Stevias, Gazanias, double white Feverfew, Nasturtiums, German Ivy and Heliotropes root easily and quickly from cuttings at this time of the year, so too do cuttings of the young growths of shrubby plants as

Fuchsias, Lantanas, Lemon scented Verbenas and Rose Hibiscuses. The wood used should be the young succulent points and so tender than when bent they will snap off. In the case of Coleuses, Alternantheras, Lobelias and many others it is only throwing time away "making" the cuttings, just stick them in as you pluck them off, they will root as well and readily as if they were "made." But Geraniums, Dahlias, Heliotropes and many others root more evenly and usually sooner when "made."

By "making" a cutting I mean cutting it off under but close by a joint and removing the two lower leaves. Therefore I should advise amateurs to "make" their cuttings except in cases where experience has taught them that success is as certain when the cuttings are not made.

Cuttings will strike in almost anything that is damp, from pure sand to brick clay, even in water alone. But for spring work I prefer clean sand.—WM. FALCONER, *in American Garden.*

GREENHOUSE AND WINDOW PLANTS.

The window garden and greenhouse should now (March) be gay with bloom, and repay the earlier care. Bring potted bulbs from the cellar, to give a succession of bloom. Those out of flower should have the stalks cut away and the leaves allowed to grow until they turn yellow, when the pots may go to the cellar. Insects, dust and dryness of the air are the chief enemies of the window garden. The red spider is so small that it is rarely seen. The leaves turn brown and soon fall. Examine the lower surface of the leaves with a magnifier; if a red or brown mite is seen it is the red spider. Syringe the under side of the foliage frequently and copiously, laying the plant on its side in a sink or bath tub; this is the only remedy. For green fly or plant lice generally, syringe with tobacco water. Mealy bug and scale insects are best removed by hand picking. If earth worms infest the soil of pots, saturate the ball with clear lime water. It will not hurt the plants if soon after watered with rainwater. If a very cold spell comes on remove the tender plants to the middle of the room at night, and cover them with some light fabric or with newspapers.—*American Agriculturist.*

MANURE.

POTASH FERTILIZERS FOR FRUITS.

At the Massachusetts Experiment Station some trials have been made to determine the value of potash fertilizers for fruits. The results are reported as follows by Professor Winthrop E. Stone:

Potash fertilizers have decidedly improved the desirable qualities of fruits. Wherever the percentage of this element has been raised the change is accompanied by an increase of sugar and decrease of acid. This, it is hardly necessary to say, is an important and desirable change—a matter of dollars and cents. Other things being equal, the fruit with the largest per cent. of sugar will bring the highest price. Moreover, less desirable varieties may be brought up to a higher standard, thus giving value to some good quality, as hardiness or prolific bearing. The fact that the quality and character of garden and orchard products can be modified by the effect of special fertilizers is of immense importance in its practical as well as scientific bearing.

CLOVER AS A FERTILIZER.

Clover seems to be the great scavenger of agriculture, a gross feeder, capable of collecting the plant food of the soil held in solution too dilute or too deep down for the roots of cereals to thrive upon it, and of rendering the insoluble soluble, and storing it up in large quantities and available from near the surface where the young roots of the cereals can at once find and use them. Dr. J. G. Holland makes an Irish character in one of his books say: "The peg (pig) 'll ate wot there won't nothin' else ate, and thin you kin ate the peg." This seems to be the office of clover, to eat what the wheat can't eat, and then die and let the wheat eat it.—*Secretary Chamberlain.*

HUMOR OF WESTERN FERTILITY.

"Speakin' of productive soil," said a man from the West, "the half has never been told. A few years ago my wife said: 'Why, Bijah! I b'lieve you've took to growin' again.' I measured myself, an' I hope Gabriel'll miss me at the final roundup if I hadn't grown six inches in two weeks. I couldn't account for it for some time, till at last I tumbled to the fact that thar war holes in my boots, an' the

black soil got in there an' done its work. Did you see that boy that was with me on the street this morning? Looks like he war about 18 years old. Wal, about six months ago my wife sot our six-months-old kid down in the plowed ground to play, an' gents, I'll be doggoned if—. But you wouldn't believe that if I told it. Yes, it's a wonderful country, gents! I could sit here a year relatin' facts, but I must go and splice our 18-foot ladder so I can pick some corn for dinner." And this reminds *Prairie Farmer* of the illustrative story told us by a man returning from "out west" when it did not extend beyond the Miami Valley in Ohio: "Why," said he, "I was ridin' along by a clearin' out there enclosed by a worm fence. I heard a great squealin' in the corn, and stopped to see what it meant. Well, I discovered that a growin' pumpkin vine was chasin' a sow. What was the result? Why the vine got to the fence, grew right through and across the road between my horse's legs, and there was a pumpkin on it as big as a half bushel before the sow got to the fence. Fertile soil out there."—*Prairie Farmer.*

The idea of keeping an orchard in clover after it has attained an age of five or six years, is one that we heartily approve; but we think there is a much better way of utilizing this clover than letting it rot on the ground, and that is to graze it off with hogs. If there is one place on the farm where the hog is pre-eminently in his sphere, that place is in the orchard. Lazy though he be, he will there most industriously watch for and save the falling fruit, and many a worm will find his career ending in the production of juicy pork, instead of being permitted to pass through his natural transformations, preparatory to bringing forth fresh hordes of fruit destroyers. More than this, no other animal, except the sheep, will so effectually distribute the fertilizer, manufactured on the spot from unadulterated materials, as the hog, and if he be given a fair allowance of these materials, in the shape of moderate rations of grain, he will not only manufacture, transport and distribute this fertilizer free of charge, but will cheerfully pay for the privilege of doing so.

HORTICULTURAL SOCIETIES.

If any one supposes that the few active members of organizations of this character set themselves up as Solomons and that their sole mission is teaching others, they are mistaken. It is quite possible that some men engaged in the growing of fruit who feel that they can learn nothing at a horticultural meeting, are wiser than their neigh-

bors. If so, they are just the kind of men that are needed to come in and help their less fortunate brothers out of the rut. Then there are others in our societies who would not think of allowing their neighbors to turn out and husk corn or prune trees five or six days in each year for them for nothing; yet who permit, if not expect, a few of their fellow members to spend twenty five or fifty dollars' worth of time yearly in conducting the meetings and keeping their society alive and keeping all hands posted, while they stay at home and settle with their consciences by the payment of their paltry little dues, yet have the good judgment to be among the earliest to seek and the keenest to appreciate the annual volume of reports when it comes around, seemingly unmindful of the fact, however, that those reports are the results of solid labor. The best that can be said of such a brother is that he is unreasonable and thoughtless in the matter of a fair division of labor; for who, if there were no moral or social obligations involved, would not gladly pay his legal dues and let others do the work?

RECEIPTS.

PARIS GREEN AND THE CURCULIO.

In the October number of the *Fruit Recorder* of the present year, you invite the experience of those who have experimented with Paris green upon the curculio. You will find a record of facts in this direction, from my pen in your paper dated August, 1884, and until some tangible refutation can be produced by others to offset its value, it should not be looked upon with distrust. That Paris green will "do the business" for the little Turk, I think is irrefutable—certainly it is so from my own knowledge and trial for the last three seasons, and I will say positively that on very close investigation upon this year's crop, I have not had one plum, prune or damson fall from the punctures of a curculio! But previous to the use of this remedy I looked upon plum culture with an instinctive dismay almost ungovernable, on account of its non-reliability. Of course, it is not for me to force an argument or intrude too much upon your columns concerning this curculio remedy, but will simply crave a little space to show the sample of some plum growers' logic when told of my experiments and results. The whole batch of arguments produced by these men do not, however, amount to a "row of pins." WILLIAM CREED.

PRESERVING FRUITS.

The Philadelphia *Press* says fruit and flowers may be preserved from decay and fading by immersing them in a solution of gum arabic and water two or three times, waiting a sufficient time between each immersion to allow the gum to dry. This process covers the surface of the fruit with a thin coat of gum, which is entirely impervious to the air, and thus prevents the decay of the fruit or the withering of the flowers. Roses thus preserved have all the beauty of fresh plucked ones, though they have been plucked several months. It is reliable and something all may try.

NO BLUFFING.

Shall we allow blights and rots and mildews and insects to scare us out of planting orchards? No! The indolent are driven out of fruit-growing. The successful reap double reward for their industry, thrift and painstaking. The difficulties are only insurmountable for those that consider them so.—*Orchard and Garden.*

PRESERVING RECIPE.

Salicylic acid is sold by most druggists at twenty-five cents an ounce, and half an ounce goes a great way in preserving, as there are 437½ grains in a single ounce. Mrs. Johnson's directions are: Into one quart (or each quart) of soft water put thirty grains of salicylic acid and six ounces of white sugar; boil until dissolved, and partly cool. Prepare the fruit just as if to be canned; then, without cooking the fruit at all, fill jars or bottles of any kind with it; then pour in the salicylic and sugar solution until all the spaces in the fruit are filled up to the top of the jars; cork or cover in any way to keep out dust, and set away just as if canned. Mrs. Johnson says she has now cherries and raspberries put up last year, all of which are in a state of perfect preservation. This year she put up strawberries in the same manner. It is probably just as applicable to peaches, plums, etc. The small quantity of salicylic acid cannot be harmful—twelve grains to the quart of fruit—as one in eating it would rarely consume over two or three grains of the acid if the liquid was taken. Salicylic acid was first obtained from salician obtained from the willow bark (salix), but is now produced by chemical processes, we believe. It acts something like quinine, but is given in much larger doses—often fifty to one hundred grains a day.—*Prairie Farmer.*

Prof. A. J. Cook, in *Rural New Yorker*, recommends Paris green (one tablespoonful to two gallons of water), or the kerosene emulsion, as a certain remedy for the grape flea beetle (*Graptodera chalybea*), and the apple flea beetle (*G. foliacea*), and their grubs. Pyrethrum, if fresh and used persistently, will also destroy the insects.

THE DOCTOR'S PRESCRIPTION.

"Nothing but a garden will do it. The pills and powders this medicine-case holds are no such panaceas for bringing the roses to your cheeks or strength and activity to your system."

COPPERAS AS A PREVENTIVE OF GRAPE ROT.

I have reason to believe that copperas is a preventive of the grape rot. In a small vineyard in Massillon, Ohio, where a quart to the square rod has been sown in July for three years, there has been no rot, while other grapes in the same neighborhood have rotted more or less every year. They formerly rotted in this vineyard.

M. CRAWFORD, Summit Co., Ohio.

Salicylic Acid should not be used for preserving fruit in tin but only in glass cans, so says the *Philadelphia Press*. We say, don't use it at all either in tin or glass. Put the fruit in glass cans; scald them well and seal them tightly, and it will keep till doom's day, and when you eat it it will not turn your stomach into a drug shop. Be sure that every chemical that will preserve fruit is not good for the human stomach, or for that of any other animal either, for that matter.

KEROSENE EMULSION.

Writing from Iowa a correspondent writes that last summer he saw frequent mention of kerosene emulsion as an insecticide, and that he has a curiosity to know how it is made. In answer we would say that the simplest form is one-third kerosene and two-thirds milk. Another form is eight parts kerosene, one part soft soap and eight parts water. Heat the soap and water to a boiling point, add the kerosene and remove the mixture from the fire. Add twenty parts of water to this, and it is ready for use. It is applied with a syringe. For many insects nothing is better, and it is neither expensive nor difficult of application.

HOW TO CRYSTALIZE GRASSES.

Take one pound of alum to one quart of water and set it back of the stove to dissolve, but do not boil, and when thoroughly dissolved

pour in a pitcher or tall jar. Have your bouquet arranged and tied; now suspend from the top of your pitcher or jar, stems up, and the grasses well covered with the water; now set aside, and do not disturb for twenty-four hours, when you may take out and behold the beautiful crystals formed there.—*Journal of Agriculture.*

HOW TO MAKE PLANTS GROW.

Success in house-plant culture consists in keeping the soil moist, not *wet*, except in the case of the calla; in seeing that the leaves are kept clean, which can be easily done by a weekly showering with a syringe or water-pot with a fine rose nozzle; in keeping down spiders and the aphis—water, above and below the leaves, in liberal quantities, applied with a syringe being the remedy for the former, and tobacco smoke or infusion for the latter; and in so regulating the temperature that it does not exceed 85° or fall below 45°. Keep between these extremes, as evenly as possible, if you would have it suited to your plants. It is a good plan to cover them before sweeping, after that remove the covering and sprinkle them daily. Keep a vessel of water on the stove to evaporate and put moss between the pots, if you can, to absorb water, which it will give off in sufficient quantities to keep the air perceptibly moist about the plants. Give them all the light you can. Don't have curtains at the windows where you keep plants, unless you can put them aside during the day time.

Attention to these details and a careful study of your plants will soon enable you to grow them well. The more study you give the matter the more intelligently you can do your work.—*Our Country Home.*

INSECTICIDES FOR THE ORCHARD.

The U. S Bureau of Entomology, in one of its pamphlets, gives the following directions for mixing the various insecticides. Our experience, however, leads us to suggest that the quantities named are somewhat excessive, and may cause damage to the foliage in some instances:

London Purple.—To 20 lbs. flour from ¼ to ½ lb. is added and well mixed. This is applied with a sifter or blower. With 40 gals. water ¼ to ½ lb. is mixed for spraying.

Paris Green.—With 20 lbs. flour from ¾ to 1 lb. is mixed and applied by sifting or by a blower. The same amount of the insecticide to 40 gals. water is used as a spray.

Bisulphite of Carbon —For use in the ground a quantity is poured

or injected among roots that are being infected. Against insects damaging stored grain or museum material a small quantity is used in an air-tight vessel.

Carbolic Acid.—A solution of one part in 100 of water is used against parasites on domestic animals and in their barns and sheds; also on the surface of plants and among the roots in the ground.

Hellebore.—The powder is sifted on alone or mixed one part to 20 of flour. With 1 gal. of water ¼ lb. is mixed for spraying.

Kerosene.—Milk Emulsion: To 1 part milk add 2 parts kerosene, and churn by force pump or other agitator. The butter-like emulsion is diluted *ad libitum* with water. An easier method is to simply mix 1 part kerosene with 8 of milk. Soap Emulsion: In 1 gal. hot water ½ lb. of whale oil soap is dissolved. This, instead of milk, is mixed to an emulsion with kerosene in the same manner and proportion as above.

Pyrethrum: Persian Insect Powder.—Is blown or sifted on dry; also applied in water, 1 gal. to a tablespoonful of the powder, well stirred and then sprayed.

Tobacco Decoction.—This is made as strong as possible as a wash or spray to kill insect pests on animals and plants.

Prof. Cook finds that flies don't like the air in his stable, owing to the fact that he keeps his barrel of carbolic acid and soft soap—used in destroying insects—there. Flies will always run away from this mixture.

It is my belief that copper in the soil, derived from the previous liberal use of Paris green to kill the potato beetle, destroys the germs that cause the potato rot; in the same way, a one per cent. solution of sulphate of copper in water (four pounds to the 50 gallons) has been found effective to arrest the progress of mildew on the foliage and to prevent the rot of the fruit in the wine districts of Continental Europe.

I dwell on this point because I think a preventive of potato mildew and rot and grape mildew and rot is to be found in sprinkling foliage and fruit with a one per cent. solution of sulphate of copper (bluestone) in water early in June, and again once or twice during the growing season. I am quite confident, too, potato rot will not be found to be common where Paris green has been used for two or three years in succession, and also that the treatment of the vines of a given crop with Paris green two or three times in the growing season will prove a preventive to a measurable extent.—B. F. JOHNSON, *in Rural New Yorker.*

Thirty-five pounds whale oil soap and four gallons coal oil to one hundred gallons of water is recommended by the California Horticultural Commission as the most effective insecticide.

EXTERMINATING RABBITS.

A New Zealand farmer has recently reported to a government investigating committee his experience in clearing some 70,000 acres which had been overrun by rabbits. For several years from 100 to 120 men were kept constantly employed with dogs in pursuing the rabbits, but with little effect. Then the entire tract was inclosed with wire netting and phosphorized oats were thickly sprinkled around the "runs," with the result that four hundred to five hundred dead rabbits were picked up every day for a long time. As a result of a year's work some 300,000 rabbit skins were preserved and shipped to England, where they brought four to six pence each. Before the introduction of poisoned oats about $25,000 yearly had been spent in fighting the rabbits, but now this has been cut down to an almost nominal sum. The method of preparing the poison is as follows: The oats were first well boiled in a caldron holding about 120 pounds. A pound and a half of phosphorus was then put in a bucket of water, and stirred carefully until it commenced to ignite, when it was thoroughly dissolved. The oats were then put into a barrel arranged for revolving rapidly, and the phosphorized water was poured into it and the opening immediately closed. The barrel was then revolved, and the phosphorus allowed to soak in the oats for about an hour, until the whole was thoroughly amalgamated. There is no danger of the phosphorus catching fire if properly handled. Little heaps of the phosphorized oats are laid in lines all over the country, and at the end of three or four days dead rabbits will be found in every direction. A farmer in New South Wales has been experimenting in another way, but with equally good results. Some seven hundred native cats were obtained by him at a cost of about $500, and were turned loose in a rocky locality which abounded with holes and had proved a welcome resort for rabbits. At first no diminution in the number of the rodents was apparent, but at the end of three months it was found that there was hardly a rabbit left, and the cats were left masters of the situation.

MISCELLANEOUS.

MEDICINAL PLANTS.

It will be remembered by many that the American Pharmaceutical Association has requested the Commissioner of Agriculture to adopt measures for the introduction into cultivation in this country such of the foreign medicinal plants as we can grow. The object is to have these plants as fresh as possible and at prices as low as possible. A very large amount of money is annually sent out of the country for these things and for drugs that are made from plants, which might be saved if the plants were grown here. The commissioner says there is no doubt the most important medicinal plants, as the rhubarb plant, the licorice plant, arnica, belladona, digitalis, opium poppy, and many others are perfectly adapted to our climate, and could be cultivated in perfection, as we know with respect to some of them, from experiments made many years ago. Some other semi-tropical products, as ginger, cinchona, vanilla, jalep and sarsaparilla, may in all probability be successfully cultivated in the extreme southern portion of the country, and it would seem well that means should be taken to give such plants a proper trial.

A new and powerful anæsthetic remedy, prepared from the leaves of a shrub called coca, or botanically *Erythroxylon coca*, has been recently introduced into medical and surgical practice. This shrub is a native of Central and South America, and on account of the difficulty of obtaining the leaves in a fresh and active state, it has been thought highly desirable that the growth and cultivation of the plant should be attempted in some locality within our borders. With respect to our native medicinal plants and drugs, their collection and traffic have been very greatly extended during the past decade, so that thousands of people in different parts of the country, notably in the mountainous regions of North Carolina, Tennessee, and in other southern and western States, are employed at certain seasons of the year in this enterprise. Fears are expressed that some of these plants are becoming exterminated in their native habitats, and in respect to some of them—as, for instance, the ginseng plant—the time has come when they may probably be made the objects of profitable cultivation.—*Rural World.*

AGRICULTURAL COLLEGES.

It is safe to say that the agricultural college should be independent and separate, and not be combined in any way with any institution or university where studies not of an agricultural nature are pursued. This has been proved by experience. Those students who attend an agricultural college do so always with a very strong and deliberate determination to study and advance themselves in the science of agriculture. And the same cannot be said of those students who attend universities; it is not necessary to particularize, but such is the fact. If a young man desires to follow up technological studies, he will choose an institute of technology, and the same of agricultural studies. The science of agriculture is important enough to deserve a separate institution, and will show better results when the college is carried on independently, and the course of study should be eminently practical as well as scientific.—*Cor. New England Farmer.*

Fair Pomona, too, is rejoicing in the rapid extension of her kingdom over the gardens and farms of the land. There are many indications that fruit culture is making rapid strides as an industry in all parts of the country. Men of brains and experience and desire for progress are forming themselves into associations for the promotion of their work, and the old societies were never more useful than now. The recent exhibitions have been remarkably complete and useful. New varieties of great merit are being constantly introduced which will increase the returns of cultivation. This year has seen marked progress in varieties and methods, and general enlightenment on the importance and possibilities of horticulture. The fruit growers and gardener occupy foremost places among the industries of the soil, and are determined to keep there if organization and the spread of knowledge can accomplish the object.—*Ladies' Floral Cabinet.*

The New York *World* says: "Southwest Missouri presents a fairer field for the emigrant than most sections of our domain. Good society, schools, churches, spring water, a mild and salubrious climate, cheap lands, the capacity for varied productions are not the least of the many inducements that invite the restless enterprise of the Eastern and Middle States to seek homes in Southwestern Missouri. Plenty of water is found by digging thirty to sixty feet. The principal productions are corn, hay, wheat and potatoes. Rye, sorghum, tobacco and flax are grown to some extent. All kinds of vegetables do well, also all kinds of fruit. An important and profitable industry is fruit growing.

Southern Kansas, Texas, Colorado and New Mexico take the surplus at good prices. One firm shipped this season to Texas alone 10,000 barrels of apples. All the tame grasses grow luxuriantly. Blue grass is indigenous, and grows every place it has a chance and will do as well as in the far-famed blue grass regions of Kentucky. Stock raising is carried on to a great extent. But little feed is required in the winter. The climate of Southwest Missouri is about the same as Western Virginia. Rain falls regularly.

The New York *Times* says that if the owner of a 100 acre farm worth $20,000, were to sell his property for cash he could not possibly invest his money nearly so well as it was in the farm, for the interest at five per cent. on the capital would not begin to provide him with house, provisions, comforts and luxuries which he enjoyed on the farm, but never took any account of in his book keeping.

COUNTRY LIFE.

The subtle charm of living in the country may be summed up in a word or two. It is the revival in our "embers" of something "that nature still remembers," of a wild, open-air, primitive existence when man was on a footing, both as friend and foe, with the animal tribes, and rooted like the plants in his mother earth. We are twin births, everyone of us. A red and hirsute Esau contends with the smooth Jacob of civilization. He is sure to get worsted in the end; but he is not dead, and will ever and anon muster his Bedouin forces for an onslaught upon the household gods and the sleek prosperity of his rival. Evolution at times has to give away to revolution. Hence the town is ever overflowing its dykes, and spreading itself over the fields. The child's vacation at grandfather's farm, the weary clerk's week or fortnight out of the store or office, the emptying of all the brown stone fronts in summer, the tribulations of "country board," the concourse around a bit of grass or a spouting founting in a city square, even the rowdy excursion on a Sunday steamboat, are all forays of the gentle or ungentle savage within us in search of the hunting grounds of a dimly remembered past. We are always coasting along a primal continent of Palms and painted Indians, whose wafted odors we faintly catch and whose drifted blossoms cross our path till the crew, unmindful of worldly-wise old Ulysses, are crazy to go ashore.

And so we go into the country. And if we be truly inspired with the "primal sympathy," we shall find in every sight and sound and smell a soothing and a suggestion, which meet a deeper need than that

of the senses. In the green pastures and beside the still waters He restoreth my *soul*.—Dr. F. N. Zabriskie *in Christian Intelligencer*.

FUNGI.

Dr. Bessy, of Nebraska, in discussing fungi at the American Pomological Society, said the difference between the largest and the smallest trees was not so great comparatively as that between varieties of fungi. There are three classes of fungi: one lives only on dead or decaying matter; one only on living tissues, and the third feeds on both dead and living tissues; and to the latter class all the injurious fungi belong. *Bacteria* belong to the latter class, and are so small that over nineteen thousand millions could exist in a square inch under the bark. The mildews, rust on leaves and grain, blight, fruit rots, and black knot in trees are all the results of fungi. The attacks of fungi call for the surgeon, and not for the chemist. Removal of the growing fungi is a removal of the disease. This teaches us to keep close watch of the fruit trees, and remove all diseased branches, burning them as soon as seen.—*Western Rural*.

EXAMPLE AND INFLUENCE.

Many years ago a young man moved into a neighborhood where but liltle fruit was raised, and started a moderate-sized nursery. The farmers generally had apple orchards, which contained some "grafted fruit," and much more "nateral" fruit. They had some "black cherries" and a few "red cherries." None had ever seen garden strawberries, and when they looked on the nurseryman's bed of the Hovey near the time of its first introduction, fertilized with a row of Large Early Scarlet, they were filled with admiration and wonder. They were eager to obtain some of the same, and the nurseryman, wishing to introduce them among his neighbors, offered the plants on the condition that if good care was taken of them, and they grew, they should cost nothing; but if they died they should be paid for. But so great was the prevailing feeling of neglect in taking care of fruit, that only one (a young woman) would take them on the prescribed condition. Time passed on—the nursery grew—specimen trees bore many kinds of fine fruit—many trees were bought and planted—enterprising orchardists made money from their improved plantations—and in the course of fifteen years or more that neighborhood became famous as a fruit-producing region.

GARDENING FOR LADIES.

The German, Flemish and Dutch women, who help husband or father in his fields are strong, hardy women who rear a stalwart race. Half the fine ladies who now find a few turns on a piazza almost too much for them, would be all the better for a graduated scale of garden work. Beginning with a quarter of an hour a day, they should find at the close of a month that they could easily do their two hours, and that they ate and slept as they never had done before, while they forgot that such evils as blue devils and nerves ever had any existence.—*English Parliamentary Report.*

France has agricultural schools for girls. One of the chief is near Rouen, which has 300 girls from six to eighteen. The farm has over 400 acres. Twenty-five sisters are the teachers. The pupils are in great demand on account of their skill as stewards, gardeners, farm managers, dairy women and laundresses. Each girl has, on leaving, an outfit and a small sum of money, earned in spare hours. If they want a home, they can always return to Darnetel, which they are taught to regard as home.

REAL AGRICULTURE.

Mr. A. W. Cheever, well known as a sound and practical agricultural writer, recently said in discussing his reasons for choosing the profession of a farmer, "If beginning a business life again, with our present feelings, we should select some kind of farming, and would not go out of New England for it, either." There is a year's ration of "food for reflection" in this statement. Mr. Cheever frankly states that farming is not without its drawbacks. Socially the farmer is below the position he ought to occupy. Tillers of the soil have never been the controllers of the world's wealth. Wealth and power have belonged to the handlers of goods rather than to the producers. It has been honorable to own real estate, but dishonorable to handle this real estate with a shovel or plow. In past ages, bread winning has not called for a high degree of skill. It is different now, but public sentiment will not change in a day. There is still an odium attached to the tilling of the soil that will not "down." It crops out in our nursery rhymes, and lends a tone to the character of our school books and pervades the newspapers, and one of the worst features of the trouble is that those who live on farms feel this state of affairs most keenly. That a man with these facts in mind can still say that he would follow the

same business again, ought to give hope and encouragement to farmer's boys. A farm will not run itself; a lazy man will never get rich, a man who will not work his brain will fail; a man who will not save, never will have property. Nature holds justice above generosity. She gives every man just about what he earns by his own personal efforts. Some men cheat her for a time, but she has ways of punishing her children that make things even.—*Rural New Yorker.*

The *Agricultural Gazette* (England) prints a number of maxims which if fixed in the memory, should possess a money value:

"For age and want save while you may,
No morning sun lasts a whole day."

"Frugality is an estate alone."

"The early sower never borrows from the late one."

"It is better to have one plow going than two cradles."

"He has a hole beneath his nose that all his money runs into."

"He that has it and will not keep it;
He that wants it and will not seek it;
He that drinks and is not dry,
Shall want money as well as I."

"He that gets money before he gets wit,
Will be but a short time master of it."

STARVATION AND HIGH CULTURE.

Mr. Norton stated at a meeting of the New Jersey Horticultural Society, says *Orchard and Garden*, that a peach orchard near Trenton had suffered all the ills a peach orchard is heir to; he thought it died of actual starvation. There never was a fair crop. The orchard passed into new hands, the old and dead trees were removed, the poor ground was enriched and 5,000 trees planted. Among the fertilizers used was a ton of kainit last spring, and two tons of bone, thoroughly intermixed and incorporated with the soil. The result is stated to be marvelous; and instead of the sickly trees of the former orchard, they are vigorous, healthy and loaded with beautiful fruit exciting general admiration.

A FREAK OF VEGETATION.

In the mountains of Venezuela grows a remarkable tree. It is found in rocky places, at heights of about half a mile. It is a stupid looking tree enough at first sight. It is lofty and slender, and has stiff leaves that grow a foot or more in length. It looks much of the time as if it were dead. In those regions there is a wet and a dry season,

and during many months at a time not a shower washes its leaves. It bears very small, insignificant looking flowers. What is it good for, this tall, slim trunk, with the dull, dead-looking branches? It is the milk tree, the famous "palo de vaca," which Humboldt describes. He first brought it into notice. It is an evergreen. Its sap is a delicious fluid resembling the finest Jersey milk, only sweeter and richer than even that. When the negroes are thirsty they cut into the side of the trunk as one would bore into a maple for sugar water, and the milk gushes forth in a great stream. It is both food and drink, so rich is it. After a little time it grows thick and yellow, and a cream rises to the top. It has a fragrant odor. When a cow tree is tapped the natives hasten from all quarters with their bowls to catch the flow of milk. The fluid is white. Sunrise is the best time to tap the tree, for then the sap flows most abundantly. The tree gets its morning milking like a cow. Humboldt was much surprised at discovering the cow tree and finding that its milk was palatable and nutritious. His knowledge of botany had taught him that most milky vegetable fluids are bitter and burning to the taste. Some of them are poisonous. But here there was one milky sap that put even great learning at fault. Attempts have been made to cultivate the cow tree, and make it grow in other localities than where it is found naturally, but in vain. As soon as it is removed from its native mountains it dies.

I ordered a Champion of the World Fuchsia from one dealer, and a Phenomenal from another. When the plants bloomed, they were exactly alike. I ordered a Safrano Rose from one dealer, and a Sunset from another. Both proved to be the same in all respects. Here there was a chance for dishonesty, since these two Roses resemble each other so much that the man who sent the Safrano might have thought he could pass it off on me as a Sunset. I ordered a Victor Hugo from one florist, and a Mad. Blauvelt from another, and no one can detect any difference in them. This is something that happens every year. If you order from the same firm all the time, it is not likely that you get the same plant, or variety, under two names, but if you order from some other firm, you do. Do florists buy up stocks of plants and give them a new name in their catalogues in order to make us think they have varieties that other dealers do not have? It certainly looks so.—EBEN E REXFORD in *American Garden*.

HORTICULTURAL SOCIETIES.

The value of local horticultural literature, much of which is slowly and laboriously put upon paper by hands unused to the work, is often

under-estimated by those who do it. As far as it is the experience of workers, a single page is worth volumes of guess work. If an editor whose eye each week passes over the whole volume of current horticultural literature, takes the trouble to make extracts from the often poorly printed and badly bound reports of an unknown society, that society can take it for granted that they are adding something to the world's stock.

The exhibition of flowers, fruits and vegetables should be encouraged to the greatest extent, for in no other way can erroneous ideas be so easily corrected.

The organization and carrying on of a local horticultural society is no child's play. Somebody must do a large amount of earnest, self-sacrificing hard work gratuitously, before such an organization gains sufficient popularity and standing to go it alone. None but those who have tried it know the obstacles to be overcome. Even at this period of horticultural advancement the aims and objects of such organizations are often misunderstood, and it takes a large amount of patience and good nature to put some communities straight on the subject.

Toward bringing about the horticultural millennium, I know of no more powerful engine than the State Horticultural Society, if used aright. It should have the best minds in the State among its members; it should have a liberal appropriation of money. What more could be wanted? The methods I suggest for its work are the same now employed by many church denominations and by the American Sunday School Union. I would pay the secretary of a State horticultural society a salary large enough for him to devote his whole time to the work. Like an agent for church extension I would have him visit and encourage weak societies and establish new, and in every possible way work up a practical sentiment in favor of employing and enjoying to the fullest extent all the beautiful and good that nature permits to grow out of the ground. A State horticultural society, like a State board of agriculture, should be aggressive in its work, *pushing it*, and should not sit supinely down waiting for something to turn up. Its reports should be up to the times, and if published promptly would secure ten readers where but one is secured if a number of months intervene between meeting and publication. The work that a live State horticultural society, with one or more efficient local societies in each county, can do in the line that I have briefly indicated, is great, and sooner or later it will have to be done. L. B. PIERCE.

SPRAYING BELLOWS.

In the way of labor-saving contrivances there is nothing that has given us greater satisfaction than the Woodason spraying bellows which are now sold by most seedmen. There may be other spraying apparatus that will serve better, but not having seen or tried them, we speak only of that which we can commend from experience. A single minute is long enough to spray every part of a hen house ten feet square, perches, roof and all. Kerosene is used and answers every purpose of whitewashing, which requires much time and labor. For spraying small patches of cabbages with Buhach or Pyrethrum powder mixed with water, to rid them of the cabbage worm; or currant bushes with hellebore, to rid them of the currant worm, there is nothing more efficacious. It is tiresome, however, to blow the bellows, so that where a large number of plants or bushes are to be sprayed, spraying pumps may be preferred. There are other bellows made for the distribution of dry Buhach or Hellebore powder. It may, of course, be extended with flour or plaster as desired.

The *Rural* began the use of these bellows years ago, and through its commendation they are now used and greatly valued by many. There is little about them to get out of order and their durability may be estimated by the fact that a single pair of bellows has served us for five years and is now as good as ever.—*Rural New-Yorker.*

HELP.

I wish to say a few words about our help. Great mistakes are made in not employing to the best advantage our own boys. By this I do not mean the hours of work which they perform, but the employment of their best energies. They are not trusted enough, and not allowed to assist in the most important part of our work—the planning. And because of this want of consultation they are led to hate the drudgery of manual labor, and seek other places where there seem to be some prospects of soon being a part of the power that controls movements. There are boys of good intellect who grow up to manhood upon the farm, and during all the years have not one word to say about the management, and when they come to plan for themselves are unequal to the emergency, because they have not been trusted and led to manage. Farmers by this course with their boys are not only doing injustice to their sons, but are doing the very worst thing for their own success by not making their best help interested help.

In some branches of business it may be advantageous to have the manual labor as near the level of machinery as possible; but

this is not true with the labor of the farm and garden. It is impossible for us to be with all our men, or to use them altogether in a gang, and it is a positive necessity that the help should not only have a mind to work, but put mind in their work.

BUHACH.

This is the powder made in California from the flower petals of the *Pyrethrum cinerariæfolium*. When first offered for sale, the manufacturers sent a box of it for trial to the Rural Grounds. It was claimed that it would kill every form of insect life—a claim which we found to be but partly true. Nevertheless, in many cases it seems to us the most desirable insecticide at present known. We tried it upon flies, mosquitos, plant lice, caterpillars of various kinds, beetles, cabbage worms, squash bugs, potato beetles and their larvæ, tomato worms, currant worms, and finally upon the rose bug. Our reports have appeared before *Rural* readers from year to year, showing that, with the single exception of the potato beetle, it has proven more or less effectual with all.

If used dry, it may be mixed with several times its bulk of flour. But we prefer to mix it with water in this way: Take, for instance, an ounce of Buhach, *wet* this with alcohol and stirring it until it becomes muddy, add two quarts of water. This may then be poured into the reservoir of the bellows as needed and thus sprayed upon the infested plants, or if poured into a pail, any of the several kinds of force-spraying pumps may be used. The bellows, however, will be found much handier where but small quantities are required. It is said that a pound of Buhach (preferably first wet with alcohol) will bear the addition of fifty gallons of water, and still kill the insects which receive the spray; but we doubt it. It may be that the imported *Pyrethrum* powder is just as economical an insecticide as the California Buhach. Never having tried it, we speak only of that which we have tried, and that, too, with much satisfaction. Last year, for the first time, the Buhach was sprayed upon the spiræas growing here, which of all plants the rose bug attacks first. Though the bushes were *alive* with these bugs, in ten minutes after the spraying not one was to be found, some having flown off, the others dropped to the ground where they seemed to wriggle either in agony, a sort of half paralysis or drunkenness—it was hard to say which. Dwarf apple trees, grapevines and other plants were subsequently sprayed with the same effect.

As is well known, this *Pyrethrum* powder is utterly harmless except to insect life.—*Rural New Yorker.*

MARKETING.

PICKING AND SORTING APPLES.

Deacon L. W. Weeks, of Marlborough, gives his method of harvesting winter apples. Says the *Maine Farmer:*

"He selects enough large sized barrels to fill a spring wagon; takes them to the orchard for filling; uses handle baskets to pick in, that are small enough to turn over inside the barrels. Have the pickers fill their small baskets, which can be carefully emptied into the barrels without bruising the fruit. Even eggs can be poured from a basket if one knows how to do it. The barrels are not filled quite full, as they are handled easier and no apples are spilled by lifting the barrels into the wagon, or by unloading them again. At the barn or cellar, the barrels are taken from the wagon by two men, one on each side, and are carefully emptied upon the ground or floor, for sorting and barrelling for market.

By this method the apples can be picked and placed in the barn or cellar ready for sorting, very rapidly and without bruising, and the pickers have no responsibility about selection, as the apples are picked clean from the tree. In harvesting fall apples that are to be sold immediately, if the quality is good, the picking and sorting are done at one operation, all inferior fruit being left on the tree, or dropped upon the ground.

Mr. Weeks objects to pouring apples upon the ground under the tree, to be sorted, as the grass is in the way of picking, and when carried direct from the orchard to the barn or cellar, the sorting and barrelling can go on during rainy weather, or before the dew would be off in the morning. He finds that it pays, in the long run, to sort well, putting in no inferior specimens. A good reputation here as elsewhere is worth attaining and keeping.

A PROFITABLE GARDEN.

Heny Pruetzman, one of the early settlers near Jamestown, Dakota, and a successful wheat grower on one hundred and sixty acres, says his experience with vegetables and small fruits, on a small inclosure of twenty rods, convinces him that if he had taken up only five acres and engaged in market gardening, he could have realized more

than he has from his one hundred and sixty acres in wheat. The past year he sold from two hundred plants, six bushels of raspberries at twenty cents a quart, making thirty eight dollars and forty cents; from seventy-five bushes he gathered five bushels currants, which were sold at fifteen cents a quart, or twenty four dollars. He also sold sixty-five dollars worth of rhubarb, all from the same plat. Receipts from one-eighth of an acre, one hundred and twenty-seven dollars and forty cents. The family, himself and wife only, were supplied from the same garden.—*No. Dakota Farmer.*

HOW TO TELL A RIPE MELON.

The rinds of melons when left on the vines to mature, generally become hard and the pulp brittle, and when, under pressure, you hear the inside crack or give way it may be regarded as a sure sign that the melon is ripe, and has matured well on the vine.

If a melon remains on the vine until properly matured the side that lays on the ground will be found to have changed from white to a pale yellow, and upon close examination numerous small pimples will be noticed on the surface, particularly on the outer edge. These pimples never appear on those that are not ripe or have been prematurely pulled.

Sometimes the desirable pale yellow color is produced prematurely by turning this part of the melon to the sun for a day or two, but the yellow thus produced is of much deeper shade. This in connection with the absence of pimples will readily tell the experienced eye how the color was produced.

If the skin will readily peel, leaving a hard, shelly appearance, it is a good indication that a melon is ripe; and also if it has a dull brown appearance. All these signs are rarely seen at the same time, but the presence of any *one* is sufficient to indicate the ripeness of the melon.—THOS. D. BAIRD, *in American Garden.*

It seems strange that fruit-growers will not learn that neatness and taste in packing are sure to be rewarded. We see this fact illustrated every day. Where fruit is tossed promiscuously into a box or barrel, without regard to size, shape or color, it simply will not command an extra price, no matter how good it may be. Even the retail dealers appreciate this fact. Two apple stands are often placed near each other. One sells little, while the other does a good business. On one the fruit is thrown into a confused mass; on the other, the apples are sorted and arranged as regards color, shape and size. It is needless to say which one does the business.

GATHERING APPLES.

The apple harvest is at hand. It may seem that nothing new can be said about so commonplace a subject as gathering this staple fruit, and yet we sometimes gain by the interchange of ideas upon the simplest matters. We think the custom of many farmers of piling the fruit upon the ground as it is picked, to be assorted and barreled later, is objectionable for two reasons: It exposes the apples unnecessarily to theft, and the work of assorting and putting into barrels must be done in fair weather when time is in demand for other work. We have found it preferable to deposit the fruit in barrels as it is picked, and to remove it to the fruit room the same day; here it is comparatively safe from theft, and where it may be assorted and barreled in unfair weather.

For picking from tall trees, a long, light ladder is almost indispensable. It is well to saw a notch in the lower end of the side pieces, in the shape of an inverted letter V. In lifting the ladder the sharp points will take a firmer hold of the ground than if the end is sawed off at a right angle. For picking, we have found a basket having a bail preferable to one with a rigid handle, as the former is readily turned over in the bottom of a barrel. We have found it advisable to gather as many of the apples as possible from the ladder before entering the tree. The ladder offers a better foothold than the branches of the tree, and a more convenient passage to the ground; it is also usually less injurious to the branches than are one's shoes, when standing much upon the brances. We have found a fruit picker to be of value only for gathering apples that cannot otherwise be reached.

For hauling the apples to the fruit room, we have found a simple platform of plank, without side-boards, preferable to the wagon box for several reasons. The barrels may be set upon the wagon at the front, middle or rear, and the necessity of rolling all forward is avoided, as the barrels may be extended a trifle beyond the edge of the platform; two may be set abreast, which is not possible when the ordinary wagon box is used. In unloading, it is possible to take off any barrel without the necessity of removing the others; thus it is easy to avoid mixing the barrels of different varieties of apples.

When a rainy day comes, of which we have many at this season, we spread a little soft straw upon the floor of the fruit room, pour out the apples from the barrels and assort them, giving plenty of time to the work, and doing it thoroughly.—*Our Country Home.*

SMALL FRUITS.

HYBRID RASPBERRIES.

It seems strange that there should still be fruit-growers who doubt that the different species of Raspberries can be changed and improved by hybridization. Having been a practical experimenter for thirty years, the results of some of my experiments in this direction leave no doubt in my mind, and will furnish convincing proof to any one who will take the trouble to investigate them.

In the year 1843 I planted in my garden what we then called the wild White-cap Raspberry, that bore hard yellow fruit, of very poor flavor. In the summer of 1845, before the flowers opened, I cut out the stamens of several of these flowers and removed all the other flowers from the bush. At the proper time I applied pollen of Franconia to the pistils of these flowers that had previously been deprived of their own pollen. Most of the plants raised from the seed of the berries thus produced strongly resembled the mother both in plant and fruit; rooting from the tips of the young canes, and never throwing up suckers. But two or three of these seedlings bore long, soft red berries, threw up abundance of suckers, and could not be induced to root from the tips. Now I ask the unbelievers in these matter, "Were these two or three red seedlings hybrids or not?"

If there should still be any doubters, let me inform them of what I did with these two red varieties above alluded to, and which I have always called hybrids. Believing that their natural characters had been in a measure broken, and that I could again cross their flowers, and by so doing I could in time combine all the good qualities of Raspberries in one or two varieties. The following summer when they came into flower I fertilized them with pollen from our best varieties, amongst others, White Marvel of Four Seasons. The results of this cross were some red, some white and some dark orange varieties, and very much improved in fruit, but not one rooting from their tips like their grandmother. From this generation of seedlings the three most promising were saved, one light yellow, one orange, one red.

But believing the acme of perfection had not yet been reached, another attempt was made. This time the pollen of Belle de Fontenay, Hornet and Brinckle's Orange were used upon the pistil of the yellow seedling. The result from the seed of these being a great many distinct varieties, four of them being very promising. One is considered

an improvement on Belle de Fontenay, others resemble Hornet, but are more hardy, and another large, delicious yellow is now called Diadem. The last named has the peculiarity of sometimes sending up canes that produce red fruit, and some that produce yellow fruit, from the same roots. If I were not prepared to prove this statement by some of the most intelligent and prominent horticulturists in Ontario, I would not have dared to make it. This is the only instance of this kind I have ever heard of, and in my opinion constitutes proof positive of its hybrid character, and showing at the same time a strong tendency to return to the original type. CHARLES ARNOLD.

[The above was written for *The American Garden* by the late Charles Arnold of Paris, Ontario, shortly before his death, and not only shows how carefully and systematically its author conducted his experiments, but also furnishes an important contribution to pomological science.—*Ed.*]

HUNGER AND QUALITY.

In speaking of the quality of fruit, a contemporary intimates that a good appetite often has much to do with the quality of fruit. That is, if a man is very hungry a very poor specimen of fruit will appear to him to be excellent. That is true. But our contemporary goes on to intimate that the alleged excellence of the wild strawberry is often dependent upon the fierceness of the appetite. It says that it has known people to hunt for the wild strawberry until they were about famished, and then think there was nothing like it. All that may be true, too. But hungry or not hungry there never was a strawberry yet grown that is equal in flavor to the wild berry. We have improved the size and appearance of the strawberry but have not improved its quality. Then is the improvement a failure? By no means. The improved berry has enough to recommend it to counterbalance this, especially from a commercial standpoint.

RASPBERRY BLACKBERRY HYBRID.

Mr. Wm. Saunders, of Canada, during a brief call at this office, spoke of hybrids which he had effected between the raspberry and blackberry. We find in late English papers a new "pure black raspberry" offered, which purports to be such a cross. It is called the "Glenfield." It is larger than any black cap, though smaller than the average blackberry. The advertisement reads: "By crossing a blackberry with a raspberry, a fruit partaking of the shape, flavor and habit of the raspberry (with just a perceptible and unusually pleasant taste

of the blackberry)—with the glossy black color and hardy character of the last mentioned—has been obtained; while as regards productiveness, etc., it will vie with the very best raspberry yet known." This seems not, as yet, to have been alluded to by American journals.—*Rural New Yorker.*

WOMAN AS A FRUIT GROWER.

A young lady brought up on a farm, though receiving between the ages of 15 and 20 the benefit of a first class education in a distant city, was suddenly bereft of both father and mother. After the settlement of the estate she found herself possessed of a farm of thirty acres, a team of horses and the implements of farm work, together with the sum of one hundred and fifty dollars in cash, with which to begin her fight with the world. After due deliberation she decided to retain the small farm and work it. It so happened that about two acres had been set to strawberries some time before, which would bear its first main crop the summer following her removal to the small farm. She immediately had this bed cultivated and manured, doing all but the heavy work with her own hands. The crop netted her about one hundred and ten dollars. The next step was to increase the plantation, adding raspberries, blackberries, etc., until now, to make a long story short, less than six years from the time the work was commenced. the original farm of ninety acres has been purchased and paid for in cash, too, and is being rapidly laid out into orchards; a poultry yard of no mean dimensions adds vastly to the income, and a snug bank account is ready for a rainy day. More than all, she has developed from a dependent girl into a strong, healthy, self-reliant business woman; and the secret of her success is good sense, a lack of that bane to American girls, false pride, and an indomitable will and a determination to succeed.—*Farmer and Household.*

A Michigan strawberry grower practices straw-mulching of the vines to keep the berries clean, and when the season is ended burns the straw as it lies. The heat clears off the leaves and creepers from the plants, besides destroying the seeds of weeds that lie on the surface, as well as insects and larvæ. After several years trial it has been found that when rain comes new leaves start out from the crown of the plant, which is uninjured by the fiery ordeal through which it has passed. The vines are then cultivated as usual. The first burning over the vines was an accident, but the result proving so good the practice has been continued.

THE JEWELL STRAWBERRY.

When so high an authoritative body as the Massachusetts Horticultural Society gives its approval to a new fruit it may be safe for the agricultural press to recommend the same for the latitude to which it is adapted. This was done by that society in the case of the Jewell strawberry. At its June exhibition of this year it awarded this strawberry a silver medal "on its great merits as a new seedling." It is a pistillate variety, the parentage of which was either Jersey Queen or Prince of Berries, ripening in mid season, of large size, bright red and very prolific. It originated and is being introduced by P. M. Augur & Sons, Middlefield, Conn.

MOLES.

The *American Garden* says: Moles are by common consent considered a nuisance and a pest in the strawberry field, and various devices are constructed for their destruction. Yet, although moles destroy a few plants by undermining their roots, it is more than probable that they are but blessings in disguise and that we would lose more plants from the ravages of the white grubs than from the underground work of the moles, if we should succeed in killing the latter. That moles do not eat strawberry plants, but eat grubs, admits of no doubt; and it is also observed that moles are found mostly in places where grubs are most numerous. We have frequently followed the mole tracks under rows of dead plants, and have always found on their roots the peculiar marks of the gnawing of the grubs, proving that the latter were already engaged in their destructive work, and were only arrested in their mischievous progress by the timely arrival of the mole, who, after having found his prey, would not follow the same row on a fool's errand, but would make a short cut to the next row, where his keen scent indicated another choice morsel.

ORIGIN OF THE LUCRETIA DEWBERRY.

We have counted 103 berries on a single stem but 28 inches long. Many prominent horticulturists pronounce it a great acquisition, when genuine, many spurious plants being offered and sold for the Lucretia.

Its history is as follows: A soldier stationed near Beverly, West Virginia, found it in the woods, a chance, natural seedling. After the war he returned to the scene of his military exploits, married one of

Virginia's fair daughters and settled down near by, and remembering his old favorite of war times, he sought out the plant, removed it to his garden and gave it careful cultivation. Here it was seen by a son of one of our neighbors. This young man's father saw the fruit in 1876, while on his way to Philadelphia, and upon his return to Ohio, he told such stories of the size, quality and fruitfulness of the plants that we induced the old gentleman, whose name was Williams, to have the plants removed to Ohio.

The plant is a trailer and can be easily and cheaply protected, where necessary, though ours stood the intense cold of last winter without any artificial protection whatever. It propagates from tips, ripens usually about the middle of July. In quality it is sweet without core. The color is a very bright, shining black.

N. H. ALBAUGH & SONS.

COVINGTON, Miami Co., O.

MISSOURI STRAWBERRY VARIETIES.

At a recent meeting of the Lafayette Co., Mo., Horticultural Society, Mr. Maitland stated that the favorable season has caused a growth of strong and numerous fruit crowns, which promise a fine crop in 1886. His choice of varieties is: Chas. Downing, Crescent, Triumph, Sharpless, Ironclad, Windsor Chief, Piper Seedling, James Vick, Park Beauty, Daniel Boone, Manchester, Vineland, Mt. Vernon and Jumbo, the last three for very late sorts.

Mr. Chas. Teubner gave as his choice Triumph, Crescent, Chas. Downing, Captain Jack, James Vick, Hart's Minnesota, Jersey Queen and Kentucky. He said that Triumph was fine for home use, berries of good quality and uniformly large, and it did well on only moderately good soil.

BEST STRAWBERRIES AND RASPBERRIES.

We made the inquiry recently of several of our best and most eminent fruit growers, for their selection of three and of six of the most valuable strawberries and raspberries, and received the following answers:

From T. T. Lyon, President of the Michigan Horticultural Society: Strawberries—For market and matted row culture, Crescent, Miner's Prolific and Champion. He would, perhaps, add Wilson as a fertilizer. For cultivation in hills, or very narrow rows—Sharpless, Bidwell, Arnold's Pride. For six—add to the foregoing, Duchess, (for very early), Piper and Wilson, for the former list; and Alpha, Maggie

and Bright Ida, for the latter. Raspberries—Among black-caps, Souhegan, Tyler and Ohio, are all doing well as early varieties. Gregg is the best late market sort, but is not good enough for home use. He prefers Souhegan and Mammoth Cluster for flavor. Among the red varieties, Parnell has a peculiar, spicy flavor, rather pleasant; Reder is large, firm, very productive and excellent. Cuthbert, however, stands worthily at the head, as the market variety of its class. [Bright Ida and Alpha strawberries were raised by the late Charles Arnold, of Ontario.]

From Parker Earle, ex-President of the Mississippi Valley Horticultural Society of Illinois: The Wilson is still regarded by him as the most important variety of the strawberry, grown as a market sort, for all places where it succeeds. The Capt. Jack is the next best shipping berry; and this with Downing and Crescent will make a list of three of the most valuable for market, where the market is near. Neither Downing nor Crescent is a very good shipper in hot railroad cars. Among raspberries, the Turner holds the first place for quality and reliability, but turns dark too soon after picking to suit the many who buy only from color. For such, the Brandywine is more successful; but is poor in flavor. The only drawback to the Cuthbert is its rather dark color. It is hardy, prolific, large and good.

From E. Williams, Secretary of the New Jersey Horticultural Society: First, Bidwell; second, Sharpless; third, Charles Downing, for carrying qualities, and Miner's Prolific, Manchester and Crescent. But for profit, based on productiveness, Bidwell would be last. For home use, Charles Downing, Cumberland, Sharpless, Bidwell, Manchester and Crescent.

George W. Campbell, Secretary of the Ohio Horticultural Society, says: "I have tested a dozen or more of the most highly recommended new strawberries, but I do not find any which I regard, all things considered, better than the old Charles Downing and the somewhat newer Cumberland. If the Manchester were staminate, or self-fertilizing, I should be willing to add it as a third, as the plant is vigorous and healthy, and the quality fair, with large productiveness if planted near a good staminate which blows at the same time. Sharpless has not met my expectations. It is vigorous and healthy, but the blossoms are injured by late spring frosts. The berries ripen irregularly. For raspberries, I find nothing better than the Souhegan among black-caps; and for a late variety there is nothing better probably than the Gregg. Hansell and Cuthbert promise well. I regard Shaffer with favor, for its large size, productiveness and strong growth. It has a rather acid but high flavor. Its only fault is its dull color."

J. T. Lovett, nurseryman of New Jersey, who has thoroughly tested all or nearly all the new sorts, makes the following selections: Strawberries, named in the order of ripening, early, medium and late, for market, on heavy soils—Warren, Sharpless, Manchester. On light soils—Crescent, Wilson, Manchester. For home garden, on heavy soils—Bidwell, Sharpless, Manchester. On light soils—Cumberland, Miner's Prolific, Manchester. For the six most valuable sorts for market, on heavy soil, add to the three above named, Duchess, Champion and Glendale. For light soils for market, add Cumberland, Capt. Jack and Kentucky. For home garden and heavy soils, add Warren, Miner's Prolific and Golden Defiance; and for light soil, add Gipsy and Mount Vernon.

Mr. Lovett gives the following list of select raspberries: Red sorts, the order of ripening, Hansell, Reliance, Cuthbert, for home garden; and Brandywine instead of Reliance for market. Black varieties: Souhegan, Hopkins, Gregg; with the only variation, for drying, of Ohio instead of Hopkins.

Franklin Davis, who was for many years an extensive fruit-grower in Southern Virginia, makes the following selection: The best three strawberries for market, Wilson, sharpless, Cumberland, for both market and home use; and for the best six he adds, Charles Downing, Crescent and Triomphe de Gand. The best three raspberries, Cuthbert, Brandywine, Gregg; and for the best five he adds, Reliance and Turner.

Matthew Crawford, the widely known strawberry raiser of Ohio, names as the best three strawberries, Cumberland, Harts' Minnesota and Mount Vernon. For market, add Glendale, Capt. Jack and Windsor Chief, as being very productive, although not very good. Among raspberries, the Shaffer stands at the head for size and productiveness. Before this sort came out, the New Rochelle was the most productive. The Herstine, the best red, not being quite hardy, the Delaware is chosen for its hardiness, good size and fair quality.

J. H. Hale, of Connecticut, who has tested more than a hundred varieties of the strawberry, would plant more of the Manchester than any other sort, on light, medium, or heavy soil. But being pistillate, he would take Miner's Prolific to fertilize it, and as the next in value; adding Windsor Chief for the third. For six, he would add Mount Vernon, Crescent and Kentucky, in the order named. For family use, he would plant Miner's Prolific as the best, and add Manchester and Mount Vernon; and for the six, add Crystal City, Sharpless and Kentucky.

The reader will observe on looking over these selected lists, that

among strawberries the following are special favorites with several cultivators: Miner's Prolific, Crescent, Sharpless, Wilson, Cumberland and Downing; while Bidwell, Mount Vernon and Kentucky stand high with a few. Among the raspberries, Gregg, Souhegan, Cuthbert and Shaffer are especially commended for their value. Other and newer sorts of high promise have received as yet a limited trial.

—*Country Gentleman.*

BLACKBERRY RUST.

A. H. Riehl, who has had abundant experience with the orange blackberry rust, writes to *Colman's Rural World*, corroborating the views which we have expressed on former occasions, and which are held by others, that when rust gets into a plantation the only remedy is to dig up and burn the plants as soon as the disease shows itself, and if the patch is badly affected the best thing is to mow off and plow up, and plant with other crops for two or three years, planting the new patch in an entirely new place. The spores of this minute fungus are blown by the winds and spread, and Mr. Riehl has found that neither road dust, lime, salt nor sulphur has the least effect.

CENTENNIAL BLACKCAP.

Samuel Miller, of Missouri, states in the same journal, that he regards the Centennial as "about the most valuable blackcap raspberry he has tried." It has a conical berry with a shining black collar, and Mr. Miller says there is a spurious sort which sprang up in the Centennial patch which has induced some cultivators to think the true variety worthless.

SCIENTIFIC.

THE MISSOURI BOTANICAL GARDENS.

The eminently public spirited citizen of St. Louis, Mr. Henry Shaw, who proposes to give his celebrated Gardens to the city on his decease, for the enjoyment and instruction of the people forever, has not waited for the event of his departure—which all hope may be long postponed—to inaugurate his generous gift. He has already founded

a school of Botany, endowing it with real estate which even now produces an income of over $5,000 a year. Prof. Wm. Trelease, an eminent botanist among the younger class of men, has been placed in charge, and inaugurated on the 6th of November. It has been made a department of Washington University. The whole movement so far seems to indicate a bright future, and must be highly gratifying to Mr. Shaw, the generous promoter of the measure. The Engelmann Herbarium, and other famous material will, it is hoped, go to the charge of this new department of the University.

Wood ashes contain all the required elements of plant nutrition except nitrogen. 100 pounds of wood ashes contains 16 pounds of potash worth 80 cents, 3½ pounds of soda worth 2 cents, 67 pounds of lime and magnesia worth 8 cents, and 5¼ pounds of phosphoric acid worth 26 cents. If we had to buy in market in the cheapest form, the manurial materials contained in 100 pounds of ashes, the cost would be $1.16.

SLEEPING PLANTS.

During the year, and in connection with this experiment with the clovers, the writer's attention has been directed to other plants assuming similar sleeping or nyctitropic movements. The oxalis shuts up its flowers and leaves like umbrellas on the first approach of night, and opens them at sunrise. The dandelion opens before six, where exposed, and closes about sundown. The little daisy that greets us by the wayside, retires to rest each evening and rises to meet the early beams in the morning. The marsh marigold goes to bed at sundown and rises with the sun. Tulips begin to prepare for repose about tea time and are late risers. This feature in the life of most plants may be made a most interesting and instructive exercise to observing boys and girls whose homes are away from the city in the open fields of nature.—*Prairie Farmer.*

FIRE BLIGHT IN THE PEAR.

The December *American Naturalist* has a paper by Prof. J. C. Arthur, which is one of the most satisfactory we have read for a long time, and is well worthy of perusal by those interested in intelligent pomology. It is long since the *Gardener's Monthly* took the stand that fire blight must of necessity be of fungus origin, because it was not possible to introduce any supposition on the other grounds of climate, soil, modes of culture, etc., without the proposition carrying

with it its own refutation. It was evident that the cause, whatever it might be, was local, and therefore induced by some special influence operating on particular parts of a tree, wholly independent of the plant itself. In other words, some parasitic action must be the acting power in inducing fire blight. Though predisposed this way, we have not hesitated to criticise theories offered in its defense, because we think nothing should be accepted as science that will not bear every attack. Professor Burrill's proposition that the disease was caused by the presence of Bacteria, was fully in accord with our prepossessions; still we have not hesitated to point out occasionally, weak points; and quite recently, in noticing another paper by Prof. Arthur, we had occasion to observe that there was still left a doubt, whether what was generally known as fire blight, was the disease Prof. Arthur had in his mind. In this paper he has made it clear, that it is the genuine fire blight with which he has been experimenting, though it is also clear that some diseases, or perhaps forms of the real disease, but not the genuine article, are sometimes confused. There is still one point which the Professor does not seem to have observed, and which we think very important to a correct diagnosis of the case, and that is, that the point attacked is really but a very small portion of the branch—an inch or two in most cases—and the rest of the branch is, as he states, killed simply through the destruction in the ascent of the sap. Usually the ringing of a branch, by which the sap would be obstructed, would not result in an immediate blackening of the leaves; they would gradually wither, and finally die away brown instead of black; and this reflection would indicate that there is yet something more than a mere cutting off of the sap supply. Still, the candid reader will have to admit that the results of Professor Arthur leave but little doubt that a species of Micrococus, allied to Bacteria, is at the bottom of all the trouble. It is only its "ways and means" that are yet to be found out.

BOTANY AND AGRICULTURE.

Eds. Country Gentleman.—It is a current notion among farmers that the aid which botany is capable of rendering to agriculture is small, both in amount and importance. This notion is co-ordinate with another common idea, that the end and aim of botany is to classify and name plants. This idea is the legitimate product of former methods of teaching botany—methods which are still followed in many or most high schools and academies, and probably in some colleges. Under this method the student familiarizes himself with the names of the parts of the flower and leaf, and with this knowledge traces a few

plants through a "key" in the botany and finds their names. In addition, he—or more commonly she—presses a few plants, sews them in a scrap-book, and this so called herbarium completes her botanical studies. This work is entirely superficial, and bears no more relation to the pure science of botany than learning a tune by rote does to the art of music. It is to be considered as nothing more than a school girl accomplishment. Happily, this method is being superseded by better methods—the "new methods," which induce the student to study what the plant does and how it does it, rather than simply what it is. What are the laws of plant growth? How does the seed germinate? How are flowers fertilized? What are the plant's relations to soils, temperature, moisture, intensity of light, to insects, and other active agencies? What is the physiology of diseases induced by unpropitious surroundings, by fungi and by insects? What are the phenomena of cross and close fertilization and hybridization? What is the physiological nature, and what the cause of changes produced by cultivation? What are the influences of plants upon climate and soil, and upon insects and other animals?

These are some of the queries which modern botany seeks to answer. This modern science is more recent than many people suppose. It is only within the last decade that it has begun to receive an impulse and general attention in this country. The subject is a peculiarly difficult one, and results come slowly. It contains as many or more practical problems, however, as does chemistry or entomology. The phenomena of plant growth and plant biology are so intimately connected with intricate and variable problems—such as weather, soils and climate—that their solution demands more time than does a purely chemical or physical phenomenon.

There is nowhere a broader field for practical research than in botanical science. A simple enumeration of common things which the farmer ought to know about plants, and which the botanist is entirely unable to explain, would fill columns. For instance, no one knows if cucumbers and melons, or squashes and pumpkins, will cross fertilize and produce the same year fruits half cucumber and melon, or half squash and pumpkin; and the experimenting which is necessary to settle this seemingly simple problem is considerable.

We must look to well equipped experiment stations for the larger results in botanical research as applied to agriculture. However, there is individual work which the teacher of botany should do toward making a practical application of the science. He should recognize the fact that our botanies are of no aid to the classification and recognition of cultivated varieties of plants, and that they have very little

to do with agricultural problems of plant growth and diseases. By general consent, the domain of botany ceases when a plant is impressed into cultivation. This should not be so. It is legitimately the province of botany to follow a plant as long as it is a plant, and to explain to its cultivator the laws of its growth and improvement. At present, we need botanists in the garden more than in the field. The crying demand of horticulture is some system of classification and nomenclature which will enable the ordinary horticulturist to name accurately an apple or a verbena. All our varieties of cultivated plants have a number of names, and we are entirely unable to designate the proper name, or to determine in many cases if the variety is really new or worthy. The elegant system of botanical nomenclature can be applied, with some modifications, to cultivated plants. In a late number of the *Country Gentleman*, I proposed an application of this nomenclature. Our greatest need is for a system of classification which will enable us to identify horticultural varieties. How shall we classify all our varieties of apples? Surely not on size, color, flavor, time of ripening or length of keeping. We must discover permanent marks in flower and leaf and tree to aid us.

At the meeting of the Society for the Promotion of Agricultural Science at Ann Arbor, Mich., Aug. 25, Dr. C. E. Bessey, of the University of Nebraska, proposed that botanists enter this unoccupied field which lies between botany on the one hand and horticulture and agriculture on the other, and claim it as their legitimate possession. He further submitted a general synopsis to which or to parts of which the individual botanist can work with inestimable benefit to agriculture:

I. Nomenclature and classification of cultivatied plants.
II. Researches in physiology of plants.
  1. In growth and nutrition.
  2. In reproduction.
    a. Fertilization.
    b. Germination.
    c. Hereditary, cross breeding, etc.
  3. Physiology of cultivation and improvement.
III. Researches in pathology, or science of diseases.
  1. Lowered vitality.
  2. Poisoning: *e. g.* from gases, soils, etc.
  3. Temperature.
    a. Physiology of freezing.
    b. Physiology of "scalding."
  4. Insect diseases.
  5. Fungoid diseases.

L. H. Bailey, Jr., Michigan Ag. College.

EXHAUSTION OF SOILS.

In discussing the exhaustion of soils the *Rural New Yorker* says:

"No country was ever blessed by nature with more productive soil. She made the best possible use of the long ages prior to the settlement of this country by white men, in forcing the most luxuriant growth of vegetation, and by its decay and that of the annual crop of foliage, had filled the soil with an amount of fertility that seemed exhaustless. So thought our fathers, and so think now many of the occupiers of the great fertile West. But a continual taking out and putting nothing back would exhaust even the ocean. It has exhausted the millions of acres of the older East, and it will exhaust the most fertile fields of the West. A study of the census must convince any searcher that the production of all our crops is year by year growing less and less. It can not be attributed to a change of seasons for a series of years, but can be only to one cause—the gradual exhaustion of plant food by our unthinking and unwise course.

"The subject of husbanding the resources of our acres, and of returning to our starving fields those elements of plant growth quite or nearly exhausted, is yearly forcing itself more prominently upon the attention of the farmers of at least the eastern half of our country; and the line is very rapidly extending westward. Millions of acres that once produced magnificent crops of the various grains, even west of the great lakes, are now lying vacant, or barely paying for the most shiftless cultivation. The question cannot be seriously considered too soon, even by farmers on the now rich and productive prairies west of the great rivers. Every train that passes eastward is loaded with a portion of their fertility, much of it in the crude, and barely remunerative state of bran, oil meal, and the coarser grains, and, to the shame of the farmers, even in the bones of their animals, while the returning trains carry back nothing in the nature of plant food.

"Though western farmers may think they have no need of such knowledge, they should not fail to thoroughly post themselves, and those farmers who do so, and who take advantage of this knowledge, will, bye and bye, be looked upon as the 'lucky ones' who have the richest farms in the vicinity in which they live."

SUNSHINE.

There is, indeed, one fact in the distribution of sunshine over the earth's surface that seems paradoxical. The farther north we go the

more heat does a given area of land receive in a summer's day from the sun.

This is because the summer day lasts twelve hours at the equator, and longer and longer as we go north, until arriving at very high latitudes there is no sunset. Why, then, the colder northern climate? Because the winter day is as short as the summer day is long; and through the winter vast masses of snow and ice accumulate and chill the whole year. Yet the fact remains, that an acre of wheat receives more of direct sunlight in a summer's day in Ohio than in Mexico, and more in Canada than in Ohio. It is also known that wheat matures in fewer days in Canada than in Ohio, and in Ohio than in Mexico. This shows the influence of sunlight in ripening grain and fruits.

XENOS CLARK.

WHY ARE SOME TREES HARDY?

In a note appended to Mr. Tuttle's criticisms of Professor Budd (*Prairie Farmer*, Jan. 2,) we stated, in effect, that the smaller the water-carrying pores or cavities in the wood of a tree or shrub, the less would be the expansion and contraction at any one point, or at all points, by freezing and thawing, and that other things being equal, it would seem that the finest grained wood should be the hardiest in a changeable climate. A particle of water one-hundredth of an inch in diameter expands one nine-hundredth part of an inch in freezing, and the elasticity of the fibres may be supposed to stand that strain. But a water cell one-tenth of an inch through would, in freezing, expand one-ninetieth of an inch, and this might rend and disorganize the structure enough to kill the life of the tree or shrub. Mr. Tuttle gives some illustrations of fine and coarse grained structures, which apparently militate against this explanation. His statement that hardiness is an inherited quality does not at all explain the secret or cause of the hardiness. The graft or progeny is merely a continuation of the parental tree structure.

Mr. Vincent's theory brings in a factor that may explain it. Water is one of the exceptions to the general rule that heat expands and cold contracts. Nearly all solids continue to contract by cold and to expand by heat. Water contracts by cooling, down to about 39°, but expands on further cooling, so that in simply sinking from 39° to 32°, it expands over one-ninth of its bulk. Now, as we understand it, Mr. Vincent explains that in the hardier woods the pores are filled with starch particles instead of water, and starch being a solid substance, expands and contracts but little with the changing temperature. This is theoretically borne out by the fact that fully ripened woods, that is,

woods in which the pores are well filled with starch or woody fibre, are less affected in winter than the immature wood. The subject is well worth further experiment, observation and discussion, all of which may lead to valuable practical results.

While on this subject, we will refer to one query of Mr. Tuttle, why is one side of a tree affected by intense cold, while the other side escapes? This is very readily explained by the fact that the sun's rays and their absence, and the frequent warm and cold breezes, change the temperature of the wood on the side, or sides, exposed to them, quite enough to change the contained sap or moisture above and below the 32°–39° temperature many times during autumn, winter and early spring, and the consequent expansion and contraction of the wood structure may thus permanently and fatally disorganize it.

INJURIOUS FUNGI.

At the recent Grand Rapids meeting of the American Pomological Society, Prof. C. E. Bessey, of Nebraska State University, delivered a very interesting address upon injurious fungi, illustrating the subject with numerous large colored charts. The following is our abstract of a portion of what he said: For a number of years nothing was known of fungi because students were not taught anything as to the structure of plants; all that was required being to learn the names and classification of the flowering plants and ferns in the student's region. It is not surprising then that men who have been through a course in botany should have vague notions as to fungi, for they have been obliged to get their knowledge of the vegetable kingdom by home reading. But there is a new school of Botany springing up in this country, which gives attention to vegetation; to the habits and the modes of the reproduction of the lower plants. A fungus is as interesting as an oak, and receives as much attention as the latter at the hands of botanists. From such botany and botanists, pomology and all branches of horticulture and agriculture may confidently hope to derive great benefit. The plants included under the name of fungi are numerous. They are manifestly different, and all cannot be treated alike. A dozen may grow on the same tree and no two of them bear any resemblance to each other in structure or habit.

Black Knot.—The black fungus is more harmful than all the rest put together, as the disease it conveys to its host is extremely infectious. The black knot of the plum and cherry is a good illustration, though a somewhat complex species of the black fungus. The fungus may be killed by certain poisons, or it may be stimulated to greater activity

by other means. Let us not forget that the fungus involved is a real plant which is at all times as subject to its environments as are the larger plants with which we are much more familiar. The disease on the other hand is a pathological condition of the affected tree, shrub or herb. The fungus is not the disease, but the agent which brings about the conditions of disease, and removal of it, will sometimes result in a restoration of normal, healthy condition, but in the great majority of cases, the diseased condition once established, the removal of the fungus can not restore health. It is almost impossible to find a remedy that will cure the disease caused by fungus. You may cut off the fungus and the remainder of the tree may be healthy. The knife is the only remedy.

Treatment.—Every parasitic fungus should be removed before it reaches its contagious period. The dead leaves and twigs killed by the fungi of the preceding summer should be burned during the fall and winter, lest they afford shelter to the resting fungi. There are many substances which are poisonous to different parts of the fungi, and which may be used in their destruction. Sulphur, and the many sulphuric compounds, are efficacious, if used in the case of those fungi which are upon the infant plants.

HOW FREEZING BENEFITS THE SOIL.

It is a well-known fact that water in the act of freezing, expands considerably, and with a force that is irresistible. It is the freezing of water in their crevices and pores that causes the rocks to be gradually worn down and "weathered," as it is called, into soil. It is this also which is continually reducing the soil to finer fragments, and which breaks up the hard clogs and mellows the ground. Fall plowing or spading assists this effect by breaking up the compact soil into lumps, which are further broken into small particles. As water and air can only act upon the surface of these particles, it is clear that the smaller they are, the more surface is exposed to the weather, and the soil is made soluble. If a block of hard soil of 12 inches cube is exposed to the weather, there are 864 square inches only of it affected; if it is broken up into cubes of one inch, 10,368 square inches are exposed to these beneficial influences; if the soil is further broken up into fragments of one-twelfth of an inch, there are more than 124,000 square inches thus affected. This fact shows how greatly the effects of frost benefits the soil, and therefore how necessary it is that the land should be fall plowed and opportunity given for this beneficial action of the weather. In the garden, even, all the soil possible should be spaded before it freezes.—*American Agriculturist.*

USES OF VEGETATION.

The proper function, or one of the right uses of all vegetation, is to produce food and clothing for us from the refuse matter of our large towns. Every little green leaf, apart from its individual beauty, has a share in the great work of purification which all leaves carry on. In malarious countries the blue or fever gum tree is now largely planted, because it grows rapidly, and its roots and leaves suck up moisture so quickly that a few of these trees actually drain any swamp or marsh near or in which they are planted. It is so with our own poplar trees, which in wet, low-lying places act most efficiently as the best of natural drains for a stagnant bit of marsh or land. Now, if you drain a swamp in the ordinary way you simply carry pollution from one place and deposit it in another place; but tree roots suck up offensive matter, and tree leaves actually purify it. The leaves throw off pure water by evaporation, and with it life-giving oxygen, instead of the poisoned gases of the atmosphere. What is true of large trees is in degree equally true of the smallest window plant. The highest mission of plants is not merely to please our eyes with color, our mouths with delicious fruits; not only do they do this and more, but they are ever silently but surely eating up what is impure and injurious to ourselves in the atmosphere and in the earth all around our homes; and any dwelling in which plants are well and healthily grown will be more likely to be a clean and healthy house than if the plants were not there.—*Ladies Floral Cabinet.*

DOUBLE STOCKS.

"Mrs. Theodosia, B. S.," San Buena Ventura, Cal., asks: "Will you kindly inform me through the columns of the *Gardeners' Monthly*, why pot-grown seeds of stocks are superior to those grown in the open ground?" Stocks grow to the greatest perfection here (where we never have frost) and seed well. I raise several varieties of seeds, in different colors. I have difficulty in disposing of them to florists, as they all wish pot-grown seeds. As the flowers of double stocks are barren, so they cannot be used in hybridizing. I cannot see why pot-grown seeds are superior to open ground seeds.

"Henderson says in his 'Hand-book of Plants:' All that is necessary to have plenty of double flowers in stocks is, to have seed from strong, vigorous single plants. I have found from experience that he is correct; nothing could be finer than our stocks from open ground seed. Yet it seems impossible to convince florists East of this.

"I will be greatly obliged if you will give me the desired information."

To answer our correspondent's questions clearly, we shall have to go over some scattered ground. It will require close attention; but the reader will be repaid by a full knowledge of the whole subject.

First, we must remember that plants do not flower at all until there has been some check to the vegetative force. If the tree grows very vigorously, we have to root prune it, or in some other way injure or check the growing force. We put this in another form of expression, and we say—the intensity of the reproductive or seed-bearing force is inversely with the plant's hold on life.

Secondly, we may remember that a flower is made up of metamorphosed leaves. The calyx is an organ, but little removed from a leaf; the corolla is formed from leaves still further advanced. Stamens are leaves, and pistils the organs more particularly related to reproduction, are leaves quite distinctly removed.

Thirdly, a double flower is one that has not advanced towards the reproductive stage further than to form petals, with perhaps a few stamens, and makes no seed.

We see from all, that a double flower is the product of a plant, or a portion of a plant, that has had its vegetative powers but slightly checked. This has been actually tested by experiment, by the present writer, and an account formed one of his earliest scientific papers, now getting on to near a half century ago. A large number of plants of the six-week stocks were taken, and a few seed-vessels from the first flowers, when the plant had barely passed its vegetative state were taken; and separately were taken seed from the last flowers on the secondary branches, and when the plant was about to die. The result was the production of nearly all double flowers in the first lot, and single flowers in the second.

We now sum up all in the following conclusion: High vegetative vigor is unfavorable to the production of single flowers.

Carrying this to the direct question of our correspondent, it will not matter so much whether plants are pot-grown or not, except in so far as this may aid or assist vegetative vigor. In some parts of the world first-class pot-culture would aid vegetative vigor, and then a good portion of double flowers would certainly result. And it is no doubt from this experience that florists have learned to look on pot-culture as the necessary means to a good strain of double flowers. Plants left to out-door chances, would be much more likely to have vegetative vigor impaired, and produce strains of single flowers.

But anyone can see that it is possible to feed well, and get a plant

to live vigorously in the open ground; and, on the other hand, to border on starvation in a pot under glass; and if this were the rule, the great run would be against and not in favor of pot grown plants.

No doubt, if this lady perseveres, she will be able to show that her out-door seed is just as good for double flowers as that raised under glass.

We have gone into the subject at some length here, because it concerns not only the production of double stocks, but also because the answer to her questions affects the whole range of practical horticulture.—*Gardener's Monthly.*

LARGE AND SMALL POTATOES FOR SEED.

The past season's experiences ought to solve the question as to whether small potatoes are as good as large ones for planting. The scarcity of potatoes last spring occasioned the planting of many small inferior tubers, and the resulting crops will convince many that there was little lost from using the small seed. At least this has been the result of my observations in this section. In my own experience small-sized potatoes of the Beauty of Hebron variety have produced a crop of excellent variety and size, but of small yield. The same is true with the Burbank variety planted later, both varieties yielding as fine tubers as I ever grew, the yield, however, being small. A circumstance has lately come under my observation, which has had considerable weight in my mind in deciding this question. A party came to me last spring after I had finished planting potatoes, and after I had sold all of my surplus seed with the exception of a bushel or so of my small potatoes, the culls from previous assorting, which averaged but little larger than a hickory nut in size. Seed being very scarce, the party referred to decided to take these small specimens, and although I freely expressed my belief that they were too small for seed, they were planted. The soil was favorable, being a clover and timothy sod, and somewhat to my surprise the yield and size of tubers is large for this season. I am decided in my own mind that the only advantage in large potatoes over small ones for seed, is in the extra amount of nourishment which the large potatoes afford the young plants during their earlier stages of growth. The difference is much less on rich than on poor soil, because on rich land the young potato plants require less early nourishment, and are better able to take care of themselves. For this reason I am not in favor of cutting potatoes to a few eyes, as recommended by some potato growers. Much better results will be secured, I believe, especially on light soil, by planting whole tubers and thinning out the stalks, leaving but two or four to a hill. In this

way the large stout tops are produced, which are better able to resist the effects of drouth or the depredations of insects, and usually such strong-growing tops (unless of over-size) will produce large potatoes and a desirable yield.—*Illinois Journal of Agriculture.*

GRAPES AS FOOD AND MEDICINE.

There is no fruit which can be grown with as much ease and certainty, annually, as the grape. It is not the first time we have said it, and in all probability it will not be the last. The same fruit which is the most valuable as food and medicine is also the one which gives the least trouble in cultivation. Why should we not be thoroughly enthusiastic on this subject and irrepressible in our often repeated advice: Plant a vine, and when you have planted one plant more.

The quantity of grapes, says Dr. Irving C. Ross, of Washington, D. C., that one may eat with impunity, is something astonishing. Persons at the European grape cures consume from three to six kilos (six to twelve pounds) daily. Grapes constitute a perfect nutriment, which includes in remarkable proportions the nitrogenous albuminoid and respiratory principles indispensable to a good alimentation. According to the analysis of a French chemist, a striking analogy exists between the juice of the grape and woman's milk. This chemist finds in 100 parts of each substance, as follows:

	Human milk.	Grape juice.
Albuminoid and nitrogenous matter	1.5	1.7
Sugar, gum, etc	11.0	12 to 20
Mineral substsnce	1.3	0.4
Water	86.0	75 to 84

Some of the affections which the grape may be used for as a reparative medicinal agent of great value are those arising from troubles in the digestive functions, diseases of the liver and spleen, suppression of the hemorrhoidal discharge, menstrual derangement, catarrh of the air passage and the state of general exhaustion that keeps up all troubles of the respiratory apparatus. The Doctor also says, that over-worked persons may derive from the vegetable milk of the luscious but inoffensive grape a rational means to re-establish the physiological conditions of clear thoughts and correct expression.

From all this it appears that there are great stimulating properties even in the unfermented juice of the grape; and as this is free from alcohol, all can take not only a little, but a good deal, "for their stomach's sake."

ARE LIVING PLANTS IN ROOMS HEALTHFUL?

The general impression seems to prevail that growing plants in the house are injurious to health, and we know of many instances where they have been turned out of doors simply because their influence on the atmosphere was considered deleterious. This conclusion seems very strange when we take into consideration the fact that but for vegetation we could not exist at all. The leaves of plants, trees and shrubs purify the atmosphere upon which we subsist, restoring it to its normal condition, rendering it healthy and salubrious when vitiated by the breath of animals. The plant feeds upon that in the atmosphere of the living-room that is injurious to us, and in return gives us an atmosphere adapted to our necessities. It is by no means uncommon to hear this objection raised against plants by him who is constantly poisoning the atmosphere with tobacco smoke. While we are confident the plant in the living room does far more good than harm, we are also confident that the moral influence the geranium exerts upon the household is far greater than that which evolves from an old pipe, or even the best Havana cigar.

STEAM HEATING.

I quote from Prof. Silliman, of Yale College, as follows:

"In passing into a state of vapor water absorbs nearly six times as much heat as is required to raise it from 32° to 212°. This increase of heat would render a solid body red hot by daylight and still the steam produced by it has only 212° of sensible heat. This quantity of heat is twenty and one-half times as much as an equal weight of air can contain and is consequently capable of heating to the same point twenty and one-half times its own weight. The thermometer indicates only 212° of heat in steam at the atmospheric pressure, and still it is susceptible of proof that the steam has really absorbed nearly six times as much heat in becoming vapor as the water from which it arose absorbs in passing from 32° to 212°. That the steam really contains this prodigious quantity of heat (essential to its condition as a vapor) we know is an established scientific fact, but it is stowed away, so to speak, in the steam, in a perfectly hidden and insensible manner, and hence it has been called *latent heat of steam*. But the instant the

steam is condensed by reconversion into water, this enormous quantity of heat is liberated and becomes sensible heat, available to warm the surrounding air, both by radiation and conduction, or by immediate contact. A careful study of the operation of this beautiful law will render clear the fact, so mysterious otherwise, that a comparatively small radiating surface heated by steam should prove sufficient to heat a large volume of air without at any time *itself* passing the limit of 212°. The latent heat of steam is 1728°. S. F. T.

FORESTRY.

RAPID GROWTH OF THE SOUTHERN YELLOW PINE.

We have always maintained that the newspaper dread of a timber famine comes from ignorance of American forest trees, and from a study only of English forest literature. In that country trees grow slowly; in our country they grow rapidly. As soon as there is the slightest chance of a scarcity here, and that there is a profit in its growth, forests will be planted, and we can soon get all we want. The *Florida Dispatch* tells us that in good southern pine lands so great is the growth of *Pinus palustris*, that in twenty-five years it is large enough to cut for timber. Instead of legislation to preserve old rotten forrests, it will be to the profit of the nation to encourage the clearing as rapidly as possible, so that new planting may take their place.

Dr. W. Thornton Parker, in the *Sanitarian*, puts the case in a very sensible way, and we quote parts of an article which is very readable to the end.

He says: "For many years our people have given considerable attention to this subject of forest culture, but instead of exercising their influence in the direction of forest culture and protection where it is most needed, many seem to content themselves with planting as many trees as possible in our parks and streets and on their private grounds in our cities and towns. This love for the beauty of foliage has often been too extravagantly bestowed, and the societies formed for the planting are not always under the direction of the wisest, and the planting, from a sanitary point of view, has not yet received much attention. To plant as many trees as possible seems to be the only

rule, and this is limited only by the means of the planter and the amount of land at his disposal.

"Where the grounds about our country houses are extensive the luxury of shade trees can be indulged in; but healthy shade without perfect ventilation and circulation of air is impossible. The soil, to be fit for man to live on, must have the rays of the sun to bathe it and the fresh warm air to come in contact with it. A soil damp and overshaded to such an extent that the sun never reaches it, is unfit for a play ground for our children or a retreat for adults; indeed, such a place is a veritable death trap for many infants and weakly persons, both in summer and in winter.

"Houses overshaded are not healthful, and too many trees near sleeping and living rooms exercise a very injurious influence. It would seem as if these truths must be too well known to need any statement, but a journey through many of our towns the past summer and careful investigation have convinced me that this undesirable condition of things is only too common, and has become a positive injury in almost every direction."

THE EFFECT PRODUCED BY FORESTS ON SPRINGS AND RIVERS.

Hon. Cassius M. Clay said before the American Forestry Congress, at Cincinnati: I move in the sphere of experience with more certainty. I remember when the forests were hardly broken here that springs of water were very frequent and perrennial. The rivulets and creeks and rivers had a perpetual flow. These have now changed. The rivulets and creeks are now dried up in summer, and the fish so often caught by me in earlier years are gone. Not one spring in a thousand remains. Indian corn was generally planted in March, and the rains and exhalations of moisture from the surroundings made crops successful every year. Now the destruction of the forests has lost to us that bed of leaves which was a perpetual reservoir of water for springs and evaporation, aided by the treading of the hard surface, the rainfall, if the same as of old, rushes off at once, sweeping the soil into the Mississippi delta. The dry winds absorb not only the ancient humidity of the air, but drink up the subsoil evaporation, so that our winters are longer, more changeable and unendurable.. Corn can hardly be safely planted till late in April, and drouth too often ruins all, in spite of our best efforts.

Dr. J. D. Hooper, of the Royal Key Gardens, says: The presence of forests plays a most important part in storing the rainfall and yielding up gradually to the streams a continuous supply of water. Moreover, the rain is retained by forests on the surface of the ground; it

gradually permeates to the subsoil, and so feeds the underground water-bearing strata upon which springs and wells must eventually depend.

Dr. Marsh in his writing "The Earth as Modified by Man," says: The protection afforded by the forests against the escape of moisture from its soil by superficial flow and evaporation, insures the permanence and regularity of natural springs, not only within the limits of the woods, but at some distance beyond its borders, and thus contributes to the supply of an element essential to both animal and vegetable life. As the forests are destroyed, the springs that flowed from the woods, and, consequently, the greater water courses fed by them, diminish both in number and volume. My own recollection suggests to me many instances of this sort; and I remember one case where a small mountain spring, which disappeared soon after the clearing of the ground where it rose, was recovered about twenty years ago by simply allowing the bushes and young trees to grow upon a rocky knoll, not more than an acre in extent, immediately above the spring. The ground was hardly shaded before the water reappeared, and it has continued to flow without interruption. The hills of the Atlantic States formerly abounded in springs and brooks; but in many parts of these States, which were cleared a generation or two ago, the hill pastures now suffer severely from drought, and in dry seasons furnish to cattle neither grass nor water.

THE AMERICAN FORESTRY CONGRESS.

The American Forestry Congress held its fourth annual meeting in Boston, Mass., September 22, 23 and 24, and at it an unusually large amount of practical information was brought together from all parts of the country. This association is growing more and more in importance, and its main object is to stir up public sentiment in regard to the more economical use of our timber resources, and while it advocates the preservation and improvement of the woods covering our mountains and hillsides, it advises the planting of trees on waste and barren places in the eastern and in the treeless regions of the western States. That the importance of its aims begins to be quite fully appreciated at large, might be inferred from the fact that each of the New England States had sent officially appointed delegates; while Canada, Ohio, and Nebraska sent representatives, and even California did not think a journey of 6,000 miles too much for her delegate to this convention.

Nobody can be, or ought to be, more directly interested in this question than the farmers, who are in many respects dependent for success on the preservation and proper distribution of forests over the

hill-sides, for these break the force of, and temper the cold winds injurious to the farm crops; they induce and in some localities perhaps increase the rainfall, and at all events equalize the water flow in springs; and yet how often, when the farmer could have a wood lot growing up from the sprouts, are the cattle allowed to roam in it and destroy the young trees; and how many worthless and worn-out lands are there on our farms, where crops do not pay, and trees would be a valuable addition.

The Commissioner of Agriculture, Hon. Norman J. Colman, manifested great interest in the discussions, and in his address said that, according to his experience in planting trees, if the soil is properly prepared, nothing was more sure to grow. Other speakers related their experience in raising profitable crops of trees on almost worthless land. An interesting paper on the time of planting evergreens was read by Mr. C. W. Strong, a well known nurseryman. The planting of evergreens has always been held to be practicable during the month of May, but Mr. Strong was sure that August was a much better time for transplanting them. The wood is then hardened, the earth is warm throughout, and danger from frosts during the night is not to be feared. He had transplanted many evergreens from a low soil to the north side of a hill with perfect success, and considered the question of August planting settled beyond cavil.

The cultivation of the Osier Willow and the Red Cedar was recommended by Mr. Hersey, of Massachusetts, after an experience of forty-five years. It does not require 100 years to grow cedar to maturity, as is generally supposed. His trees at thirty to forty years of age were worth one dollar each for fence posts, which he maintained was a good investment on land worth $10 per acre, the price his poor gravelly loam would bring. The Osier Willow requires a warmer soil; the sand of the river bottoms, subject to occasional overflow, is the best. Planting may be started from cuttings as well as from roots. The first crop is of no use; but the second year the willows grow from five to seven feet, surpassing all imported willows. A clear profit for basket work willows of $60 per acre yearly may be attained. This figure seems to have been largely exceeded by a willow farmer in Georgia, who has set out some 80,000 plants, and claims a profit of $200 per acre. When we consider that the importation of prepared willows and willow-ware into this country amounts to more than $200,000 worth every year, this would seem a profitable field for many a farmer, who has the proper soil at his disposal. The outlay necessary is not great and the returns come in soon and steadily every year.

A paper of particular interest to agriculturists was read by the secretary of the association, Mr. Fernow. He stated that attempts were being made in Germany not only to put sawdust in proper shape for shipment, but to grind up the brushwood for bedding and manuring purposes. He showed that while the wood litter was for its physical properties preferable to straw in the stable, experiments had shown that in the field as manure it was by no means inferior, in its action, to regular barnyard manure, and the feeding value of straw far surpassed its value for bedding and manuring. If such materials could be cheaply prepared and baled, many of the lumberman's difficulties might be avoided, and a great benefit provided for agriculture.

The magnitude of the subject of forestry and the many interesting sides to the question, were made evident by a large number of valuable, practical papers on a great variety of topics, presented at this meeting; and when we hear that the products of the forest in one year are worth $800,000,000—more than ten times the value of all the gold and silver dug from our mines, and a good deal more than that of all our coal and metals of every sort—that not even the vast corn crop equals this amount, and that no other is in such danger of permanent exhaustion, we must admit that, from a mere economic standpoint—to say nothing of any indirect beneficial influences of forest preservation—the matter of proper management of these resources is of national importance.

After the sessions, which lasted the better part of three days, a practical illustration of the teachings of the Congress was furnished by an excursion to the plantation of Mr. Jas. S. Fay, at Wood's Holl on the coast of Massachusetts. Worthless and barren, worn-out pastures on this gravelly soil had been seeded in the most primitive manner by sowing on the snow without any preparation of the soil whatever, and a dense, excellent growth of Scotch pine, from twenty to thirty years old on over 150 acres, was the results, which a European forester present pronounced most remarkable under the unfavorable conditions. That forest planting on land worth $10 per acre could yield a profitable crop was demonstrated here by an experiment of no mean dimensions.

If every farmer who has such barren, unsightly places would spend a little thought, a little work and a small outlay of money on them, he would soon be repaid in money as well as in the enjoyment which a clump of thrifty trees planted by himself and yielding shade to his cattle and shelter to his crops would afford.

It is to be hoped the report of the American Forestry Congress will be printed, and made accessible to our thinking farmers, who but

for an absence of correct information, would long since have paid that attention to tree forests which they deserve.

The secretary of the association, Mr. Fernow, is a trained forester, and always ready to give information to those who apply to him at 13 Burling Slip, New York.—"*Forester*," *in Rural New Yorker.*

PREPARE THE GROUND FOR YOUR GROVES.

The Iowa *Homestead* has these remarks which may be applicable to other localities as well:

Every year we hear farmers wishing for a more southerly climate, where the winters would be shorter and the cold less severe. They do not seem to reflect that a hundred miles south means a damper atmosphere and a cold, by reason of the dampness, practically as severe both on man and beast. But it is in the power of any farmer to have the temperature of one hundred miles south without its dampness, by surrounding his buildings with a dense grove of trees. We are amazed at our own folly and blindness in not seeing this years ago.

We had groves, of course, but they looked to the protection of the house and ornament rather than utility. It was only the experince of the absolute waste of feed in fighting zero and blizzards that brought us to see the necessity of protection to the dumb beasts who could not plead their own cause.

We mention this because farmers who wish to plant groves next spring should prepare the ground this fall. They should plow for broad belts, should make selection of their varieties, should find out where they could be had at best advantage and thus get ready for the important work of planting in the spring.

WHAT TO PLANT.

Anything, we reply, rather than nothing. Soft maple and cottonwood beat nothing a long way, but we would not advise bothering with them. Several distinct objects may be in view. One is protection from storms, another ornament, still another, the future value of timber for posts, ties or lumber.

For a temporary protection to feed lots in the shape of a wind-break, we know of nothing better than Russian Mulberry. It is hardy and grows rapidly and close.

For a permanent wind-break there is nothing like the evergreens. American or white pine is grand, but will not endure the tramping of stock. Scotch pine will, but is more straggling in its growth.

A Russian mulberry hedge, with an evergreen belt north of it and twenty feet at least distant, the mulberry to be cut away when not needed, will protect any stockyard and repay the expense many fold.

In any selection of trees for ornament or forest planting, the white ash should not be forgotten. It is hardy, easily cultivated and beautiful. We are so far greatly pleased with the Catalpa. We cannot pass any of our groves without stopping to admire, and notice travelers all turn their heads to that side of the road.

They will grow on the slightest provocation. Planted in rows, five feet apart, they will in two years shade the ground completely and smother out weeds in three.

As to their value for posts, we can only rely on what others tell us, with an uncertain allowance to be made against any timber growing on prairie soil.

The poplars and willows brought from Russia by Prof. Budd are full of promise. They grow as easily as Catalpas and grow readily from cuttings. The laurel-leaved willow, *salix lauri-folia*, is the most beautiful of all willows and should have a place on every lawn and in every grove.

But by all means plant groves if you would give comfort to your family, beauty to the landscape, value to your farm, thrift to your stock and dollars to your bank account.

A grove of valuable trees is a monument to your memory more durable than marble.

STONE FRUITS.

A PEACH TREE ENEMY.

The Elm-bark Beetle, *Phlœotribus liminaris*, which formerly confined its devastations to the elm principally, to-day attacks also fruit trees, especially peaches and cherries, and causes considerably more injury than is generally supposed. I noticed lately a small peach orchard, every tree of which was infested, and the stems thickly covered with gum, while the previous year all were healthy and bore a crop of fine fruit. It has been stated that these insects attack only

sickly and dying trees, but I have positive proof that this is a mistake, as they have killed three year old cherries, plums and peaches that presented a most luxuriant growth and healthy general appearance.

The full grown insect, a minute cylindrical beetle about one-tenth of an inch long and one-thirteenth of an inch in diameter, issues from the bark the latter part of August through holes so small as to be nearly imperceptible, over which the cuticle closes after the insect's exit. The beetles continue to appear on the surface until freezing weather. In about four days after their appearance, they bore a hole back through the bark, the full size of the perfect insect. All the material they thus remove passes through them, their castings being merely the borings, yet it is not for the purpose of obtaining food that they gnaw these apertures, but to provide a place in which to deposit their eggs, and also to furnish a receptacle for their dead bodies.

After the female insect has deposited her eggs in the bottom of this hole, into which she fits so snugly that it is difficult to extract their bodies, she dies, forming a perfect shield for the eggs. As no traces whatever of the dead insects are discoverable the following season, I am led to the conclusion that their bodies serve as the first food for the young larvæ.

On the approach of warm weather the following spring, the eggs hatch; the larvæ begin to feed on the alburnum, and radiate in jogged lines in all directions from their breeding place for about an inch in circumference. They are so numerous under the bark that they undermine it completely. But the insects and the holes in the bark are so small as to escape attention until the mischief is done and the tree dies, yet the jets of gum on the surface are plainly visible and cannot escape the attention of the observer.

As a remedy, carbolic soap and diluted potash, used alternately, have given satisfactory results. They should be applied to the trees in April, and again in August and September. A. J. Caywood.

WESTERN PEACHES.

The peach tree in the West has had a hard time of it, and to a large extent has given up the ghost. In Michigan, as is well known, the yellows played havoc with the orchards, encouraged by the mistaken policy of not giving a heroic treatment at once and destroying the trees as rapidly as the disease made its appearance. But the Michigan peach growers finally got down to business, encouraged by the laws of the State—if the word encouragement may be permitted

in this connection—and now the State will soon be growing peaches again with its old time energy. At least the growing trees promise well. The Missouri Horticultural Society sends out a report under date of August 22d, in which it announces that the peach trees are in very poor condition. In the northern half of the State one-half of the trees are reported dead, and the other half as badly injured. In the southern part of the State, however, the crop is good.

The unfortunate experience which many of our peach growers have had will doubtless cause them, or many of them, to shun peach growing in the future. But we assume our old position in such matters which is this: Success does not invariably attend any branch of horticulture or other farm pursuit. This is a world of cloud as well as of sunshine. Cholera kills our hogs; disease thins our herds of cattle; storms and grasshoppers destroy our crops, and winters kill our trees. But we average pretty well in any branch of farm industry, that is as well in one, as a rule, as we do in another. The growing of fruits is in its infancy, but in this section of the country we have overcome some of the formidable difficulties, but there are difficulties yet to be overcome. But we shall succeed. Our western people are not made of stuff that permits difficulties to thwart it. We shall yet be able to get rid of everything but hardy varieties, and every branch of fruit culture will be a paying industry.— *Western Rural.*

WILD GOOSE PLUM.

The general failure of this plum at the East (and elsewhere) is its want of productiveness. A. H. Gaston of Illinois, writes to the *Prairie Farmer* that he has discovered that the flower is imperfect, and needs fertilizing by some other wild variety growing near it. He sold a tree to a purchaser 15 years ago, who set it in an open space in a wild plum thicket. It has borne good crops for ten successive years, and this year produced 200 quarts (six bushels), which sold for ten cents a quart, or $20 for the crop. We give this statement for what it is worth, and if there is no error about it, it will be worth much. Although the wild goose plum is not of high quality, its very handsome appearance, and ripening, as it does at the North, early in August, render it a desirable market sort if heavy crops can be had from the tree.—*Country Gentleman.*

THE ROBINSON PLUM.

The Robinson plum is one of the most promising of the new varieties now before the public. It is a seedling originated in Putnam county, Ind., from seed brought by Mr. Picket from North Carolina

nearly 50 years ago. It was first introduced to public notice six years ago, when Dr. J. H. Robinson, in a paper read before the Putnam County Horticultural Society, described the variety, highly praising its merits. It was named after Dr. Robinson by this society. J. W. Ragan, in his report to the Indiana Horticultural Society, 1881, says: "The Robinson bore one-third crop of good smooth plums, 12 trees yielding more than 25 bushels. Fruit slightly oblong, nearly round, with an indistinct suture; color, a pretty marbled red on a yellowish ground; flesh, when fairly ripe, very fine, almost sweet; juicy; when cooked it is one of the best (having almost no trace of that bitter astringency of some of the Chickasaw varieties), and very rich. This is from experience. A fine canning plum; seed very small.

ROLLING STONE PLUM.

J. S. Harris, of Minnesota, stated at a meeting of the Wisconsin Horticultural Society, that a native plum called the Rolling Stone, had been introduced by O. M. Lord, of Minnesota City, the fruit keeping nine days after picking, while the skin peels as easily as that of a tomato for table use or for canning. It has something of the flavor of prunes. The original tree, twenty years old, is in good condition and bears well. It is not probable that the quality would suit eastern cultivators, but the plum may be valuable in the Northwest, where it would endure the cold winters.—*Country Gentleman.*

A HARDY PEACH.

The Kilbourn or Canada Iron Clad is probably the hardiest good peach known. For an early large peach, almost equal to the Early Crawford and but a few days later, we have found the Wager to be a marvel of productiveness and hardiness. But we would advise all who wish to try it to rely on budded trees rather than on seedlings. This "reproduction from the seed" has proved to us a rather uncertain business.

THE YELLOWS.

"Dying with the yellows," said the individual in the seat next to me as he pointed to a peach orchard, near which our train was passing rapidly. "Dying with the yellows," exclaims the grower, when he sees the leaves of the trees turn to that color. "Dying with the yellows." You hear it wherever peaches are grown and see it in every paper which publishes fruit reports. It is an ever ready excuse and a handy

reason. But what is it? Nothing but genuine, unadulterated starvation. The seat of the disease is in the soil, not in the tree, and should be treated accordingly, so remarks a contemporary.—*Western Rural.*

The peach-growing centre is gradually moving south. A few years ago there were great orchards in New Jersey. Then Delaware was the chief producer. Now Maryland and Virginia are coming to the front. The largest peach farms are in Maryland. The Round Top Farm has 125,000 peach trees. On the estate of Col. Watkins there are 120,000 trees. A peach tree's usefulness is over after ten or twelve years of life, and the soil in which it grows is unfit for peach culture.

LIST OF PEACHES.

An extensive grower of peaches for market in Michigan, who aims to secure a regular succession of ripe fruit from near midsummer till frost, gives the following list: Alexander, Mountain Rose, Early Crawford, Foster, Wager, Late Crawford, Oldmixon, Smock and Hill's Chili.

CANNING, ETC.

CIDER MAKING.

Fresh pure cider is a wholesome and delightful drink, but there is very little made that is pure and free from the taint of rot and filth. The cider miller, though by no means without blame, may be less so than his customers, who often take apples to mill, which, from the fact of their having been in contact with manure, a cow would not eat unless under the pressure of starvation. To make cider, fit to be used as a beverage, all but sound apples should be rejected. As long as these mills are almost always situated near a running stream of water, it must be considered, should the apples be dirty, a great sin of omission to crush the fruit without previous and thorough washing.

To make a really good champagne cider the freshly expressed juice should be filtered to free it from solid matter. Cleanly washed sand and animal charcoal are the best for a filter, though clean cotton may do. Clean casks are indispensable. The cask should be thoroughly soaked, if possible, by letting a steady stream of clean water run into

it (keeping it full all the time) for a number of days, or washing with water and lye. Fumigate with sulphur. Casks which have contained spirits are very good.

Put a faucet into the cask, fill it full of juice, and place it in a cool cellar. Then put in the bung, but leave a small opening for the escape of the gas produced in the process of fermentation, and bung up perfectly tight before fermentation has fully ceased. The cask should now be left undisturbed until spring, in fact, the longer the better. There is no need of bottling cider thus made. Draw from the cask, and if necessary, admit air by the small aperture on top, but never more than absolutely needed to allow the escape of the fluid through the faucet when open.

To keep apple juice through the winter in an uncured (unfermented) state, add one pound of whole mustard seed to the barrel. One ounce of salicylic acid, which is often recommended, will effectually stop all tendency to fermentation, but being injurious, should never be used; while mustard seed is perfectly harmless.

A HOME MADE FRUIT DRYER.

While on a visit to the farm of Mr. J. D. Ellis, Polk county, Oregon, a representative of this paper saw a very good fruit dryer that had been built on the place by the proprietor at a cost of about ten dollars.

This one was made entirely of rough lumber, and answers the purpose admirably, though if it were of matched lumber it would no doubt economize much heat and save considerable fuel.

In dimensions it was about eight feet square and the walls ten feet high, put up in box fashion and rested upon the ground without floor, with battens over the cracks on the outside, roofed with shakes and had no ceiling overhead. Cleats were nailed horizontally up the wall upon which rested other strips of lumber, this forming racks to hold the trays, which were also made of lumber. A common box stove about two feet in length to which was fitted a T joint from which an endless link of common six-inch stovepipe formed along each of the four sides of the building in a horizontal position. At the further side from the stove another T joint sent the pipe through the wall and by an elbow and other joints carried the smoke above the roof and so formed a splendid draft to the stove.

A thermometer is kept on the inside, and to regulate the heat to the proper temperature a box with slatted sides and a trap door placed in the top of the roof forms a ventilator. If a structure on this plan were made of dry matched lumber its cost would be nominal, and with intelligent management would prove, as even this one does, a great

economizer of fruit in a much better state than by the old sun-drying practice, and a source of considerable profit on a farm with an orchard. During weather or periods when other work could not be done, this would furnish easy and profitable employment to the men folk.—*Northwestern Farmer.*

A CHEAP FRUIT DRIER.

The *Farmer's Call* has the following proposition for a cheap fruit drier: Suppose a small octagonal building, not over six or seven feet across, and of a convenient height. In the center, on the floor, a common box stove, or a cook stove would answer. Over this, on a frame support, best made of a bar of iron, set an octagon shaft, to turn in a socket. Into this shaft have a proper number of arms mortised, reaching outward horizontally. On these arms stretch cheap cloth, or other suitable material, for shelves for the fruit. On one or more sides a series of sliding windows may be arranged, at which the operator or operators can stand outside and arrange the fruit, the shaft being revolved for that purpose. Other requirements can easily be imagined. We believe that for twenty or thirty dollars an evaporator can be built on such a plan, that would be just as good and far cheaper than most of the costly concerns in use; and any carpenter with brains could build it.

CANNING.

Recently the statement has been published that fruit had been successfully preserved by simply heating it to boiling and then tying cotton batting over the mouth of the jar; but this process has naturally been looked upon with suspicion by house-keepers, who have learned by sad experience the fatal effect of the admission of a very little air to a can of fruit. At the Kansas Agricultural College, however, this method has been put to the test of careful experiment by Mrs. Kedzie, teacher of household economy and hygiene, who reports, through the *Industrialist*, that it has been a perfect success. She says:

"In the college kitchen laboratory, experiments were tried with five kinds of fruit, including tomatoes, and the results were perfectly satisfactory in every case, not even a particle of mould forming in the can. In most cases the cotton was simply tied over the canful of hot fruit; in some cases there was a piece of white paper put on first to prevent the cotton from dropping down and becoming juice-soaked. This seems to be the preferable way. The cotton is taken just as it

comes off the roll, the thickness being about as it unwinds, and it is tied down with strong twine.

"If this should be as successful with all fruit canners as here, there is no longer need for patent fruit cans; for any bottle with a wide neck suitable to receive the fruit, or any jar with glazing which is perfect, to allow no entrance of air through its walls, will be all-sufficient for keeping the fruit for winter use."

ORCHARDS.

LARGE OR SMALL APPLES.

A tree bearing five barrels of small apples, would have to furnish plant-food for twenty-six thousand two hundred and fifty seeds, while the tree bearing ten barrels of large apples has to furnish plant-food for only fifteen thousand two hundred seeds, and a relative proportion for core and skins. The five barrel apple tree bears three thousand seven hundred and fifty apples. The ten barrel apple tree bears one thousand eight hundred apples. The five barrels of small apples, after deducting the cost of picking and marketing, would not bring in more than two dollars. The ten barrels would afford a net profit of not less than ten dollars, and frequently twenty dollars. It is clear, that instead of a tree bearing three thousand seven hundred and fifty apples, we want a tree bearing one thousand eight hundred apples. How can we bring about the change? Taking off half the fruit would do it. I have tried this plan. But before it can become general in our large orchards, we shall have to have a new generation of farm men. As a rule, anything which checks the growth of an apple tree, throws it into excessive bearing. It would seem, therefore, that the true plan is to adopt some method of increasing the vigor of the trees, such as pruning, fallowing and manuring.—*American Agriculturist.*

THE SWEET PARADISE.

Apples are considered to be more nourishing than potatoes, which require other food with them to render them satisfying to bodily needs. Apples are medicinal, too; a noted physician used to say that he used

no medicine himself but apples and abstinence whenever he felt out of sorts. Sweet apples are more nutritive and more grateful to a tender stomach than sour, and comparatively few know how excellent many sorts are, cut, sliced and baked. Baking imparts a much better flavor than stewing. Some years ago I planted an avenue line with that exceptionally erect and handsome grower, the Winter Sweet Paradise—a sort which carries its heavy and regular crops well in the interior of its stately head, and so it is not bent out of shape by the weight. I began to think I had too much fruit of that particular sort, but find them so good, after being an hour in the oven, that I value them more than ever, and I can readily sell any superabundance in this region of mines and works. G.

TYRONE, Penn.

SOIL AND FRUIT.

It is thought by some experienced fruit growers that the kind of soil has much to do with the quality of the fruit, and especially with the keeping qualities of apples. This may be true, and in selecting sites for the orchard this should be kept in mind, and the selection made with reference to the production of the finest fruit.

As a nurseryman and orchardist of long experience, I have been often disappointed in trying to get specimens quickly by top-grafting on old trees. Not always, but generally, I have got specimens from the young trees quite as soon as from the grafts. But I have found exceptions enough to show how the belief has come about. If we top-graft a variety that is late in coming to bearing when root-grafted or budded on small seedlings, and do this top-grafting upon a variety that ripens up its wood and stops growing quite early in the season, the scion will be forced into the same habit, since it must stop growing when the sap stops coming. Even this cannot be said without a little qualification, because the leaves of a late growing scion on an early maturing tree will keep green longer than the rest of the tree. But as poor Josh Billings said of laziness, that there is no cure for it, yet a second wife will hurry it a little, so a scion on such a tree will be checked enough to form fruit buds quicker than on a tree maturing later. Thus I find that the late-bearing Prolific Sweeting bears much earlier top grafted on the Tetofsky, but I am sure that the Tetofsky top-grafted on a Prolific Sweeting would not bear so soon as a root-grafted Tetofsky.

Here, I think, is the source of error in this matter. When people have grafted a late bearing and late growing scion on to an early ma-

turing sort (I mean that matures its wood early) they have got fruit earlier than on the young trees and they have hastily concluded that such is the universal rule.—T. H. HOSKINS, Newport, Vt., in *N. E. Homestead.*

In the summer of 1884, in company with another, I made excursion here and there in Champaign county to see for himself the condition of orchards, and to note on what soils and in what situations apple and pear trees were most vigorous and fruitful. One of these was down the east bank of the Salt Fork of the Vermillion of the Wabash. This country was settled between fifty and sixty years ago, the emigrants coming from Ohio and Indiana, and taking up lands on the edges of the timber. Here, orchards were planted, and in one of the oldest I observed three or four apple trees remarkable for their size and vigor, and laden with fair, smooth, and for the quantity on the limbs, large-sized fruit. Curiosity being excited, a closer inspection was made, and it was found that each one of these trees had one or more hog-wallows under it of greater or less size. The site of the orchard was originally moist, if not wet, and close alongside it, and on the creek's banks, many of the gigantic burr oaks, blackwalnuts, blueashes and other noble timber trees of the primeval forest growth, were still standing. On this occasion I remember I asked myself the question: If the largest and most valuable of our timber trees grow best in a soil wet six months in the year, and moist twelve, why not the apple?—*B. F. S. in Country Gentleman.*

HOW TO USE CRAB APPLES.

J. C. Plumb, writing in the *Western Farmer*, says:

As this fruit is universally plenty and fine this year, while in many sections the larger apples are very scarce, it is well to know some of the many ways of making the Siberian family useful. The sweet and subacid varieties are valuable for eating out of hand, for baking and sweet pickles, and for these purposes alone find a ready market at the prices of the best apples. But the common acid varieties, from the Transcendent down to the Soulard, and the native crab of the woods, have their uses, the most common of which are:

Apple Jelly.—Stew until well cooked with water only sufficient to cover the fruit, drain and press gently through a double cheese-cloth; sugar equal to juice, "pound for pound;" boil twenty minutes; skim twice, and it is ready for the glass or crock. If glass is used they should be taken from hot water. When cold lay a white paper on the jell, and tie another over the top of the crock. Less sugar may be used.

but it will require more boiling. If the juice be poor the jelly will be thin and cooking makes it dark colored; so for a very nice article only the best material should be used.

Canned Apples.—Prepare as before, being careful to have all perfect fruit; sweeten to taste and seal up as other fruit. The new way is to put in any sweet earthen jar. Lay a clean paper on the fruit and over all tie a double fold of cotton batting. The same care must be used in having the fruit hot as in ordinary canning. We found this entirely successful last year. Keep in cool cellar until wanted in winter.

Marmalade.—When the fruit is cooked, as before, press the pulp through a colander, add one-half pound of sugar to a pound of apple, and put down with the batten covering.

Spiced Apples.—Is made the same way, with the addition of spices to suit the taste.

Sweet Pickles.—Steam the fruit until a fork is easily pushed through it, being careful not to overdo them; jar with a pickle as follows: For each ten pounds use three pounds of sugar, one quart of vinegar, two ounces of cinnamon, two ounces of cloves. Boil and pour over the apples while hot.

In all the above work, we consider the best granulated sugar the cheapest.

Dried Apples.—We are this year trying the northern plan of drying our Transcendents by punching out the core with a tin tube one-half inch in diameter, and stringing and hanging in the hot-box over the stove. With good sound fruit this is quickly prepared, and when only well wilted can be safely kept by packing in clean crocks or tubs with the air excluded with the cotton batting. We expect to have the finest grade of dried fruit we have ever used. The skin of nearly the entire Siberian family is so thin that it is not in the way when the fruit is cooked for use, and even this year there are enough of them to fill a large gap in the loss of the apple crop.

RENOVATING AN OLD ORCHARD.

F. K., Richmond, Ind., asks: "What is the best thing to do with an old orchard? I had it all trimmed up nicely, but it fails to bear fruit. The trees appear very healthy, and look as though they ought to bear heavily. The orchard is in grass, and has been for several years."

Reply:—The best thing will be to plow the grass under next spring, cultivate in beans or potatoes through the summer, give it a good dressing of stable manure next winter (1886-7), and seed down to

clover in 1887. If you are not willing to plow it up, give it twenty tons per acre of good stable manure this winter, and half as much annually every winter hereafter. In this case the manure should be spread with a brush harrow or smoothing harrow.—*Farm and Fireside.*

SOIL FOR APPLE ORCHARDS.

The statement that orchards succeed best on low and moist land in some places at the west, appears to apply only to certain localities. Secretary Rockwell, of Warsaw Horticultural Society (Ill.), says that the trees on dry upland have done best in that region, and that orchards which presented a compromising appearance after the last intensely cold winter, afterward recovered more completely than was expected, with a promising crop. He writes to the Prairie Farmer that on good land with thorough cultivation, trees are vigorous and thrifty; on poor land there were many dead and dying trees. A remarkably flourishing orchard in that neighborhood, of 400 trees, has received good cultivation, and the trees are examined every year for borers.

CLOVER FOR ORCHARDS.

J. A. Fetters gave an account of his orchard management to a meeting of the Ohio Horticultural Society. The orchard has been twenty years in bearing, and the trees are as thrifty as ten years ago. It is kept mostly in clover, occasionally breaking it up and sowing again to clover. The hogs are kept in the orchard all the time, but when the fruit is ripening they are driven to closed quarters every night, and in the morning before turning them out again the apples are gathered which have fallen. From sixty trees, six hundred bushels were gathered. It is well to bear in mind that clover would be detrimental to the success of the orchard if manufactured into hay and drawn from the ground yearly; while with a sufficient number of swine to keep it eaten down, the clover and swine together would keep the orchard in fine condition. On land not naturally rich, an additional top dressing with manure would be important.

WOOD ASHES FOR FERTILIZING ORCHARDS.

A lady of Seneca Falls, N. Y., inquires how to use wood ashes for fertilizing an orchard; in what quantities, and at what season of the year.

When wood ashes are spoken of as a fertilizer we very naturally have our thoughts mainly upon the potash they contain, and regard

them as a special fertilizer, but they contain all the mineral ingredients of plant foods. Few commercial fertilizers have as large a percentage of phosphoric acid as hard wood ashes. Here is an analysis of the ashes of oak wood: One hundred pounds of the ashes contained, potash, 10 lbs.; soda, 3.6 lbs.; magnesia, 4.8 lbs.; lime, 73.5 lbs.; phosphoric acid, 5.5 lbs.; sulphuric acid, 1.4 lbs.; chlorine, 0.2 lbs.; silica, 1.1 lbs. Some of these ingredients are contained in compounds difficult of solution. If treated, as manufacturers of superphosphates treat bones, with sulphuric acid, the effect of ashes on crops would be much more rapid than if applied as they come from the fire. But that is taking more trouble than farmers and orchardists can be expected to take, and the crude ashes may be used with very good ultimate effects.

An application of anywhere from 100 to 200 pounds of the ashes to an acre would afford a fair supply of the potash and phosphoric acid, the most valuable ingredients. It would require a very heavy dressing of barnyard manure to furnish as much of those minerals as would 100 pounds of ashes. The barnyard manure would supply more nitrogen, but the wood ashes would furnish much larger proportions of phosphoric acid and potash.

As to the season of the year, we would apply them whenever we had them, as soon as possible. Fall or winter, when the ground is bare, is a good time. Phosphoric acid and potash will not leach through the soil and waste, like nitrogen, but will be slow in dissolving. If ashes are to be applied without treatment by sulphuric acid, the sooner they can be brought in contact with the solvents contained in the soil, nature's great laboratory, the better.

As to how to use them, the most direct and economical way is to scatter them directly over the roots that absorb the food to supply the growing trees and fruit. In an orchard of bearing age there will not be many feeding roots or rootlets near the bases of the trees. The greater part would be found near the extremities of the branches, extending a short distance beyond. We think if such special manures could be spread upon a strip, beginning about two-thirds of the distance from the bases of the trees to the extremities of the branches, and extending about half as far beyond the extremities of the branches as the space occupied under them, they would be applied where they would do the most good. There would be but little use in applying them near the body of the tree, where there are few except old, large roots, or far beyond the uttermost extent of the branches where the feeding roots will not reach for years to come. We think that barnyard manure, spread over the area named above, would do the apple trees much more good than the same amount spread over the entire surface of the ground.—*American Rural Home.*

NOTES ON PEARS.

The list of really valuable pears is much shorter than our nurserymen would have us think, although some of the catalogues are epitomes of reliable information; among others, that of Ellwanger & Barry I always refer to as authority, as I do to Campbell's on grapes. These catalogues, when trustworthy, are the most valuable of all helps to the amateur growers.

From experience with most of the leading varieties, I should now plant the following for a general home orchard: For summer: Bartlett, Clapp, Petite Marguerite, Tyson. For autumn: Belle Lucrative, Burre Superfin, Duchesse. Howell, Seckel, Sheldon, Onondaga, Anjou, Clairgeau. For winter: Lawrence, Jones, Winter Nelis and Josephine de Malines. To this list five or six others might be added that would be generally quite as satisfactory. REV. E. P. POWELL.

PEAR BLIGHT.

Prof. Arthur does not tell us what these germs are, but we suppose them to be bacteria. One thing is certain, these germs or bacteria that are rising from "damp spots" into "the air when dry" have great power of discrimination, and select the same kind of trees though situated hundreds of feet apart, neglecting the intermediate trees. The only trees I had killed the first year, 1881, were the new Frederick of Wurtemberg, one growing on high land, with a gravelly subsoil; one on soft, black soil with clay underneath; and the third somewhat similarly situated, but each one from 300 to 1,000 feet from the others. The next year four St. Michael Archangel trees were attacked just in the same way; three of them recovered, but the fourth is in a bad way, full of blighted limbs, with pears hanging on the live ones. My crop from the four trees this year was eight bushels.

I do not see that any of the experiments in inoculation are of any value. There is no doubt that there is just as likely to be sap poisoning among vegetables as blood poisoning among animals. We all know how careful surgical men are of blood poisoning from diseased animals, and a diseased limb is quite as likely to contain a substance sure poison to living tissues. Inoculating a tree does not tell us what is the cause of the blight. That is what we want to know.

I do not look upon the blight with any great fear. With about 3,000 pear trees 30 to 40 years old on my own grounds, and neighbors adjoining with 1,000 more, where no blight has ever appeared except upon a few of my own trees, and all that were attacked having fully

recovered, except some 20 or 30 quite dead, and bearing this year one of the largest crops, without ever cutting off a blighted twig or limb at any time, I read with complacency the dictum, "promptly remove every trace of the disease, and burn the branches," and enjoy the enthusiasm of the theorists. C. M. HOVEY.

APPLE SCAB AND LEAF BLIGHT.

The following interesting abstract of an article by Prof. Wm. Trelease in the 1884 report of the Wisconsin Experiment Station, was prepared by Mr. Louis H. Pammel, a former special student of Prof. Trelease.

In the first annual report of the Wisconsin Agricultural Experiment Station, Prof. Wm. Trelease contributes a valuable paper on the Apple Scab and Leaf Blight, which deserves attention from every thorough-going fruit grower. The apple leaf blight or mildew, so troublesome in recent years, is caused by a parasitic fungus, known botanically as *Fusicladium deudrilicum*. The fungus causes the leaves to have rounded, velvety spots, which are of an olive green color when young, but become darker with age, and in some cases, almost black. The spots vary considerably in size, and may easily be detected, most frequently on the upper side of the leaf; at times they are found to attack young twigs. These spots are the fruiting portion of the fungus, which has a concealed growing portion, which is a corruscation of one of these spots. The fungus in some way effects an entrance into the outer wall, or epidermis of the fruit, where it develops a mycelium of closely interwoven, colorless threads. This compact mass of cells, called the stroma, as it increases in thickness, soon bursts the detached cuticle and produces, in contact with the air, a comparatively small number of short, heavy, brown, and sometimes branched threads, which finally bear brownish, mostly one-celled spores, but occasionally, in some of these spores there is found a cross partition, a little above the middle, thus making it two-celled. These spores germinate by sending out a slender tube, which penetrates the cuticle of the leaf and there develops in a new mycelium. In the apple scab, the surface of the apple is disfigured by brownish or nearly black spots, which appear at first as little pustules, surrounded by a ragged white border. Older scabs have an irregular and somewhat flaky surface, and are generally checked by pale brownish cracks. Some apples are so badly covered with this crust that very little healthy skin remains. A section shows that it consists of a fungus which lives in the cavities of the thick-walled epidermal cells, where its mycelium grows at the expense of these and the cells immediately beneath

them, forming a compact, colorless stroma, which can scarcely be distinguished from mildew under the leaf cuticle. The exposed mycelium soon produces a sparse development of olive-brown threads, which are sometimes divided into short cells, that break apart and serve to multiply the fungus. In many cases the cells grow much larger, and in course of time they produce spores of a greenish-brown color, usually one-celled, but sometimes with a single cross partition. It appears, from studies made, that the apple leaf blight and scab are the same thing, which in the one case lives beneath the cuticle, and in the other in the epidermal cells.

The effects of leaf mildew on the tree are injurious in a marked degree. Not only is the starch and other assimilated matter of the injured leaves more or less completely lost, but these organs are so deformed as to be of little use. Assimilation has become interrupted by the fungus, so that the reserve material has been reduced to such an extent that the next year's fruit crop will be greatly diminished. Among the varieties most subject to the leaf blight we may enumerate: Westfield Seek-no-further, Tallman Sweet, Large Yellow Crab, Transcendent, Brier Sweet Crab, Late Strawberry, Fameuse, Walbridge and Haas. Most Crab hybrids and Russian varieties are less liable to attack than those mentioned in the above list. The Scab also has its favored sorts. Among these may be mentioned the Fameuse, Early Harvest, Northern Spy; while Duchess, Alexander, Golden Russet and Wealthy, scab less.

In the orchard of Mr. Hatch, of Ithaca, Richland county, Wisconsin, 99 per cent. of Fameuse and Walbridge, 40 per cent. of Haas, 20 per cent. of Plum's Cider, 10 per cent. Pewakee, 5 to 10 per cent. Tetofsky, and something less than 5 per cent. of Duchess, scab injuriously in bad years. Numerous specimens of apples brought into the Chicago market this year are very badly affected by the fungus disease.

REMEDIES.

Better system of drainage and more open planting. Leaves should be raked together on a still and damp day and burned. Prof. Burrill suggests pruning away any unnecessary growth that is most affected, then syringing the tree with an emulsion of kerosene oil made with soap and water.

CLOVER IN AN ORCHARD.

A correspondent asks the *Michigan Farmer* if there is any better substitute for a hog pasture in an orchard than June clover, and says

white clover has been recommended. If it is better, when should it be sown? With wheat or alone? etc.

To this a correspondent replies through the *Farmer:*

This question could be answered by the monosylable no! but it would seem from the last paragraph that some question has arisen in this correspondent's vicinity, or among his friends somewhere, as to the merits of the two clovers, red and white, for a hog pasture. Perhaps the white clover advocate objects to red, because it checks the growth of young trees, and the objection is a valid one while the orchard is young—say for the first five years after setting, but when the orchard begins to bear nothing is better for it than to seed it to June clover, and pasture or feed the hogs there. If the orchard is kept well fertilized for the first five years, and the ground well tilled with a hoed crop, there can be no objection then to seeding to clover and let it remain. June grass, and doubtless white clover, will, in time, come in gradually as the clover gradually dies out, but hog pasturing will sustain the fertility, and produce sufficient growth for an annual crop of fruit.

A young orchard is frequently treated to a kind of savagry, to which most other farm productions would succumb. It is often planted in a light soil, either natural or made so by constant tillage, and kept in a crop, because most people think sowing or planting must follow plowing, and the farmer, in most neighborhoods, who would manure a young orchard, and not grow a crop on the strength of it, would be considered a crank in farming, or at least very improvident.

If this correspondent's orchard has been treated to constant cropping until the verge of sterility is reached, (we prefer to consider this a supposable case,) then a very liberal dressing of the best barnyard manure should be spread over the entire surface, after plowing shallow in the spring, and thoroughly worked in with a cultivator or harrow, along with spring rye one bushel to the acre, and clover seed at the rate of a bushel to about eight acres. There would be in this supposable case almost an absolute certainty of a catch of clover, and the orchard would be started on a career of profit to the owner, both as a pasture for his swine, and for a purveyor to the family table. The trouble with half the Michigan orchards to-day is that they are literally starving to death. Planted on light soil, they have been kept in cultivation until the crops ceased to be profitable and the trees have ceased to grow. The surface roots have been kept feeding in the subsoil because the annual plowing has shaved off the surface feeders and compelled them to go deep or die. The farmer who says his orchard has ceased to bear and is unprofitable, ought to be hauled up to the confessional, and his sin exposed. He has kept sucking at his one orange under the delusion

that the pap was perennial, and he throws away the peel, disgusted that it isn't permanent.

KIND OF CROPS, AND HOW LONG TO CULTIVATE.

I answer this from my own experience. I set my trees 28 feet apart each way, and planted to corn six rows each way, leaving four feet from trees on each side. Pumpkins planted between the trees yielded very large crops. This I did for four years. Each season when the corn was hardening, I let in the hogs, a few at a time, keeping as much cut down as they could eat, so they would not be tempted to tear down that which was left standing. As a result, I had my hogs well fattened, and the stocks and offal left on the ground helped to enrich the orchard. The trees grew finely. After four years I sowed one-half to rye among the corn before turning in the hogs; the other one-half to mixed grasses, except a small corner seeded down to buckwheat for the bees. The rye made a fine growth, and furnished splendid pasture for the hogs. I let the hogs run on this rye for three years, but never cut it. On the fourth year I had a fine crop of "cheat," and trees were in fine condition. I then plowed under the "cheat" and sowed to clover, and my orchard is healthy, vigorous and in splendid condition to-day. —*Prairie Farmer.*

THE HOLLY AUSTIN CRAB ORCHARD.

Mr. Holly Austin's crab orchard near North Madison comprises 1,200 trees of the Hughes Crab variety, planted upon twenty-five acres of land. The trees are set thirty-two feet apart and are fifteen years old. Not a dead limb or a diseased apple is to be seen. The trees have their natural shape, never having been trimmed except with a pruning knife the first three seasons. In consequence the lower branches, heavily laden with fruit, rest upon the earth and the upper branches rest upon them in succession. We never saw trees so heavily laden with apples. Many single trees bear from fifteen to twenty bushels. Mr. Austin estimates five bushels to the tree as an average, which we would think a small estimate. The orchard has been a steady and sure bearer and has yielded seven crops. It is good for twenty years yet, and the cider made from the Hughes Crab by Mr. Austin is said to be unexcelled in any market. There are but two other such orchards in this part of Indiana, one owned by W. P. Levy and the third by Argus Dean. Our farmer friends will be repaid by a visit to this apple orchard.—*Madison (Ind.) Courier.*

The Press says that "Mr. Caywood can't understand why people are not allowed to buy fruit for its beautiful appearance on the table alone. They buy flowers with no taste at all. Why decry beautiful fruit because its flavor is not the best?" Mr. Caywood may have reference to the Lawson (Comet) Pear, or possibly to the Kieffer. We would humbly answer that it is better to buy flowers for their beauty and fruits for their quality, since the one is not fit to eat while the other gives us the most delicious and healthful of foods. But Mr. Caywood overlooks the fact that the most delicious fruits are, as a rule, the most beautiful.

INSECTICIDES IN THE APPLE ORCHARD.

[We were much interested in listening to the reading of Prof. Forbes' account of his extensive and carefully-made experiments, which as conducted thus far, and to be continued next year, are of great service to the fruit-growers of this State and elsewhere. We took a complete copy of the whole paper, but give here a synopsis of it prepared by our associate, Mr. Weed, which contains the leading points.—ED. PRAIRIE FARMER.]

At the Centralia meeting of the Illinois State Horticultural Society last week, Prof. S. A. Forbes, State Entomologist, read an exhaustive paper giving details and conclusions concerning the experiments he has been carrying on the past season, with London purple, Paris green and lime as remedies against the codling moth and curculios. In concluding the paper he gave the main points so plainly and concisely that we quote them:

(1.) The investigation was undertaken to test the efficacy of lime and arsenical poisons as insecticides for the codling moth, and apple and plum curculio in the apple orchard.

(2.) Owing to the scarcity of apples, and the abundance of apple insects, the season was the most unfavorable possible for the success of these remedies.

(3.) The insecticides were applied suspended in water, the Paris green in the ratio of 1½ ounces to four gallons, the London purple in half that quantity, and the lime in indefinite amount.

(4.) The spraying with Paris green began when the apples were about as large as currants, and four days later with the London purple and lime.

(5.) All the trees were thoroughly sprayed eight times between June 9th and September 3d.

(6.) The fallen apples were gathered six times from July 16th onward, and those remaining were picked as they ripened.

(7.) All the apples, both fallen and ripened, 16,529 in number, were examined individually for insect injuries, and those due to the codling moth and curculio separately noted.

(8.) As a result of the examination of 2,418 apples from trees which had been sprayed with Paris green, and of 2,964 others from trees which had not been so treated, checked for comparison, the end of the season showed 21 per cent. of the sprayed apples had been infested by codling moth, and 67.8 per cent. of those not so treated; while 22.4 per cent. of the poisoned lot had been infested by the curculio and 20.3 per cent. of those not sprayed. That is to say, treatment with Paris green had been entirely ineffective for the curculios, but have saved something more than two-thirds of the apples which would otherwise have been damaged by the codling moth. It should be remembered in this connection, that the Paris green not only serves to protect the apples from attack, but by destroying the insects, must assist to lessen the amount of insect injury in succeeding years. Analysis of apples one week after treatment with Paris green, a heavy storm intervening, gave abundant evidence that this insecticide could not be safely applied for some weeks preceding the harvesting of the fruit.

(9.) As a result of the comparison of 1,205 apples from a single tree sprayed with London purple, and 2,036 apples from a check tree not so treated, it appeared that 49 per cent. of the former were affected by the codling moth, and 58.8 per cent. of the later, and also that 23 per cent. of the first lot of apples had been invaded by curculios, and 23.6 per cent. of the second lot. The London purple thus saved about one-sixth of the apples which would otherwise have been sacrificed to the codling moth, and like the Paris green, it was without effect upon the curculios. In comparing these results with those derived from the Paris green experiment, it must be remembered, however, that the spraying with London purple began four days later than that with Paris green, and that only one-half the amount was used. It should be further noted that both were applied to the limit of serious damage to the foliage, conspicuous as early as the last of July.

(10.) 1,706 apples obtained from a tree treated with lime, as compared with 1,825 apples collected from a tree of the same variety used as a check, show that 53.9 per cent. of the former contained the apple worm, and 49.8 per cent. of the latter, thus indicating the uselessness of this substance against the codling moth. A similar application made to a tree heavily loaded with fruit, bearing 3,555 apples, and placed in comparison with a tree of another variety, bearing only 820 apples, serves merely to show that the ratio of codling moth injury to the fruit of a single tree depends largely upon the number of apples borne. The

lime had no injurious effect whatever upon the foliage. Here as in the other cases we found that the curculios were entirely unaffected by the insecticide application. In fact, I believe we may fairly conclude from this year's work that it is useless to attempt to combat the plum curculio in the apple orchard by insecticide applications to the fruit.

(11.) As bands for traps serve only to capture the apple worm after it has done its mischief, and hence interpose only a general protection against future attack, and are liable to be rendered ineffectual by the neglect of one's neighbors, the use of Paris green will serve at least as a valuable addition to remedial measures against the codling moth. Since it may be safely applied, however, only to the spring brood, it is best to use both bands and insecticides, each measure supplying the deficiency of the other.

FINAL CONCLUSIONS.

(12.) Attending only to the picked apples, and condensing our statement of results to the last extreme, we may say that, under the most unfavorable circumstances, Paris green will save *to ripening*, at a probable expense of ten cents per tree, seven-tenths of the apples which must otherwise be conceded to the codling moth; that London purple will apparently save about one-fifth of them; and that lime will save none. Furthermore, all these applications are without effect on the apple and plum curculios in the apple orchard.

(13.) Our observations upon the life history of the codling moth merely confirm the statement of previous observers in this latitude, to the effect that the insect is double brooded. It is apparent, however, that the first attack is not made upon the apple until this has reached the size of a small pea. For next year, I propose, if the conditions are at all favorable, to carry on these experiments on a larger scale, to vary them in such a way as to show the smallest quantity of the poison and the fewest applications that will effect the purpose of protection, and to thoroughly test other remedial measures than those we have studied this year.

The orchards that continue to bear are those that either stand on naturally strong land, or are kept invigorated by manure either spread on the surface from the yard or distributed by hogs. The latter plan is much the readiest way of keeping up the fertility, and it don't matter if the soil is never again broken, except by the primeval plow which the hog employs.

APPLE CURCULIO.

Mr. Kellogg, of Wisconsin, sends us some apples that have been the prey of the apple curculio. As the apple grower who is familiar with the subject is aware, the apples are of gnarly, deformed condition. However, there are many who do not understand why apples present this appearance. It may be that years pass and no trouble of this character is noticed in the orchard, but suddenly there comes a season in which the fruit is badly injured. It is sometimes difficult to recognize the best known varieties so terribly are they deformed. They will be small in size, irregular in shape, with ridges and bumps; and in every depression examination will show a little black dot, which gives the apple the appearance of having been drawn down to that point, as a cushion would be drawn down by a thread. As before said many do not understand what the trouble is. This is the work of the apple curculio. It makes its appearance the last of May or the first of June. They attack the fruit with their long, slender snout, drilling a small hole about a tenth of an inch in depth, and scooped out at the base. The holes are made principally for the purposes of food. Some, however, are for the deposit of eggs. Wherever they sting the apple, growth stops, and about the hole which the sting makes, a hardness appears, which, preventing further development, causes the irregular surface of the apple.

As to remedies, a writer says that the fact that they go through the chrysalis state in the fruit, while it hangs on the tree, makes it difficult to destroy them, except by gathering and destroying the stung fruit. This would be attended with much labor and care. The fact that they seem to prefer the native crab and thorn apples, and the fact that among cultured pears and apples there are some varieties to which they take a special liking might be taken advantage of, and by sacrificing the fruit on these trees the great bulk of the beetles might be destroyed with much less difficulty. The same remedies used against the plum curculio, are said to be used in checking this pest also, but owing to differences in their character and habits, the remedies cannot all be used with the same degree of success. The apple curculio is much less inclined to drop from the tree when disturbed by sudden jars; the length of time during which it is depositing its eggs, and the length of season required to reach maturity, would make it necessary to greatly prolong the contest to be as effectual. Covering the fruit and the trees with soot from burning coal tar might make it so offensive to them, as to drive them to some other tree or orchard, but whether it would be possible to use enough, even of this disgusting stuff, to

drive away an insect so utterly depraved in taste as to relish the wild, bitter crab apple is a question. As remarked in regard to the use of poisonous compounds to kill the plum curculio, which is now recommended for the codling moth and has been indorsed by some of our leading fruit growers and even entomologists, there seems to be no reason to suppose that this remedy would be any less effectual with the apple curculio than with the others mentioned. It may be possible to furnish the beetles with inviting shelter, near at hand, for winter quarters and then to destroy home and occupant. Those afflicted with this and other pests should carefully observe their habits and try all possible, practical means to effect their destruction.

INSECTS AND REMEDIES.

INSECTICIDES.

The following are the insecticides enumerated by Prof. Riley, in the catalogue of the exhibit of Economic Entomology, at the New Orleans Exposition: Arsenical mixtures, namely, London purple and Paris green—two cautions to be avoided—inhaling the dust, and purchasing the adulterated Paris green, which may be known by its color; bisulphide of carbon, for underground work, and stored grain; borax, for roaches; camphor, for dry goods; carbolic acid, one part in a hundred of water; hellebore, one part in twenty of flour, or four ounces in a gallon of hot water, and sprayed on currant bushes; petroleum, milk or soap emulsion; pyrethrum, blown on dry, or sprayed, one tablespoonful to one gallon of water; soap-suds, for aphides, and all soft-bodied insects; tobacco decoction, for insects on plants.

Pyrethrum may be applied by mixing with water, or as a powder. In the latter case it still remains effective when considerably diluted with flour—a fact not neglected by unprincipled vendors. The liquid mixture—a tablespoonful to two gallons of water—may be sprayed on to plants, or in stables and poultry houses, or may be rubbed directly on to animals being pestered by lice or flies. The powder may be dusted on to animals and plants by use of a bellows. In the same way it may be used in rooms to kill flies and mosquitoes, or, if preferred, as the dust is obnoxious to the neat housewife, it may be placed on papers in parts of the room.

Of late it has been found to be a merciful provision to rid our domestic animals of flies which are often so very annoying. This use not only affords great relief to the horses, but often nearly as much to the person who has to drive them. To use this insecticide for such purpose, put a small teaspoonful into a pint bottle of warm water, keep it tightly corked, and every two or three hours, as the case requires, sponge the horses off thoroughly on the legs, under the lower jaw, about the loins and about the sides.

The great difficulty in the use of pyrethrum comes from the fact of its frequent adulteration, and worthless character, possibly from being long kept in open boxes, or simply wrapped in paper. This objection, however, is not without easy remedy.

In the first place, if we purchase buhach, especially if we procure direct from G. N. Milco, Stockton, California, we shall be quite likely to secure a pure and fresh article, as he grows it extensively, and can hardly afford to send out an inferior article, even though he was minded to do so. It is easy to give our druggists his address, and to tell them of the nature of this article, so that they will keep it in airtight vessels.—A. J. Cook, in *Michigan Horticulturist.*

INSECTS AND REMEDIES.

Most of the second evening session at American Pomological Society was profitably given up to an illustrated lecture on "Economic Entomology," by Prof. A. J. Cook. He said, in part, "Destructive insects are increasing every year, and the problem of warring against them is becoming very important. Many of them are more formidable by reason of the few bird foes met in this country. Some insects are changeable in tastes and habits, leaving one kind of plant to attack another, or eating up one vegetable and then feeding upon another. Eternal vigilance alone can save the harvest. Until recently California was absolutely free from insect depredations; but now it is infested as badly as the other States. All insects have their enemies and a knowledge of these is absolutely necessary to the successful farmer or fruit grower. Their habits and life should be more carefully studied, and the best means of extermination ascertained. The census shows that the known damage done by insects in a single year in this county (Kent county, Mich.), was over $2,000,000, and the unknown damage would, doubtless, amount to as much more. Large areas of certain crops favor insect attacks. Wild cherry trees near an apple orchard are a partial protection from tent caterpillars, the former being more desirable food. France pays liberally for the diffusion of knowledge concerning these insect pests, and the remedies, but our Government is doing next to

nothing in this direction. More experiments and more discussion among farmers are greatly needed. Birds are natural enemies of the insects, and yet many seem bent on destroying these feathered friends of the fruit grower. I know that Paris green and London purple will destroy the codling moth. Sprinkle the trees just after the blossoms fall; once is enough, no trouble about it, and it's a perfect protection. But lice, and other sucking insects, are not injured by this process. They need the kerosene emulsion." The lecturer was deluged with questions from all sides after closing his remarks, and it was almost impossible to take them one at a time. He answered good-naturedly as far as he was able.

Mr. Augur had found the apple maggot attacking tender winter varieties as well as fall sorts. Prof. Cook: "Turn in hogs to eat up the fallen fruit." Mr. Woodward: "I prefer sheep, protecting the trees with wire cloth, or some offensive wash if necessary." Mr. Moody: "For the codling, I have used the spray with entire success every time. It also destroys many other insects. I use half a pound of the poison mixed with 100 gallons of water, and throw the liquid over the trees with a force-pump. No danger from poison in using the fruit. I have used it so strong that it killed the leaves, and yet even in August not a trace of the poison could be found on the fruit, either with the microscope or by chemical analysis. I use the fruit in the winter, and my friends often say, 'Why, how well you look!'" Mr. Hathaway: "Would it not be dangerous to turn stock into the orchard soon after the spraying?" Prof. Cook: "I have mown the grass under the trees immediately after spraying, fed it to horses, with no harm resulting; but it is better to wait until after the poison has been washed away by rain." Mr. Woodward: "I feel quite certain that I once lost several sheep which had eaten such grass soon after spraying. It is hadly safe; better wait a little."

THE APPLE TREE BORER (*Saperda Bivittata*)

Essay read before the Montgomery County, Mo., Horticultural Society, by F. Lionberger, secretary.

I suppose that every orchardist in this part of the country has been forced to make the acquaintance of the apple tree borer as it is very troublesome. At the same time I doubt not there are but few that know the beetle that deposits the eggs in May and June.

The beetle is striped brown and white, and is about three-fourths of an inch long. The beetle lays the eggs early in the spring in the bark of the trees near the ground, where there are any crevices or rough places. A tree with smooth bark is seldom attacked. As soon as the white

grubs come out of their eggs they at once commence to cut into and around the tree in the inner bark, but as they grow larger they generally go into the harder wood and work downward toward the roots.

However, they will not, as some suppose, keep up their destructive work from year to year, but when full grown will build a nest out of splinters inside the trunk and change into a beetle.

I will here give a number of well-tried remedies:

1. The first and best remedy in my opinion is clean culture, with a top-dressing of manure now and then, in order to secure a good thrifty growth, and to keep the bark at the base of the trees smooth as possible; such trees are seldom attacked; while a slow-growing, neglected tree with a lot of rubbish and weeds around the base are just the conditions the beetle looks for when depositing her eggs.

2. The beetles fly around and are the most active just after night sets in; therefore, if fires are built through the orchards a few times during spring at the proper time a great many will fly into them and perish.

3. I have often seen the borers kept out by planting a bunch of common tansy under each tree. The beetles do not seem to like to hunt for a hiding place among a bunch of tansy. Care, however, must be taken, not to let the bunches grow too large, or of course they will themselves prove injurious.

4. Judge S. Miller recommends to wrap the trees with common paper early in the spring so that it will go into the ground a little. This will keep the beetles away if done at the proper time. I have tried it.

5. Dr. B. F. Dunkley, of Dunksburg, Pettis county, Mo., says that for thirty years he has kept the borer out by using the following wash early in the spring: Take two thirds soft soap, one-third pine tree tar, put in water enough to make a thick paint, then add one pound of sulphur and boil it together, use while still warm.

6. Jacob Faith, of Montevallo, Mo., an extensive fruit grower, uses the following wash very successfully: Take four pounds of sulphur, one-half bushel of lime, slack with hot water, or soap suds boiling hot, and stir well, then add one-half gallon of crude carbolic acid and one gallon of soap, stir well while hot; ready to use when cold. For rabbits, put in one gallon of gas tar instead of soap.

7. The Tolysolve preparations put up in cans ready for use are also recommended by some. I have never tried them.

Any of the above remedies I would consider good if applied at the proper time.—F. LIONBERGER in *Colman's Rural World.*

THE CANKER WORM.

This destroyer of the foliage of the apple tree appears to be constantly spreading in various portions of the Western States. It has largely extended in some parts of the East, while in others its progress has been promptly checked. It seems remarkable that the owners of farms,who will employ very prompt means to turn maurauding cattle out of their wheat and corn fields, will look on and do nothing to rid orchards of this equal destroyer, which may be easily and readily extirpated by spraying early in the season with Paris green. For large orchards, fill with water and with a seven-hundredth of its part of Paris green, or its equivalent with London purple, one of the wagon tanks used by steam threshers, and drive through the orchard and shower the trees with a force pump. A pound of Paris green will treat an acre; and with these appliances fifteen acres may be gone over in a day. For smaller orchards barrels will do. We have known whole neighborhoods thoroughly cleared of the canker worm in this way, where it had before infested thousands of trees. This remedy seems to require many repetitions before all owners are willing to apply it.

THE RED SPIDER.

C. L. Allen, who has had much successful experience in the cultivation of ornamental plants, said at the meeting of the Society of American Florists; that the red spider is a small and beautiful insect, and as it is customary with many to abuse and misuse the weak, this insect has come in for its full share. Like other spiders, this is carnivorous, and never ate a plant in its life, and he regarded it as a friend and not a foe. A healthy condition of plants from care in watering, repels the minute destroyers the red spider feeds on, and thus drives it away. Mr. Allen greatly amused the meeting with the theory ascribed to Darwin, of the fertilization of red clover by the bumble bees, namely, that as the field mouse destroys the bumble bee nests, and cats destroy the mice, and that the reputed patrons of cats are old maids, therefore, the amount of red clover in any locality is in proportion to the number of old maids residing there—for they protect the cats, which destroy the mice, which eat the bumble bees, which fertilize the clover blossoms.

FIGHTING OUR INSECT FOES.

The lecturer at the third evening meeting held in connection with the recent State Fair at Rochester, Thursday, September 13, was Prof. J. Henry Comstock of Cornell University, who took for his topic the "Insect Enemies of the Fruit Crop," and urged the necessity of systematic and combined action by horticulturists, requiring, for the best results, "concert of action over a considerable area." To show what may be accomplished in this manner, the speaker gave an interesting account of recent operations in California. Three years ago, many magnificent orchards in that State were found completely overrun by insects. "So great was this scourge in some sections that the price of real estate was seriously affected." The beautiful Santa Clara valley especially, in the vicinity of St. Jose (one of the finest fruit sections Prof. Comstock has ever seen in journeys extending the whole length and breadth of the country) "was so overrun by scale insects and other pests that the residents were greatly discouraged, and people from other sections were loth to invest there."

Prior to this time, the grape growers of the State, aroused by the discovery that Phylloxera had attacked their vines, had secured the establishment of a board of "State Viticultural Commissioners," charged with the duty of studying the enemies and diseases of the vine, and advising proper means of combating them. It was found, however, that no part of the law creating this body could be made exactly available for the benefit of the scalebug-infested orchards of San Jose, and the fruit-growers of that section took counsel as to what they could do for themselves. "The most serious pests they had to contend against were scale-insects. These creatures at that time had been studied but little in this country; in fact the two most common species that were overrunning the San Jose orchards were unknown to science until Prof. Comstock described them a year later." Various means of destroying them had been suggested, but practical experience was lacking. The growers determined to experiment, and did so, by a committee, on a large scale and with great care, noting the effects of the washes tried, both on the insects and on the trees, and finally deciding pretty definitely on the best treatment.

Meanwhile, fruit-growers in other sections of the State had become aroused, and had secured a great enlargement of the duties of the State Viticultural Commissioners. This body was now empowered to prevent the introduction and spread of fruit diseases and fruit pests of all kinds, by enforcing quarantine regulations, with heavy penalties for their violation. A law was also enacted providing for

the appointment of county boards of horticultural commissioners, authorized to examine suspected orchards, nurseries or single trees, as well as fruit-packing houses, store rooms, sales rooms and other places, and to enforce thorough disinfection in the event of their discovering "scale-bug, codling-moth, red spider or other noxious insects liable to spread contagion dangerous to trees or fruit, or their eggs or larvæ."

"It is now two years," the lecturer proceeded, "since the passage of these laws and the publication of the results of the experiments of the San Jose committee. The results brought about are wonderful. The growth of public opinion has been toward a hearty support of this war against insect pests." A letter recently received from Dr. S. F. Chapin (one of the San Jose committee, and now Vice-President of the State Board, and Inspector of Fruit Trees) says:

"Most of our serious fruit pests are held in subjection to so great an extent that where the effort is carefully made, large crops of very choice fruit are gathered where, two or three days since, almost total failure was experienced. Notably is this the case here at St. Jose * * * ; the scale insects are now overcome by those who make the effort. * * * This work has been done almost wholly by the judicious application of concentrated lye. * * * Coal oil is not now used. * * * I can name orchards in which trees are now being dug out which were washed with coal oil two years ago—trees which at the time were not killed and which were thought to have escaped harm from the oil, but which have since died. * * * Regarding the codling moth, the careful methods so clearly demonstrated the past season as successfully combating that pest, have been practiced this season by many growers, and have been successful beyond anticipation. * * * In our county of Santa Clara, the fruit product as returned to the county assessor for 1882, was $1,611,800, while two years ago the value was $976,475. The assessment of the county has an increase over last year of $3,552,529, principally owing to the increased value of fruit land."

After remarking upon the encouragement afforded to fruit growers everywhere by this California experience, Prof. Comstock wisely urged " the desirability of concert of action *on a small scale* if we are not to have State action, or while such action is being brought about. Let the people of a town unite, and wonderful results will be attained; if a whole town cannot be brought to take steps of this kind, then let a neighborhood unite, or even two or three neighbors." The first step, of course, is to ascertain just what insect enemies are present, and then learn their complete life histories, in order to attack them effectively. The book called "Insects Injurious to Fruits," (written by William Saunders, and published last spring by J. B. Lippincott & Co.,

of Philadelphia, who will mail a copy to any address on receipt of the price, $3), was highly recommended as "the best single work on entomology which the American fruit-grower can obtain"—confirming the opinion expressed by an editorial in the *Country Gentleman*, of June 14, page 482.

The lecture closed with brief directions for recognizing and attacking the more important insects that endanger the safety of the apple crop—a crop of vast importance in the fruit-growing region around Rochester. These may be classified as below:

ATTACKING THE FOLIAGE.

Web or Tent Making.—1. The apple tree tent caterpillar, which appears in spring, and uses his tent only as a house. Remedy: Burn the tents with kerosene torch *at some time when the insects are in them.* 2. The fall web-worm, which appears in July and August, and uses the tent both for residence and pasturage; these may be burnt out at any time.

Not Making Webs.—3. Yellow-necked apple tree worm; 4. Red humped apple tree caterpillar. All caterpillars of each of these two species *keep together*, and denude the limbs of foliage. Remedy: Cut off infested branches. 5. Canker-worms, fall and spring; these are measuring worms, and the female imago cannot fly. Remedy: Prevent the females from climbing up the trunks. 6. Green plant lice, very abundant the last two years in spring, but not very generally greatly injurious. Remedy: Dip ends of branches into strong soapsuds.

ATTACKING THE FRUIT.

7. The codling moth is the chief, and is to be caught in bandages around the trees, which bandages must be frequently examined. Or spray the trees early in spring with Paris green.

ATTACKING THE TRUNK.

8. Scale insects are in some sections very destructive. Remedy: Spray the trunks with strong lye, or use whale oil soap.—*Country Gentleman.*

PAPERS.

HOW I HAVE TAUGHT HORTICULTURE TO BEGINNERS.

[Read before the Illinois Horticultural Society at Centralia, Dec. 8–10, 1885.]

During the last year I have had the honor of instructing, as I believe, the first class in horticulture ever organized in connection with an otherwise strictly literary institution in the country.

Without text-book or curriculum it was no easy task to provide, from day to day, for the succeeding lesson.

Assuming that the student was somewhat familiar with the related sciences—botany, geology, chemistry, meteorology, zoology, etc., or that he was to receive such instruction from the proper teacher, I only proposed to give him such practical hints as would enable him to apply his scientific knowledge to the every day affairs of life.

Horticulture is an art, not a science. It is a branch of agriculture and includes pomology, vegetable gardening, landscape gardening, floriculture, the propagation of trees and plants, or the nursery, forestry, etc.

The botanist studies the structure and habits of plants with a view to their classification and scientific arrangement. For this purpose he prefers the natural plant—the one which best represents its species and not the cultivated plant. In this particular he differs from the horticulturist, whose greatest delight is in causing nature to succumb to the influence of his arts.

The botanist pursues his highest scientific investigations through a study of the wild rose with its simple flower of five petals, and, as a scientist, fails to admire the gaudy queen of the garden, while the horticulturist finds his greatest delight in producing the widest deviations from nature's ways.

Our handsome flowers and luscious fruits are the products of the "art which does mend nature."

Varieties are the result of domestication. The apple of the forests of Europe, from which our numerous varieties have sprung, was scarcely an edible fruit; and had it remained uninterrupted in its natural forests unto this day it would have continued to reproduce its species (*pyrus malus*) with the same and almost definite character of its offspring as characterizes our maples and beeches of the wildwoods.

But man sought a better fruit than he found wild about him, so the crab was transplanted to his garden; and from repeated propagation and careful culture, husbanding with jealous care every advance, he has slowly but surely led the captive far away from its original type, until we, in the happy possession of our pippins and pearmains, have almost forgotten their lowly origin and the patient labors of those who have, through their intelligence, wrought these changes.

This we term an art—the art of horticulture. First we have a simple species: from this we develop the distinct variety.

If we plant a seed of an apple we expect, as a result, an apple tree. It may be, as to quality of fruit and other desirable characteristics, a great improvement upon its immediate progenitors; yet it is an apple, nevertheless.

We call this a variety. Varieties of marked character result, as shown above, from the ameliorating tendencies of what we call domestication.

If, therefore, we plant seeds, we multiply varieties of the species to which the seeds belong.

These new varieties do not all prove to be better in the desirable qualities than were the parents. Indeed, with all our arts and skill, it is only the rare exception that rewards our labors with satisfaction, while the "ninety and nine" may show decided tendencies to degeneracy, for nature is ever struggling against us.

It will be seen, therefore, how uncertain, even after securing a valuable variety, are we in its possession, as with the growth and decay of the original tree or plant would come the certain loss of our favorite variety. But here again art comes to the rescue, as with the slow but steady advance of knowledge and skill in the production of desirable varieties comes also our skill in their perpetuation and multiplication by propagation.

We propagate a species by planting the seed, a variety by other and often purely artificial means.

There are classes of fruits and plants which we cultivate and admire that, when established in a distinct or desirable variety, are self-propagating. To this class belong the strawberry and raspberry; the one through its runners or off-shoots, the other by tips and suckers. These and many others propagate in this way, and rapidly, without artificial means, while the gooseberry and currant, and many other of our small fruits, shrubs, etc., are self-propagating, but, unaided by art, are less rapid in their multiplication. With some we practice layering as a means of extension; others we propagate by cuttings, and there are yet others with which we must resort to even more difficult and

strictly artificial modes, such as budding and grafting, if we would enjoy a continuation of a desirable variety; and there are still others which require even greater skill and ingenuity, with appliances and fixtures rendering their propagation critical and expensive.

But nature has placed bounds and limits, beyond which we cannot go. While we may materially change the habits of a species in the production of varieties and in their subsequent extension by propagation, *we must follow the line of affinities* in the selection of stocks on which to propagate. No human skill will ever succeed in causing a peach tree to grow on an apple stock.

Nearly related species of a genus, as the pear, apple, quince, or hawthorne, or, as the peach, plum, apricot, and other stone fruits, can be used as stocks—the one for the other—but far better results may always be expected from the pear on pear, apple on apple, peach on peach.

With the propagation of varieties comes the care and culture of the young and tender plants. This is the work of the nurseryman. His skill consists in the care, culture and training of the plant or tree to that age and strength of constitution fitting it for transplanting into the orchard, the garden, the forest or the pleasure grounds.

Perhaps the most dangerous and critical period through which our favorite is destined to pass, is the transplanting from the nursery to the permanent grounds. Great skill and an intelligent understanding of the wants and habits of the tree or plant are here required if we would obtain satisfactory results. But our cares do not end here. Much will depend upon our judgment and wisdom in the selection and preparation of our grounds, and in the after-care and attention bestowed both upon the soil and its occupants. A practical knowledge of geology and botany will aid us in laying a good foundation—the one in the selection of soils, the other in determining the species adapted. A study of meteorolgy and zoology will guide us in providing against the vicissitudes of our climate, and in warding off the attacks of insects and other animal pests.

Pruning should be disciplinary or curative: disciplinary in guiding the young tree or plant in the way it should go; curative in removing dead, maimed or diseased parts. In either case, as with the skillful surgeon, the highest aim should be the spilling of the least possible blood. Quack horticulturists and quack surgeons often make serious work by the too free use of the knife.

In esthetic horticulture the reward of our labors is in the pleasurable enjoyment we feel in its results. Our pleasure is proportioned to the degree of culture we enjoy. We designate those who follow horticultural pursuits from this standpoint as amateurs.

Economic horticulture offers a more substantial reward in her golden fruits. While those who have a natural adaptability to the calling will usually succeed best, there are many who follow horticulture for the living they find therein.

In either case, to best husband the result of our toils, we must know how and when to harvest our crops and what disposition to make of them afterwards in order to reach the highest fruition of our labors.

I have now briefly outlined the course of study which I have followed as a teacher of horticulture.

Each process, in the progress of the course, has been illustrated as fully as it was possible to do by a practical application of the lessons taught; yet we have labored under the great difficulties, which might naturally be expected, in inaugurating a new department in an institution of the character of the one I have the honor of representing.

It is quite probable that but few of the students whom I have taught will follow horticulture as a pursuit, yet I have tried to impress them with the thought that, in the years to come, they may look back to the simple lessons they are now receiving with pleasure, if not with absolute profit; for, after all, we recognize and admire the person as fulfilling, to the highest degree, our ideas of a useful and well developed man or woman who has a practical knowledge of what we term every day affairs.—W. H. Ragan, Dupaw University, Greencastle, Ind.

A MISSOURI FRUIT SHOW.

The importance of this undertaking, as suggested in previous issues, is enhanced the more one thinks and talks about it. The Missouri Horticultural Society, at its annual meeting last week in Warrensburg considered it and thought very favorably of it. We could not find a member present that was not in favor of the effort, and all were of the opinion that it should not only be attempted, but that every means should be employed to insure its success. Enough is now known of the value of cold storage to justify us in saying that many of our early and even perishable fruits can be so preserved as to show them along with the later and hardier varieties.

It has been suggested that not only the fruits but vegetables also, and the cereal grains and their products as well, should be exhibited, and that possibly with all these there might be combined a flower show. With the fruits of the earth we are concerned, because in suggesting the effort our aim and desire was to demonstrate to the world what Missouri can do and is doing to-day. Thousands of people at a distance, who have never seen Missouri's claims in these regards pre-

sented, have an idea that it is a swamp, a wilderness, a veritable border Indian hunting ground, not only uncultivated, but not susceptible of cultivation.

They have little or no idea of our flocks and herds, our pastures and dairy products, our orchards and nurseries, our universities, colleges, normal and other schools, our large cities and equal civilization to the oldest States of the Union; no idea of our population, the fertility of our soil, the extent of our cultivated and pasture lands, and but little if any knowledge of the State, unless it be the term of derision invented for political purposes, Poor Old Missouri.

Now, then, it is the wish to so present the products of our orchards and of our fields, as that every one that sees them shall pronounce the State one of the finest in the Union, the people abreast of the times in all that can evidence enterprise, intelligence, thrift and commercial progress; for the State that can show the finest fruits and the best products of the soil, must be accredited to possess good farmers and first class business capacity. We have no State Board of Immigration, no means voted by the legislature to disseminate information abroad calculated to attract the sons of the progressive and hardy farmers of the Northern and Eastern States, or of foreign countries; hence what is done in this regard must be done by private and individual enterprise, and by the officers of local and State associations.

The enterprise which has made the State what it is to-day, must take hold of the means at their command and spread their goods, wares and merchandise before the world, at such time and place as that they may be seen and admired by the greatest number, and the fame thereof go out through all the land. We know no better time, no more convenient place than the St. Louis fair, managed in the interest of agriculture, attracting crowds by thousands from all parts, and nearly every State. But the work of maturing the plan of operations and of putting the machinery into operation by which the enterprise is to be brought to a successful issue, rests with our State societies and their enterprising officers.—*Colman's Rural World.*

A MISSOURI FRUIT SHOW.

We believe in advertising our own goods, our own county, our own State. We believe in doing it thoroughly and well, in order that all who ought to know might know, and if they don't want to know we will make them anyhow. Some think ignorance is bliss, we do not; particularly when the bliss consists in knowing nothing of our grand State and its grander future. There is hardly a crop prominently known to American horticulture which it is desirable to cultivate that cannot

be grown in Missouri as abundantly, and with as good or better returns as in any State in the Union. The people of other States do not know this, and not knowing do not appreciate it when told. Thousands of men pass through Missouri every year with their wives and families and the wealth they have acquired and settle in other and less favored States because they know nothing of this State. They know nothing of our productive lands, of our immense orchards, our wheat and corn, our cattle and sheep, our colleges and schools, our churches, and social and domestic surroundings, and the peace and plenty which permeate our rich and noble State, because it has not been advertised in every paper, at every railroad station and road side inn, and on the granite hillsides of their own States; because their country has not been deluged with highly colored pictures and fairly-worded pamphlets describing it as it has of the States and Territories beyond; therefore they go farther and do not fare as well as they would if they knew something which we could tell them of Missouri. Such ignorance is not bliss, neither is it desirable or profitable.

The great St. Louis fair has done much to advertise St. Louis, for many have attended it from a distance, either as exhibitors or sight-seers, who have carried away with them impressions of its magnificence and of the extent of its manufactures and commerce. But whilst these in a measure must convey an idea of the surrounding country and the productiveness of the land to sustain such a city it does so only in part, and a very small part at that. True, when we make a show of grandly improved stock it conveys an idea of our advanced farming, but the exhibits are open to the world, and the stock one sees is as likely to be from Maine or Kansas as from Missouri. And what is true in that regard of stock is equally true of nearly everything shown at the fair.

We want something that shall show the capacity of our orchards and the quality of our soil as a State; something that shall command the attention and the admiration of other States and of other peoples far and near, that shall convince them that Missouri is worthy of attention and deserving of more than a passing notice, that shall impress them in such a way as to compel them to cry for more; then will they discover, what many thousands ought to have known years ago, that this is one of the grandest States in the union, and the one above all others in which they can settle to advantage both to themselves and their children after them.

There are many ways of doing this and in a council of prominent men there would develop a great variety of opinions as to which is the best. We are just now presenting an idea for the consideration of the

members of the State Horticultural Society, and one which they can make work to advantage, viz: a Missouri Fruit Show, a show that shall command at once the attention and the admiration of all and whose very greatness shall compel its publication far and wide even if it does not bring the people to see it. Such a collection of fruit as we contemplate could be made from the counties of Missouri and the largest hall on the St. Louis Fair Grounds would be too small to contain it. Each one of fifty counties would take pride in collecting, packing and displaying its own productions and in making the most and best of them and a committee of the State Horticultural Society have the superintendence of the whole.

Should the society contemplate such an effort we doubt not the Fair Association would afford them space, though we have not approached them on the subject, and facilitate the enterprise all they properly could. Will the enterprising secretary, Mr. L. A. Goodman, think of this and submit it to the society at its annual meeting?

As a pomologist he was world-renowned for his knowledge, accuracy and good judgment, and as such had longer experience than any other man of whom I have any record in this or any other country. His books will ever be precious memorials of good fruits and good men; of a life whose great object was to make others happy in the enjoyment of the beauties and bounties of creation, and which has been a blessing to our world. For more than a generation he edited the "Fruits and Fruit Trees of America," first written by his brother forty years ago. With the progress and expansion of pomology, this work grew under his hand to such an extent that he might well have claimed to be the author; yet, with characteristic modesty, he preferred to lay his laurels upon his brother's grave. This encyclopædic work, in its many successive editions, is now the generally recognized authority in regard to the multitude of fruits described in it.

Charles Downing is dead, but his spirit is still with us, and will continue to inspire our souls, and the souls of those who shall succeed us, as long as a love of the beautiful in nature, of rural pleasures, and of domestic comfort shall have a place in the heart of mankind. His star has now set, but it has left a golden record which shall illumine the annals of pomology while the earth shall bring forth the fruits which he so much loved. His works are a rich legacy to the American people, and an enduring monument to his memory.

HORTICULTURE AT THE FAIR.

The Horticulturists of Missouri have reason to be proud of the officers of their State Society. They are workers, sure; hard workers,

and what they do is not only well but intelligently and effectively done. They have now shown at the New Orleans Exposition, at the meeting of the American Pomological Society at Grand Rapids, Michigan, and at the St. Louis Fair; and at each have won first honors. In mentioning these places we do not lose sight of other exhibitions they have made, or other honors won; but a society capable of winning at these can win anywhere, if they have but the energy and the intelligence to enter the list.

The exhibit made last week at the fair was a grand one, but it told only a part of the story. It only exhibited what could be done, and, too, what will be done within a very few years if these gentlemen are at the helm; for the merits of Missouri as a fruit growing State are only partly known, and its capacity but fairly developed. Presently we shall have more county societies, all acting in concert, gathering together the best of their products, and first exhibiting at the place of their growth for home encouragement and then in one grand central aggregation in St. Louis at the great fair to be seen and known of all men.

Fifty county societies, properly officered, could gather together the best products of their respective counties and show them every year at their own fairs and make such a display as would astonish the people themselves; then if the best of those fifty exhibits could be all sent to St. Louis and each shown by itself, as Bates county, Jasper county, Platte county, Jackson county fruit, it would inform the people of the world more and better of the culture and progress of its people and their horticultural and agricultural capacities than any other one thing. Such an aggregation of fruit from this one State would fill the largest hall on the fair grounds and make a show the like of which had never been seen before; and we have no doubt the fair association would cheerfully accord the space.

As it was, the State Horticultural Society made an excellent show with 172 varieties of apples, 84 of pears, 20 of grapes, 5 of quinces and 3 of peaches, besides a large collection merely for display occupying altogether 400 plates. In the exhibit we found 15 varieties of new seedling apples, some of which were very promising, but of which more hereafter. Mr. G. H. Shepherd, of La Monte, Mo., made the next largest and best show, consisting of nearly 300 plates. His was the finest exhibit made by one individual at the department. Michigan, Iowa and Arkansas were also represented, the latter being especially fine. These with other and smaller individual displays made altogether a very fine show which attracted attention every hour of the day and every day of the fair. It was one of the best made in recent years.—*Colman's Rural World.*

AMERICAN POMOLOGICAL SOCIETY.

T. T. Lyon, of Michigan, made the State speech of welcome at Grand Rapids to the American Pomological Society. P. Barry responded. Mayor Curtis extended a welcome to the city. This was responded to by Mr. Barry. President Angel also made a speech of welcome.

The following States were represented: New York, New Jersey, Pennsylvania, Michigan, Massachusetts, Ohio, Georgia, Texas, Minnesota, Nebraska, Virginia and Indiana. Canada was also represented.

The first real business was the election of officers and the following was the result: Marshal P. Wilder, president; Patrick Barry, 1st vice-president; Benjamin D. Smith, treasurer; Charles W. Garfield, secretary. Prof. Beal's services as secretary were recognized by a resolution of thanks. Prof. Beal has been a hard-working, faithful secretary.

Among other things, the president's address contained the following:

Ours is truly an American society. It has raised the standard of excellence by which our fruits are judged, discouraged the cultivation of inferior sorts, and thus educated the taste of the public for those of better quality, so that kinds once common in our markets have become obsolete, and are now considered unworthy of propagation. In doing this portion of its work it has discarded by general consent more than 600 varieties, either worthless or superseded by better sorts. It has established a uniform system of rules, by which fruits are to be known and judged. But, what is of the higest importance, it has instituted a much needed reform in the nomenclature of fruits, by which all long, unpronounceable, indelicate, inappropriate and superfluous words are to be suppressed in the dedication of our fruits.

One of the grandest achievements of the society is its catalogue of fruits, published biennially, with isothermal divisions and columns for fifty States, Territories and districts, in which are recorded the fruits which may successfully be grown in those divisions, with stars to designate the merits and seasons of each. This is a work of great merit, and not attempted by any other society. Few things in the history and progress of American pomology have been more effective in the past and more promising of valuable results in the future than our system of State reports. They embrace correct information from trustworthy persons, having special reference to the varieties most successfully grown; new kinds worthy of special notice; the chief obstacles to

successful fruit culture in each district, and correct information in regard to the extent and progress of fruit culture in each section of our country, and are published under the supervision of the chairman of the general fruit committee of our society, and contain a vast fund of information not elsewhere to be found. The reports constitute a mine of pomological wealth, and contain not only all the modifications and changes which may have been made in collecting information concerning the culture of fruits, but also in the naming of them, synonyms by which they are known; the most desirable varieties being designated in our catalogue by stars, according to their several merits.

The American Pomological Society has performeed an immense labor through its meetings and its committees, in correcting confusion, and it is wonderful to contrast the early condition of pomology with its present mature state. Its future labor will be continuous and of vital moment in introducing new and valuable varieties; and what will be of the greatest importance, maintaining an accurate nomenclature. It will inform fruit growers in every State and Territory what fruits they are to look to for successful culture. But most important of all, its business will be to give to American pomology a high character as a science; to prevent the appearance of mere money making, and petty attempts to impart undue prominence to new favorite and laudatory names. The continued aim of the society will be to maintain a position of dignity, integrity and impartial usefulness. The special aim of the society should be to enlist in its active membership all the best elements of our country, and to form, as far as possible, a closer relation with all existing State pomological and fruit growers' societies.

Let us have no more names of generals, colonels, captains, presidents, governors, monarchs, kings or princes, mammoths or Tom Thumbs, or such titles as Nonsuch, Seeknofurther, Ne-plus-ultra, Hogpen, Sheep-nose, Big Bob, Iron Clad, Legal Tender, Sucker State, or Stump the World. These were suggestions made in my last address to which I still adhere and from which I have nothing to take back. The terms Pearmain, Pippin, Beurre, Doyenne, Bon Chretien, etc., applied to apples and pears, once described classes of fruit which are now so confused and blended that the names have lost their significance. The cases are very few where a single word will not form a better name for a fruit than two or more. These reforms have been adopted in the catalogue of the American Pomological Society, and other prominent horticultural and pomological societies have voted to adopt the improved nomenclature, and I desire to ask the co-operation of all pomological and horcultural societies in this and other countries in carrying out this important reform.

And now in fulfillment of my promise to urge upon you while I live, the importance of producing from seed, new improved varieties of fruits, adapted to the various soils and climates of our vast territory, I have substantially to repeat what I have said in my former addresses. These are the means which God and nature have provided for the improvement of our fruits, and the better we understand and practice them the nearer shall we approach to that divine beneficence which gives flavor and richness to our fruits, and to the senses the highest types of beauty, grace and gratification.

Thus from time to time I have spoken to you, and, were these my last words, I would again impress them upon you as of the utmost importance. With a careful study of the tendencies of varieties, and a judicious selection of parents, as breeders, we shall go on to produce fruits which will be adapted to every climate or condition of our land where any species of fruit may be grown. When we see what nature has done without the aid of manipulation, in the cold regions of the north, as in Russia, from whence came the Oldenburg and Tetofsky apples, the Black Tartarian cherry, and other good fruits, as seen by Prof. Budd and Mr. Chas. Gibb, who can doubt our ability to produce fine fruits even in the colder regions of our country?

AMERICAN POMOLOGICAL SOCIETY—TWENTIETH BIENNIAL MEETING.

The evening session of the society on the first day was taken up by a popular lecture on "Injurious Fungi," delivered by Dr. C. E. Bessey, of the Nebraska State University. His paper was illustrated by a series of charts, and the members were deeply interested in what he said, and yet he failed to add greatly to the list of preventives and remedies. He spoke first of the bacteria family, which exists everywhere within a few thousand feet of the earth. The house-wife in her process of canning simply excludes the air to keep out bacteria. The family of mildews was next alluded to, a cross-section of mildewed Concord grape leaf being shown; as the resting-spores of the grape mildew are in the leaves which fall to the ground in the fall, it would be a good plan to burn the leaves. Blight was the next family described; not the disease known by that name, but the fungi producing it. These were fully illustrated, and their method of operation was explained. The black fungi, he said, is perhaps the most injurious family, next to bacteria. In the mildews reproduction is both by non-sexual and sexual influences; viz.: by breaking off and separating into individual spores in the first case, and by the falling of the resting-spores with the leaves, thus carrying the fungi over the winter in the latter instance. Speaking of the black-knot in the plum and cherry

tree, he said that in the spring the parasitic threads multiply in the bark and finally burst out, the surface at first being a lot of little spores; then the trouble is very infectious. Resting-spores carry it over the winter. Ergot on rye and strawberry rust also belong to this family. But beyond the first or early stage of this black fungi he knew nothing—did not know what it did the rest of the year, hence could not take care of it. "There is great need," said he, "of finding out the whole life history of these fungi. Somebody with plenty of time and money should take up this subject. It must be borne in mind that fungus is a plant. It grows. It may be killed by poisons or stimulated by favoring conditions. Remedies for the diseases thus produced are almost impossible. You cannot restore a plum limb affected with black knot; you can only cut it off. Fungous diseases call for the surgeon, and not for the practitioner, who restores by remedies. The knife is the only remedy, though it may take the whole tree, and even the orchard at times.

Regarding preventive measures it is very important that all parasitic fungus should be gathered and destroyed. Nearly every fungus produces resting-spores; these come when the fungus is dying. If destroyed, then, of course the trouble is removed. This, then, is the time to attack it. Burn up the dead leaves and twigs lest they afford shelter to these spores. As poisons, or fungicides, many things can be used; sulphur and its compounds, borax, salicylic-acid and several other things might be mentioned. But all must be brought in direct contact with the fungus, hence of course they are utterly useless in destroying the internal parasites."

At the conclusion of the paper the reader was applauded, and received a formal vote of thanks.

At the morning session of the second day a paper on the same subject was read by Prof J. C. Arthur, of the New York Experiment Station, the reader, however, confining his remarks more especially to blight. He said experiments had shown that blight could be introduced into healthy pear limbs by minute particles of diseased tissue, or the viscid substance accompanying the disease. A week after such insertion the bark begins to blacken, but the leaves show no affection until the limb is practically dead, which will not be for two or three weeks; then the leaves die very suddenly, most likely during hot weather or a warm rain. He had only succeeded in inoculating the disease through the leaves by using the very youngest leaves, and then only with much difficulty. He watered the roots with countless billions of pear blight germs, but could not introduce the affection that way, nor in any matured branch, but he had succeeded almost invariably

with the young and succulent growth. After the bark and outer portion of the branch are blackened with the disease, the sap of the tree continues to pass through the center of the limb for a time; hence the prolongation of life in the leaves and ends of the branch. Blight can be propagated only by natural processes; tying affected branches in healthy trees failed to impart the disease. It lives in the branch through the winter. Disease germs enter the tree through the tenderest tissues at the ends of the branches and in the flowers, usually in early spring, but where they come from is yet a mystery. Germs will grow in perfectly dead matter of almost any kind, especially in any starchy or analogous substances. A particle of blighted pear twig placed in a solution of corn meal and water, boiled, would fill the liquid with germs in a day or two. The course of the disease is usually about as follows:

"The germs in a diseased tree escape to the surface in a sticky exudation; washed free by rains, they drop to the ground, and multiplying indefinitely in decaying vegetable substances, either beneath the trees, or in marshy or wet places at a distance. Here they may pass the winter and even live for years. They are borne in the air, when dry, by the wind, or carried up by evaporation. Then, coming in contact with the moist surface of tender twigs or the center of the flower, the germs find entrance to the tree, and thus the reproductive process goes on. We have proved absolutely that the germs only cause the pear blight, and, further, that the germs are of a specific kind."

The scientific name of the specific bacteria, which produces the pear blight, he said, is Micrococus amylororus. The pear tree is especially liable to blight by reason of its succulent habit of growth. Apple trees, being of more solid growth, are not usually attacked or injured to any great extent.

Various pertinent questions were asked by different members at the close of the Professor's instructive paper, but he was unable to give any very conclusive answers. For instance, in replying to the question, "What shall we do to prevent the pear blight?" he said: "While I was studying the disease, half my orchard blighted before I knew it. I know of no remedy so far. An antiseptic over the growing shoots, if it could be kept there, would, of course, protect them, but the rains would wash it off."

Mr. Moody had used sulphur and lime for some years past, and had not been troubled with blight during the last five years, in an orchard of 10,000 trees; but Prof. Arthur has no faith in it as a preventive. In his opinion, no washes or applications to the soil can have any influence upon the blight. "Do not fertilize heavily; don't let the trees

grow too fast," he said. "To get the best fruit, we want the trees to grow as fast as possible, but to prevent the blight, they should grow as slowly as possible."

It was with great difficulty that the pear blight questions and discussions were shut off by the chairman, so great was the interest manifested in the subject.

A paper on "Protection from Frost" was then read by Prof. Lazenby, of the Ohio Experiment Station. In the comparative tests between mulched and bare ground, it was found a temperature of from three to five degrees greater was maintained where no mulch existed. This, he thought, proved that mulching strawberry beds is disastrous. It prevents absorption of heat during the day and radiation at night. As to the use of smoke, while it keeps the temperature up in a house where it can be confined, he does not consider it of any special value in the open air. Mr. Rogers, New Jersey: "From five to seven degree is the difference in favor of bare ground, I think. This has been a long settled fact in my State."

Mr. Scott, Michigan: "I have tried the smoke in the field; it's a pretty sight, but of no practical value."

A note from F. K. Phœnix, Wisconsin, on the same subject, was then read, though it contained no new suggestions of special value. Speaking of using explosives, and the vibration of noises, he said, "I don't know how much it would take to scare off the Frost Devil, but noise is cheap in America. I most profoundly believe in the human mastery and control of earthly elements and conditions." Mr. Morrill, Michigan: "I prefer to mulch; it brings profit in dollars and cents. It keeps the blossoms back later, thus protecting them, even though the temperature under the mulch falls lower."

Mr. Pierce, of Ohio, then read a paper on the "Conduct of State and Local Horticultural Societies." He opposed addresses from outside speakers, and thought the fairs and exhibitions should be held in the country around the fruit growers, rather than in the towns and cities. Secretary Garfield then made a few remarks on the same subject, agreeing with Mr. Pierce with regard to having exhibitions in the country. "The whole family, everybody, should be interested," he said. "When the father plants the tree, let the wife hold it, and the children stand ready to water it."

"Lessons of the World's Fair" was the title of the next paper, read by Mr. Goodman, of Missouri, Secretary of the State Society there. Flat tables, and five apples or pears to a plate, a glass structure lighted from above as well as the sides, were among desirable features for fruit shows he thought. Better rules for judging were also urged, a

certain scale of points being desired, by which to decide. He found Missouri could raise just as good apples as Michigan. "Our Ben Davis grown on the 37th parallel, is much better than yours at the North. I don't wonder that you despise this apple as it grows here. I think some of our Southern varieties would become good keepers at the North. The pear exhibit at New Orleans was poor. We have no genuine winter pear in the West. I have learned that." Among other lessons learned at New Orleans, Mr. Goodman said, was patience; they had to wait and wait, and were still waiting, at least for the premiums promised. He also alluded sharply to the cold storage facilities promised by the management, which exhibitors never got, and he spoke of many blunders and shortcomings there, going out of his way to arraign the management with sarcastic bitterness, so much so, in fact, as to bring Parker Earle, Chief of the Horticultural Department, at New Orleans, promptly to his feet at the close of the paper. He defended the management courteously and manfully. Said he, "I've listened with satisfaction to the paper. It contains many good suggestions; but some of the statements are based upon misconception. The cold storage promised was fully provided, and it was the best on the continent. If my friend did not use it, that is no fault of the management. There was no charge for cold storage. The exposition has enough real faults to answer for without having matters that are untrue imputed to it. As to the character of Horticultural Hall there, everybody was surprised at its peculiar adaptation for the preservation of the fruit. The oranges kept admirably; the apples remained in perfect preservation for over four months."

NOTES FROM AMERICAN POMOLOGICAL SOCIETY.

[From Rural New Yorker,]

THE BEST STRAWBERRIES.—BY PARKER EARLE.

"I consider Crescent best of all with me. I fail with almost all other kinds. I use several kinds of fertilizers; all seem to be successful. I am now planting Sharpless as a companion almost exclusively." Commissioner Colman: "Why is Crescent better than Wilson?" Mr.

Earle replied: "Because we can grow it and get it to put into the market, which we can't do with the Wilson." Mr. Green: "I am unable to name any one variety that is better than all others." Mr. Colman found the Wilson best. Mr. Earle said: "The rust troubles us greatly in southern Illinois; we cannot grow the Wilson for this reason. Crescent escapes the rust so far. Then, the Tarnished Plant Bug is another terrible enemy with us, preventing successful culture of most other kinds." Mr. Morrill, Michigan: "Down on the Lake shore we grow immense crops of strawberries for the Chicago market. We use Crescents for early on light soil, and Sharpless for late on heavy soil." Dr. Hape: "Sharpless is best in Georgia, especially in the vicinity of Atlanta. We have none of the troubles spoken of by Mr. Earle." Mr. Engle, Pennsylvania: "We grow Sharpless mainly; Crescent is more productive, but it does not sell as well and never brings as much money." At this point a member started

BIG STRAWBERRY YARNS

By telling how he raised a pretty large strawberry; for the contagion spread at once until each member seemed desirous of telling a bigger story. The irrepressible Dr. Hexamer alluded to the mammoth President Lincoln berry shown at the New York Horticultural Society's meeting some years ago, which measured, he said, 14½ inches in circumference. He said members might believe, or disbelieve it, as they chose; but it was a fact. But just as everybody was content to award the honor of the biggest strawberry to the Empire State, a gentleman from that obscure corner of the universe known as Rhode Island, arose for the climax, and I'll assume he doesn't want his name published. He said a nest of rabbits was once found in a good sized strawberry raised in his State; he never measured the berry. After this period of amusement rather than profit, Chairman Barry finally shut off the big stories and the society took up the discussion of

BLACKBERRIES.

Stone's Hardy Blackberry, as compared with the Snyder, was asked about. Mr. Lyon: "It is too small, although as hardy as Snyder; but too small for market." Mr. Johnston, N. Y.: "I find it very hardy, better than Snyder, but small. I believe all the hardy blackberries are small. It continues longer in bearing than Snyder. We think well of it." Mr. Green inquired about the Tecumseh; but in vain, there being no response. Mr. Plumb, Wisconsin, spoke of the difficulty in laying down blackberry canes for winter. Mr. Woodward asked about the

Evergreen Blackberry. Mr. Green said it was of no value, though very pretty. Mr. Morrill asked information about the Mammoth Dewberry, receiving no response. Mr. Lyon, speaking of the Early Harvest, said it did not succeed with him; he had found it very tender. Mr. Morrill: "I have it growing quite extensively, but have been deceived as to its hardiness. It was killed to the snow line last winter. But from 500 hills protected, I picked nine cases of sixteen quarts each. For its season, with winter protection, it will doubtless prove a good sort. It holds color well after picking; is black and glossy, and ships well." Mr. Scott, Michigan: "With me it kills dead as a door nail every winter." Others gave similar reports. Mr. Munson: "The Brunton and Early Harvest belong strictly to the South. We have grown both for years. Brunton was worthless at first, but when the Harvest was planted with it, both succeeded well. They resemble each other very much. Brunton is the hardiest in our climate, as to rust and drouth. Both are very prolific, producing from 5,000 to 6,000 quarts per acre."

Mr. Hobbs, Indiana: "We cannot grow Early Harvest, it is too tender. The Lucretia Dewberry is hardy with us, but poor in quality." Speaking of the latter, Mr. Campbell said: "It originated in Miami county, Ohio. It is very prolific, large and handsome, and when perfectly ripe, it is as good as anything I ever tasted in the way of a blackberry, but it must be entirely ripe." Mr. Scott: "I have fruited Taylor's Prolific six years; quality much better than that of Snyder; a week later; does not turn red after shipping." Mr. Green: "The Taylor is a remarkable berry, very productive and the largest we have. Downing considered it among our best hardy sorts." Mr. Phillips, Michigan: "It succeeds well with me; bears heavy crops on the lake shore at Grand Haven, while Early Harvest kills right down." Mr. Hobbs: "Taylor's Prolific originated in Indiana; it is not as hardy as Snyder, but larger and much better in quality to my taste." Mr. Lyon: "I discover little difference between Snyder and Taylor as to hardiness. Regarding the Lucretia Dewberry, one great trouble is, the fruit being so near the ground becomes covered with dirt.

Mr. Morrill, on being asked to describe his method of laying down blackberry canes, said he dug away the soil on one side, bent over the canes, and threw dirt over them and passed on to the next in the same way—a very simple matter, he said. Mr. Hilborn, Canada: "I have tried the Taylor for six years, but have never been able to raise a quart of the fruit yet." Mr. Gibson: "In Colorado the hardiness of blackberries and raspberries is not so important. We cover everything in that shape out there; we don't look for a berry that will stand our winters. Quality and productiveness are the points with us. In covering

for winter, in addition to bending over from the roots, we plow the soil up against the canes."

RASPBERRIES.

Some of the newer and a few of the older raspberries were next discussed, beginning with the Caroline. A member found it insipid though hardy. Mr. Green considered it an excellent berry. So did Mr. Rogers. He said it was too soft for market, however. Mr. Taylor wanted to know if there was any difference between the Tyler and Souhegan, and was told their origin was quite distinct, Souhegan having been sent out a year before Tyler was known.

Shaffer's was next called. Mr. Scott: "A great bearer—better than anything else; color too dark to sell well; excellent for canning; not so good for eating fresh." Mr. Augur: "It does admirably in Connecticut; a strong grower; brings good prices; one of the most profitable sorts." Mr. Hobbs: "Strong grower; most productive; largest in size; color somewhat against it; but one of the best for cooking we have." Mr. Hathaway: "I agree with Mr. Hobbs, and, besides, it is more hardy than anything else almost." Dr. Hape: "It succeeds admirably South; don't think it is fully appreciated throughout the country," Mr. Munson: "If we could succeed with raspberries at the South it would be very valuable there. I would be glad to hear from others at the South as to Raspberry growing; it is a failure in Texas." Virginia reported fair success with Shaffer's, but preferred Herstine. Mr. Johnson: "I think very highly of it, especially for evaporating, for which purpose I would especially recommend it. I have never heard any complaint of the flavor. My family like it well." Mr. Bennett, Michigan: "The color is against it, even here in Grand Rapids; it is too soft for shipment; one of the largest and best for canning; would raise it if confined to one berry." Dr. Hexamer: "If the Shaffer can be eaten with the eyes shut it is all right. It is all very well to talk about educating the taste, but it is a most unprofitable busines; better cater to the tastes already existing." Mr. Streeter, Ohio: "I think well of it; it has more good points than any other." Mr. Ohmer: "A strong grower, of muddy color; berry large; excellent for cooking; lowest priced berry in the Dayton market; people must shut their eyes in order to eat it." Mr. Lyon proposed to drop the Shaffer discussion and the chairman so directed.

Mr. Morrill inquired about the Nemaha. Mr. Green had found it hardier and better in quality than the Gregg. Mr. Scott: "I have 1,000 plants of it; it is fully as productive as Gregg." Mr. Munson: "I would like to hear about the Marlboro, as to hardiness and its

ability to stand drought, at least." Dr. Hape: "I have tried it one season. It stood the sun well in Georgia, and did well generally." Mr. Collins, New Jersey: "I can speak well of it; it's a fine berry. Its weak point with us seems to be its prolonged period of ripening. I fear it will not ripen promptly enough together for our market. It grows and produces well, quality not very good." Mr. Augur: "I have fruited it a little. It is certainly early and productive—no question about that. In quality I call it good, not the best. Its fine appearance and earliness will probably sell it." Mr. Manning: "I saw it growing at Col. Wilder's place; it grew well, but there seemed to be very little quality about the fruit." Mr. Hooper: "It seems to succeed finely along the Hudson river." Mr. Green: "I think it is destined to become a very popular raspberry. It is not high in quality, however." Mr. Hobbs: "Vigorous, hardy, productive, of good size, about as good as Hansell." Mr. Gibson: "I am very much pleased with it, indeed; it must prove valuable for market; very early and solid; larger than anything I have fruited; quality from fair to good."

Mr. Morrill asked about Rancocas. Mr. Woodward: "A very good berry; have not tried it thoroughly yet, but it seems worthy of cultivation." Mr. Collins: "Produces its crop early." Mr. Engle: "I fully indorse what has been said of it. I think it has come to stay." Dr. Hexamer: "I talked with five New York commission dealers, who have handled the Marlboro to some extent. Four of them considered it the most profitable for market of all sorts; the fifth preferred Cuthbert. The Rancocas ripens its entire crop in from eight to ten days." Mr. T. T. Lyon asked about the Hilborn; he thought it was fine flavored and of good size. Mr. Hilborn: "I have fruited it now for about seven years, and find it the most profitable sort I have. It is about as early as Souhegan." Commissioner Colman wanted to know about the Parnell. It did well with him. Dr. Hexamer: "I think it is not much cultivated now; there are many sorts much better." Mr. Colman: "It has outlived many other varieties with us."

Mr. Hobbs: "What about the Crimson Beauty? It is a good, strong grower, hardy, of beautiful color, better than Hansell or Marlboro. Its only failure seems to be its habit of dropping off the bush in pieces." Mr. Lyon: "I find it to bear many imperfect berries of late years." Treasurer Smith asked about the Souchetti, which he said the President liked very much. Mr. Engle: "I fear Crimson Beauty is going to fail in several respects, although the quality is good." Mr. Green "I never could get a perfect berry from it yet, after four years' cultivation. It's a poor thing." Mr. Scott said the same thing of it. Mr. Moore, speaking of the Souchetti: "I think it finer in quality than any

sort spoken of here to-day, but not fit for general culture." Mr. Miles, of Delaware, considered Crimson Beauty of no value. Turner was ten times as good, he said.

CURRANTS.

Fay's Prolific Currant was inquired about. Mr. Smith, Massachusetts, does not like it; it will not succed with him. Mr. Rogers: "One of the best and most promising in New Jersey." Mr. Scott, and others from Michigan, spoke well of it, as did Pennsylvania and several other States. Mr. Lyon: "We have a peculiar difficulty with currants of late; the borer eats off the bush near the roots. The only kind that has escaped so far is the Victoria." Mr. Augur asked about Lovett's Improved, "It is a great bearer; larger than Red Dutch, not as large as Cherry." H. H.

LANGUAGE OF FLOWERS.

At the last monthly meeting of the Missouri Valley Horticulturists, Miss Lizzie Espenlaub paid the following beautiful tribute to flowers, in a paper entitled the "Language of Flowers:"

When in the beginning God created man and breathed into him the spirit of immortal life, he gave to him two natures, the one earthly and fit for his rude contact with the physical world; the other to reach from the mortal to the immortal. Through this nature man is able to rise above this cloud-obscured home, and dwell in the pure light of the spiritual.

At the dawn of the race, as the shepherds watched their flocks on the mountain slopes of their early Arian home, they saw the Spirit of the Eternal One speaking to them from the starry hosts above; and the beautiful flowers at their feet told of the wonderful Creator.

> "If Nature put not forth her power
> About the opening of a flower,
> Who is it that could live an hour?"

Nature is a great book spread out before us. Pages of the geologists are the rocks beneath us, the astronomer's chart the stars above us, but the botanist's the lily of the valley, violet, harebell, anemone, etc.

The geologists and astronomers are wonderful and mysterious, but the botanists beautiful and simple, appeals to the soul.

As a nation rises in civilization, poetry and the love of flowers go hand in hand. The Scotlander sings of the bonny brases of his native hills. The Switzer gazes on his snow capped Alps and the beautiful flowers blooming at the foot of the avalanche. They love the grand and the beautiful of their native land. The grandeur without the beauty would be deficient.

The "Language of Flowers" is supposed to have been used by the earliest natives, but the Greeks are the first of whom we have any trustworthy records. They carried it to a very high degree, using flowers as types of everything interesting, public and private.

The "Language of Flowers" was cultivated by the countries of continental Europe; but after the decline of the power of Rome little attention was given to it. But we see it revived in the Middle Ages, when it was greatly developed by the Roman Church. The variety of flowers that adorned the altar enabled the worshiper to distinguish between feasting and fasting ceremonies.

Flowers have played an important part in all the mythologies. Oak was the patriot's crown, bay the poet's, and myrtle the crown for beauty. The olive was the the emblem of peace, and the ivy the emblem of Bacchus. A poet thus characterizes the ivy:

"The ivy, that staunchest and firmest friend,
That hastens its succoring aim to lend
To the ruined fane, where in youth it sprung,
And its pliant tendrils in sport were flung.
When the sinking buttress and mouldering tower
Seem only the spectres of former power,
When the ivy clusters around the wall,
And for tapestry hangs on the moss-grown hall,
Striving in beauty and youth to dress
The desolate place of its loneliness."

The significance of many flowers is derived from their properties, the amaranthus being called by the Greeks the "Never-fading" because of its duration.

The daisy has received much attention from the poets. Shakespeare says "its white investments figure innocence."

While Montgomery thus apostrophises:

This small flower to Nature dear,
While moon and stars their courses run,
Wreathes the whole circle of the year,
Companion of the sun.

It smiles upon the lap of May,
To sultry August spreads its charms,
Lights pale October on his way,
And twines December's arms.

'Tis Flora's page: in every place,
In every season, fresh and fair,
It opens with perennial grace,
And blossoms everywhere.

On waste and woodland, rock and plain,
Its humble buds unheeded raise;
The rose has but a summer reign,
The daisy never dies.

The rose, by universal suffrage, is made the queen of flowers, and has a symbolism varying with its color. Wordsworth thus rejoices in the union of the houses of Lancaster and York, whose emblems were the red and white roses:

Her thirty years of winter past, the red rose is revived at last;
She lifts her head for endless spring, for everlasting blossoming;
Both roses flourish red and white; in love and sisterly delight,
The two that were at strife or blended, and all old troubles now are ended.

Flowers are also the emblems of several European countries, as the Fleur-de-lis of France, the Thistle of Scotland, the Shamrock of Ireland.

Flowers speak to us in a silent language and are linked with all the finer sympathies of our natures.

The sweet blossoms that cover the greenwood are the delight of our childhood, they deck the chamber of old age and are the last sad gifts of sorrow to the dead.

Flowers are the bright remembrancers of youth;
They waft us back, with their bland odorous breath,
The joyous hours that only young life knows,
Ere we have learnt that this fair earth hides graves.
They bring the cheek that's mouldering in the dust
Again before us, tinged with health's own rose;
They bring the voices we shall hear no more,
Whose tones are sweetest music to our ears;
They bring the hopes that faded one by one,
Till naught was left to light our path but faith,
That we too, like the flowers, should spring to life,
But not, like them, again e'er fade again or die.

OUR REPORT

Our report has been full to overflowing this year, and I am sorry to say that I was compelled to leave out a number of valuable essays and condense others from members of our local societies. But the value of many of the papers in this report will, in a measure, compensate us for this, and above all

THE REPORT OF PROF. TRACY

Will be of invaluable benefit to us all as a book of reference, and we can point with pride to the "Best Report" our society has ever published.

L. A. GOODMAM,
Secretary.

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APPENDIX.

FLORA OF MISSOURI.

By S. M. Tracy.

State University, Columbia, Mo.

The following catalogue is, I believe, the first publication of any list of the plants of the State, excepting a "Partial Catalogue of the Plants of Illinois and Missouri," published by Mr. Geyer about 1842 which has long been out of print. The present catalogue was commenced more than five years ago, but the press of other important work has prevented its earlier publication. Even now there are doubtless many species which are not included as there are some sections of the State which I have been unable to visit, and from which I have found it impossible to obtain lists. The counties along the central part of the Southern boundary, and the extreme Northern and Northeastern portions of the State have not yet been carefully studied.

The sources from which this catalogue has been made are; the herbarium of the State University which includes valuable collections made by the State Geological Survey, Prof. Swallow, Dr. Peck of Louisiana, Mr. Geyer and Dr Engelmann of St. Louis and others; the "Flora of Jackson County" and extensive notes from Frank Bush of Independence; notes and specimens from Prof. G. C. Broadhead of Pleasant Hill, Geo. W. Letterman of Allenton; Mrs McCluney of Sedalia, and many others. I am indebted to Prof. Trelease of Washington University for access to the Riehl collection of Missouri plants, and to Mr. B. T. Galloway of Columbia, who has done the entire work of preparing the list of grasses, and has furnished notes upon many other plants. Free use has been made of the various published works of Dr. Gray, and the government reports of King and Wheeler. During the past twelve years I have visited many parts of the State, and have preserved a careful record of plants observed in the different localities. Nearly every plant named in the catalogue has been carefully examined by myself, and doubtful specimens have been referred to Dr. Gray, Vasey or other recognized authorities for verification. I have

endeavored to make the list accurate and have not included species of whose presence here I was not fully satisfied.

The arrangement of the catalogue is made to conform to that of Bentham and Hooker, and the nomenclature to that of "Gray's Flora of North America," and "Gray's Manual" fifth edition. In giving localities I have, in most cases given the names of the counties where found, followed by the names of the person who collected the specimen now in the University herbarium, or reporting its presence. The catalogue contains the names of 123 orders with 1786 species and varieties.

From the present incomplete list it will readily be seen that the State has four well defined botanical regions. First, river bottom lands extending along the entire length of the State on the East and through its central portion along the Missouri river, and its larger tributaries. Second, the swamp region of the Southeast. Third, the Ozark region, including the hilly and broken country which covers a large portion of the State South of the Missouri river. Fourth, the prairie region which includes a large portion of the State North of the Missouri river, together with the Northwestern portion of the part of the State South of the Missouri river. In the extreme Northwest, the flora assumes a character much resembling that which is typical of the Western plains. The constantly changing character of the flora of a newly settled country, makes it practically impossible to make a list which is complete in all its details, as new plants are yearly introduced, or are found in new localities driving out the earlier forms and producing constant changes. When the State was organized our hills and prairies produced an abundant growth of buffalo grass which soon gave place to the blue joint which is, in turn being driven out by the more valuable blue-grass. With cultivation came purslane, dandelion, lambsquarter and hosts of other troublesome weeds from the East, and within the last ten years the prickly solanum has immigrated from the far West and now seems perfectly at home in the streets of St. Louis.

It is earnestly desired that the catalogue be made as complete as possible, and to this end botanists and all others are requested to send notes and specimens of plants not named in the present catalogue, or from new localities. All such specimens will be placed in the University herbarium, and duly acknowledged in future editions of the catalogue.

DECEMBER 31, 1885.

CATALOGUE.

RANUNCULACEÆ.
Crowfoot Family.

1. **Clematis** Fremonti, Watson. Virgin's Bower.
   Franklin, Jefferson, Washington, (Letterman), St. Louis, (Eggert).
2. Pitcheri, Torr & Gray.
   Bates and Jackson, (Bush), Boone, (Tracy), Harrison and Livingston, (Broadhead), Iron, (Galloway).
3. Viorna, L. Leather Flower.
   Cass and Greene, (Broadhead), Greene, (Shepard).
4. Virginiana, L.
   Boone, (Tracy), Cole and Eastward, (Broadhead), Mississippi, (Galloway), Pike, (Pech).
5. **Thalictrum** anemonoides, Michx. Meadow Rue.
   Boone, (Tracy), Greene, (Shepard), St. Louis, (Geyer and Kellogg).
6. Cornuti, L. Tall Meadow Rue.
   Boone, (Galloway.) Cass, (Engelmann.) Lincoln and Linn, (Broadhead), Pike, (Pech), St. Louis, (Murtfeldt).
7. dioicum, L. Early Meadow Rue.
   Iron, (Broadhead).
8. purpurascens, L. Purple Meadow Rue.
   Greene, (Shepard), Jackson, (Bush), Miller, (Winick), Pike, (Pech).
9. **Anemone** acutiloba, DC. Wind Flower.
   Jefferson and St. Louis, (Letterman,) Stone, (Shepard).
10. cylindrica, Gray. Long-fruited Anemone.
    Greene, (Shepard), Mercer, (Broadhead).
11. decapetala, L. Carolina Anemone.
    Bates, Cass and Vernon and in Western Mo. only, (Broadhead), Greene, (Shepard), Rare in Jackson, (Bush).

12. dichotoma, L.
Jackson, (Bush), St. Louis, (Murtfeldt).

13. Hepatica, L. Liver leaf.
Pike, (Pech), St. Louis, (Kellogg and Murtfeldt), Central and Eastern Missouri, (Broadhead).

14. nemorosa, L. Wind Flower,
Boone, (Tracy), Howard and Knox, (Broadhead), St. Louis, (Murtfeldt).

15. parviflora, Michx. Small-flowered Anemone.
Knox and along Mo. river, (Broadhead).

16. patens, L., var. Nuttalliana, Gray. Pasque Flower.
St. Louis, (Murtfeldt).

17. Virginiana, L. Virginian Anemone.
Boone, (Galloway), Cole, (Broadhead), Jackson, (Bush), Pike, (Pech) St. Louis, (Reihl).

18. Pennsylvanica, L. Pennsylvanian Anemone.
Boone, (Tracy), Warren, (Broadhead).

19. **Myosurus** minimus, L. Mouse-tail.
Jackson, (Bush), Miller, (Winick), Pike, (Pech), St. Louis, (Murtfeldt).

20. **Ranunculus** abortivus, L. Small-flowered Crowfoot.
Common.

21. var. micranthus, Gray.
Boone, (Galloway), Benton, (Swallow), Jackson, (Bush), Miller, (Winick) St. Louis, (Geyer).

22. *acris*, *L.*, Buttercup.
Chariton, (Swallow).

23. aquatilis, L., var. tricophyllus, Chaix. Water Crowfoot.
Adair, Jasper, St. Charles and Western Mo., (Broadhead), Pike, (Pech).

24. var. stagnatilis, DC.
Little Blue river, Jackson, (Bush).

25. fascicularis, Muhl. Early Crowfoot.
Jackson, (Bush), Pike, (Pech), St. Louis, (Geyer).

26. multifidus, Pursh. Yellow Water Crowfoot.
Jackson, (Bush), Pike, (Pech).

27. *muricatus, L.*,
Miller, (Winick).

28. Pennsylvanicus, L. Bristly Crowfoot
St. Louis, (Murtfeldt).

29. recurvatus, Poir. Hooked Crowfoot
Boone, (Tracy), Jackson, (Bush), Miller, (Winick), Pike, (Pech).

30. repens, L. Creeping Crowfoot.
Common everywhere.

31. rhomboideus, Goldie.
Greene, (Shepard).

32. sceleratus, L. Cursed Crowfoot.
Jackson, (Bush).

33. **Hydrastis** Canadensis, L. Yellow Puccoon.
Rich woods throughout the State, but nowhere abundant.

34. **Isopyrum** biternatum.
Boone, (Tracy), Jackson, (Bush), Jefferson and St. Louis, (Letterman), Western Mo., (Broadhead).

35. **Aquilegia** Canadensis, L. Columbine.
Common everywhere—A white, flowering variety common in Jackson, and a yellow in Buchanan—(Broadhead).

36. **Delphinium** azureum, Michx. Larkspur.
Common everywhere—A white flowering variety in Jackson—(Bush).

37. exaltatum, Ait. Tall Larkspur.
Lincoln, (Broadhead), Miller, (Winick).

38. tricorne, Michx. Dwarf Larkspur.
Common.

39. Ajacis, L.
Adv. along railroads—Jackson, (Bush).

40. **Actæa** alba, Bigel. White Baneberry.
Greene, (Shepard and Bush), St. Louis, (Murtfeldt).

41. spicata, L., var. rubra, Mx. Red Baneberry.
Boone, (Galloway), Iron, (Broadhead), Pike, (Pech).

42. **Cimicifuga** racemosa, Ell. Black Snakeroot.
Greene and Wright, (Bush), Iron and Wayne, (Letterman), St. Louis, (Murtfeldt).

43. **Nigella** Damascena, L.
Becoming spontaneous in Jackson, (Bush).

MAGNOLIACEÆ.

Magnolia Family.

44. **Magnolia** glauca, L. Sweet Bay.
Missouri, (Torr and Gray).

45. **Liriodendron** Tulipifera, L. Tulip Tree.
Butler and Southeast Mo. (Letterman), Mississippi, (Galloway.) Not found north of Madison, (Broadhead).

ANONACEÆ.

Custard Apple Family.

46. **Asimina** triloba, Dunal. Papaw.
Common everywhere.

MENISPERMACEÆ.

Moonseed Family.

47. **Calycocarpum** Lyoni, Nutt. Cupseed.
St. Louis. (Shepard).
48. **Cocculus** Carolinus, DC.
Barton, Cole, Vernon, (Broadhead).
49. **Menispermum** Canadense, L. Moonseed.
Common everywhere.

BERBERIDACEÆ.

Barberry Family.

50. **Caulophyllum** thalictroides, Michx. Blue Cohosh.
Green, (Shepard), Jefferson along the Meramec, (Letterman), Pike, (Pech).
51. **Podophyllum** peltatum, L. May Apple.
Common everywhere.

NYMPHEÆCEÆ.

Water-Lily Family.

52. **Brasenia** peltata, Pursh. Water-Shield.
Barton, (Broadhead), Perry, (Demetrio), Putnam, (Swallow).
53. **Nuphar** advena, Ait. Yellow Pond-Lily.
Barton, Iron and Western Mo. (Broadhead), Boone, (Tracy), Green, (Bush),
54. **Nymphæa** odorata, Ait. White Pond-Lily.
Barton, (Broadhead), Buchanan and Mississippi, (Galloway), Pike, (Pech).
55. tuberosa, Paine.
St. Louis. (Murtfeldt).

56. **Nelumbium** luteum, Willd. Chinquepin.
Boone, St. Louis, (Tracy), Buchanan and Cass, (Broadhead), Pike, (Pech), Jackson, (Bush), Pettis, (McCluney).

PAPAVERACEÆ.

Poppy Family.

57. **Papaver** *somniferum*, L. Common Poppy.
Spontaneous about gardens.
58. **Argemone** Mexicana, L. Prickly Poppy.
Boone, (Galloway), Jackson, (Bush), Knox and Ralls, (Broadhead), Pike, (Pech).
59. var. albiflora, D. C.
Jackson, (Bush).
60. **Stylophorum** diphyllum, Nutt. Celandine Poppy.
Jefferson and St. Louis, (Letterman), St. Charles, (Broadhead.)
61. **Sanguinaria** Canadensis, L. Bloodroot.
Common everywhere.

FUMARIACEÆ.

Fumitory Family.

62. **Dicentra** cucullaria, DC. Dutchman's Breeches.
Common everywhere.
63. Canadensis, DC. Squirrel Corn.
Boone, (Tracy).
64. **Corydalis** aurea, Willd. Golden Corydalis.
Boone, (Galloway), Cass, (Broadhead), Pike, (Pech), St. Louis, (Riehl).
65. var. occidentalis, Englm,
Miller, (Winick).
66. var. micrantha, Englm.
St. Louis. (Engelmann).
67. crystallina, Englm.
Cass, Livingston, Vernon, (Broadhead).
68. flavula, Raf.
Boone, (Tracy), Jackson, (Bush).

CRUCIFERÆ.

Mustard Family.

69. **Nasturtium** *Armoracia*, Fries. Horseradish.
Common in old gardens

70. lacustre, Gray. Lake Cress.
Greene, (Shepard), Pike, (Pech).

71. limosum, Nutt.
Jackson, (Bush).

72. obtusum, Nutt.
Jackson, (Bush), St. Louis, (Murtfeldt).

73. *officinale*, R. Br. True Water Cress.
Adventive at Kansas City, (Bush).

74. palustre, DC. Marsh Cress.
Greene, (Shepard), Jackson, (Bush), Pike, (Pech), St. Louis, (Riehl).

75. var. hispidum, F. & M.
Jackson, rare. (Bush).

76. sessiliflorum, Nutt.
Jackson, (Bush).

77. sinuatum, Nutt.
Along rivers in woods. Jackson, (Bush), St. Louis, (Murtfeldt).

78. *sylvestre*, R. Br. Yellow Cress.
Pike, (Pech).

79. **Barbarea** vulgaris, R Br. Winter Cress.
Pike, (Pech.)

80. **Arabis** Canadensis L. Sickle Pod.
Common.

81. dentata, Torr. & Gray.
Jackson, (Bush).

82. hesperidoides, Gray.
Jackson, (Bush). Pike, (Pech).

83. hirsuta, Scop.
Boone, (Tracy), Pike, (Pech).

84. lævigata, DC.
Boone, (Tracy).

85. Ludoviciana, Meyer.
St. Louis. (Riehl & Murtfeldt).

86, lyrata, L.
Jefferson, (Letterman.)

87. patens. Sulliv.
Greene, (Shepard).

88. **Cardamine** hirsuta, L. Small Bitter Cress.
Boone, (Tracy), Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Louis (Geyer).

89. —var. sylvatica, Gray.
Jackson, (Bush).

90 rhomboidea, DC. Spring Cress.
Boone, (Tracy), Cass and Polk, (Broadhead), Pike, (Pech), St. Louis, (Riehl).

91. rotundifolia, Michx. Mountain Water Cress.
Greene, (Shepard).

92. **Dentaria** laciniata, Muhl. Pepperwort.
Common.

93. multifida, Muhl.
Knox, (Broadhead)

94.. **Leavenworthia** aurea, Torr.
"Missouri," (F. L. Harvey.)

95. Michauxii, Torr.
St. Louis and Franklin (Letterman).

96. **Silene** aurea, Nutt.
Greene, (Shepard).

97. **Vesicaria** Shortii, Torr. & Gray. Bladderpod.
Greene, (Broadhead).

98. **Draba** brachycarpa, Nutt.
Jackson, (Bush), St. Louis, (Geyer).

99. Caroliniana, Walt.
Boone, (Tracy), Cass, (Broadhead), Clay, (Bush), St. Louis, (Geyer & Letterman).

100. var. micrantha, Gray.
Jackson, (Bush), St. Louis, (Murtfeldt).

101. cuneifolia, Nutt.
Boone, (Tracy), Greene, (Shepard), St. Louis, (Letterman).

102. nemorosa, L.
Lewis, (Egeling).

103. verna, L. Whitlow Grass.
Boone, (Galloway).

104. **Hesperis** *matronalis*, L.
Nat. in Boone (Tracy).

105. **Sisymbrium** canescens, Nutt. Tansy Mustard.
Benton, (Swallow), Jackson, (Bush), Pike, (Pech), St. Louis, (Geyer & Murtfeldt).

106. *officinale*. Scop. Hedge Mustard.
Common.

107. *Thaliana*, Gaud. Mouse-ear Cress.
Boone, (Tracy).

108. **Erysimum** asperum, DC. Western Wall-flower.
(Torrey and Gray.)

109. var. Arkansanum, Nutt.
Franklin, Jefferson, St. Louis. (Letterman).

110. cheiranthoides, L. Wormseed Mustard.
(Torrey and Gray.)

111. **Thelypodium** pinnatifidum, Watson.
Jackson, (Bush).

112. **Camelina** *sativa*, Crantz. False Flax.
Cass, (Broadhead).

113. **Brassica** *alba*, Gray. White Mustard.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Murtfeldt).

114. *Campestris*, L. Charlock.
Jackson, *in old fields*, (Bush).

115. *nigra*, Gray. Black Mustard.
Common everywhere.

116. *rapa*, L.
Jackson, *in old fields*, (Bush).

117. **Capsella** *Bursa-pastoris*, Mœnch. Shepherd's Purse.
Common everywhere.

118. **Lepidium** intermedium, Gray.
Jackson, (Bush).

119. *ruderale*, L.
Jackson, (Bush), Miller, (Winick), St. Louis, (Torrey and Gray).

120. Virginicum. Wild Pepper-grass.
Boone, (Tracy), Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Louis, (Geyer).

121. **Thlaspi** *arvense*, L. Pennycress.
Jackson, (Bush).

122. **Raphanus** *Raphanistrum*, L. Wild Radish.
Polk, (Broadhead).

CAPPARIDACEÆ.

Caper Family.

123. **Cleome** integrifolia, Torrey and Gray.
Clay, (Broadhead), Jackson, (Bush).

124. *pungens*, Willd.
Pettis. (McCluny,)

125. **Polanisia** graveolens, Raf.
Jackson, (Bush), St. Louis, (Murtfeldt).

CISTACEÆ,

Rock-Rose Family.

126. **Helianthemum** Canadense, Michx. Frost-weed.
Cass, (Broadhead), Greene, (Shepard), Pike, (Pech).

127. **Lechea** major, Michx. Pin-weed.
Greene, (Shepard).

128. minor, Lam.
Greene, (Shepard), Pike, (Pech), St. Louis, (Riehl), Southwest Missouri, (Broadhead).

129. tenuifolia, Mx.
Greene, (Shepard).

130. thymifolia, Pursh.
Pike, (Pech).

VIOLACEÆ.

Violet Family.

131. **Viola** blanda, Willd. White Violet.
Boone, (Tracy).

132. Canadensis, L.
Pike, (Pech).

133. canina, L. var. sylvestris, Reg. Early Blue Violet.
Greene and Knox, (Broadhead), Pike, (Pech).

134. cucullata, Ait. Blue Violet.
Common everywhere.

135. var. cordata, Gray.
Boone, (Tracy) Pike, (Pech), St. Louis, (Geyer).

136. var. palmata, Gray.
Common everywhere.

137. delphinifolia, Nutt.
Common everywhere.

138. hastata, Michx.
Pike, (Pech), Boone, (Galloway).

139. lanceolata, L.
Livingston, (Broadhead).

140. pedata, L. Bird's-foot Violet.
Common everywhere.

141. var. bicolor.
Boone, (Tracy), Greene, (Shepard), St. Charles, (Broadhead), St. Louis, (Murtfeldt).

142. primulæfolia, L.
Jackson, (Bush), St. Louis, (Tracy).

143. pubescens, Ait.
Common everywhere.

144. rostrata, Pursh.
Miller, (Winick).

145. rotundifolia, Michx. Round-Leaved Violet.
Boone, (Tracy).

146. sagittata, Ait. Arrow-leaved Violet.
Common everywhere.

147. striata, Ait.
Common everywhere.

148. *tricolor*, L.
Cass, (Broadhead), Pike (Pech), *escaped.*

149. var. arvensis.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Murtfeldt).

150. **Ionidium** concolor, Benth. & Hook. Green Violet.
Common in rich woods.

POLYGALACEÆ.

Milkwort Family.

151. **Polygala** ambigua, Nutt. Milkwort.
Jackson, *not common*, (Bush).

152. incarnata, L.
Cass, (Broadhead,) Greene, (Shepard), Jackson, (Bush), Pettis, (McCluny.)

153. Nuttallii, Torr. & Gray.
S. W. Missouri, (Broadhead).

154. sanguinea, L.
Greene, (Bush & Shepard).

155. Senega, L. Seneca Snake Root.
Boone, (Tracy), Greene, (Shepard).

156. verticillata, L.
Boone, (Galloway), Greene, (Shepard,) Jackson(Bush), Pike, (Pech), St. Louis, (Riehl).

CARYOPHYLLACEÆ.

Pink Family.

157. **Saponaria** *officinalis*, L. Bouncing Bet.
Common about old gardens.

158. **Silene** antirrhina, L. Sleepy Catchfly.
Jackson, (Bush), Miller, (Winick), Pike, (Pech), St. Louis, (Riehl).

159. *noctiflora*, L. Night-flowering Catchfly.
St. Louis, (Murtfeldt).

160. regia, Sims. Royal Catchfly.
Common in Southern Missouri.

161. stellata. Ait. Starry Campion.
Common everywhere.

162. Virginica, L. Fire Pink.
Butler, (Letterman), Iron, (Broadhead), St. Louis, (Riehl).

163. **Lychnis** *Githago*, Lam. Corn Cockle.
Common in wheat fields.

164. **Cerastium** arvense, L. Field Chickweed.
Miller, (Winick).

165. nutans, Raf.
Common everywhere.

166. oblongifolium, Torr.
Boone, (Tracy).

167. *viscosum*, L. Large Chickweed.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).

168. *vulgatum*, L. Mouse-ear Chickweed.
Pike, (Pech).

169. **Stellaria** *media*, Smith. Common Chickweed.
Boone, (Tracy), St. Louis, (Murtfeldt).

170. longifolia, Muhl. Long-leaved Stitchwort.
St. Louis, (Riehl).

170½. borealis, Big. Northern Starwort.
Boone, (Galloway).

171. **Arenaria** lateriflora, L. Sandwort.
Jackson, (Mann).

172. Michauxii, Hook.
Livingston, (Broadhead).

173. patula, Michx.
Jackson, (Bush), Washington, (Riehl).

174. Pitcheri, Nutt.
Common everywhere.

175. squarrosa, Michx. Pine-barren Sandwort.
Jefferson, (Letterman).

176. stricta, Michx.
Greene, (Broadhead).

177. **Sagina** procumbens, L. Pearlwort.
St. Louis, (Riehl.)

178. **Spergula** *arvensis*, L. Corn Spurrey.
Boone, (Tracy.)

PARONYCHIEÆ.

179. **Paronychia** dichotoma, Nutt. Whitlow-wort.
Osage, (Broadhead.)

180. **Anychia** dichotoma, Michx. Forked Chickweed.
Common.

181. var, capillacea, Torr.
Jackson, (Bush & Mann.)

PORTULACACEÆ.

Purslane Family.

182. **Portulaca** *oleracea*, L. Purslane.
Common in gardens.

183. **Talinum** teretifolium, Pursh.
Common south of Mo. River.

184. **Claytonia** Caroliniana, Michx.
Boone, (Tracy,) Greene, (Shepard.)

185. Virginica, L. Spring Beauty.
Common everywhere.

ELANTINACEÆ.

Waterwort Family.

186. **Elatine** Americana, Arnott. Waterwort.
(Watson, in King's Fifth Report.)

HYPERICACEÆ.

St. John'swort Family.

187. **Ascyrum** Crux-Andreæ, L. St. Andrew's Cross.
Greene, (Shepard).

188. **Hypericum** adpressum, Barton. St. John's-wort.
Jackson & Henry, (Bush). St. Louis, (Kellogg).

189. angulosum, Michx.
Mississippi, (Galloway).
190. aureum, Bartram.
Pike, (Pech).
191. Canadense, L.
Greene, (Shepard).
192. corymbosum, Muhl.
Boone, (Tracy), Jackson, (Bush), Miller, (Winich), Pettis, (McCluney), St. Louis, (Murtfeldt).
193. Drummondii, Torr & Gr.
Greene, (Bush), St. Louis, (Riehl), S. W. Mo., (Broadhead).
194. ellipticum, Hook.
Pike, (Pech).
195. graveolens, Buckl.
Pike, (Broadhead).
196. mutilum, L.
Greene, (Shepard), Jackson. (Bush), Pike, (Pech).
197. nudiflorum, Michx.
Greene, (Shepard).
198. prolificum, L. Shrubby St. John's-wort.
Common.
199. pyramidatum, Ait. Great St. John's-wort.
Jackson—*rare*, (Bush).
200. Sarothra, Michx. Pine-weed.
Greene, (Shepard), Iron & St. Louis, (Letterman).
201. sphærocarpon, Michx.
Barton, Cass & Pike, (Broadhead), Boone, (Galloway).

MALVACEÆ.

Mallow Family.

202. **Malva** *crispa*, Gray. Curled Mallow.
Jackson-*escaped*—(Bush).
203. *rotundifolia*, L. Common Mallow.
Common everywhere.
204. *sylvestris*, L. High Mallow.
Jackson, (Bush), Miller, (Winick), St. Louis, (Murtfeldt).
205. **Callirrhoe** digitata, Nutt.
Greene, (Letterman), Jasper & Lawrence, (Broadhead).
206. involucrata, Gray.
Jasper, (Letterman).
207. triangulata, Gray.
Mississippi, (Galloway).

208. **Malvastrum** angustum, Gray. False Mallow.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Louis, (Letterman).

209. **Sida** hispida.
Cass, (Broadhead).

210. *spinosa*, L.
Common everywhere.

211. **Abutilon** *Avicennæ*, Gærtn. Velvet Leaf,
Common everywhere.

212. **Hibiscus** grandiflorus, Michx. Rose Mallow.
St. Louis, (Letterman).

213. militaris, Cav. Halberd Leaved Mallow.
Cass, (Broadhead), Jackson, (Bush), Pettis, (McCluney), Pike; (Pech), Mississippi, (Galloway).

214. Moscheutos, L. Swamp Rose Mallow.
Barton, (Broadhead), Mississippi, (Galloway).

215. *Syriacus*, L. Shrubby Althea.
Cass, (Broadhead), Pettis, (McCluney).

216. *Trionum*, L. Bladder Ketmia.
Common everywhere.

TILIACEÆ.

Linden Family.

217. **Tilia** Americana, L. Basswood.
Common everywhere.

LINACEÆ.

Flax Family.

218. **Linum** Bootii. Englm.
Cass, (Broadhead).

219. perenne, L.
(Watson, in King's Fifth Report).

220, rigidum, Pursh.
"Missouri," (Mrs. Lincoln's Botany).

221. striatum, Walt.
Pike, (Broadhead).

222. sulcatum, Riddell.
Jackson, (Bush), Maries, (Broadhead).

223. *usitatissimum*, L. Common Flax.
Occasionally escaped.

224. Virginianum, L.
Common.

GERANIACÆ.

Geranium Family.

225. **Geranium** Carolinianum, L. Carolina Cranesbill.
Common.

226. *dissectum*, L. Cut-leaved Cranesbill.
Pike (Pech).

227. maculatum, L. Wild Cranesbill.
Common.

228. Robertianum, L. Herb Robert.
Greene (Shepard).

229. **Flœrkea** proserpinacoides, Willd. False Mermaid.
St. Charles (Egeling).

230. **Oxalis** *corniculata*, L. Yellow Wood Sorrel.
Pike (Pech).

231. var. stricta, L.
Common.

232. violacea, L. Violet Wood Sorrel.
Common.

233. **Impatiens** fulva, Nutt. Spotted Touch-me-not.
Common.

234. pallida, Nutt. Pale Touch-me-not.
Common.

RUTACEÆ.

Rue Family.

235. **Zanthoxylum** Americanum, Mill. Prickly Ash.
Common.

236. **Ptelea** trifoliata, L. Hop Tree.
Common, except in N. W., (Broadhead).

SIMARUBEÆ.

237. **Ailanthus** *glandulosus*, Desf. Tree of Heaven.
Boone and St. Louis, (Tracy), Jackson, (Bush).

AQUIFOLIACEÆ.

Holly Family.

238. **Ilex** decidua, Walt.
Common in Southern Mo.

239. lævigata, Gray. Smooth Winterberry.
(Swallow).

240. opaca, Ait. American Holly.
Butler, (Letterman), Mississippi, (Galloway).

241. verticillata, Gray. Black Alder.
Boone, (Swallow), Iron, (Letterman), Mississippi, (Galloway), Pike, (Pech).

CELASTRACEÆ.

Staff-Tree Family.

242. **Euonymus** Americanus, L. Strawberry Bush.
Boone, (Tracy), Eastern Missouri, (Broadhead), Mississippi and New Madrid, (Galloway).

343. atropurpureus, Jacq. Waahoo.
Common everywhere.

244. **Celastrus** scandens, L. Climbing Bitter-sweet.
Common everywhere.

RHAMNACEÆ.

Buckthorn Family.

245. **Berchemia** volubilis DC. Supple-jack.
Butler, (Letterman), Stone, (Broadhead).

246. **Rhamnus** Caroliniana, Walter. Buckthorn.
Iron & St. Louis, (Letterman), Common S. E., (Broadhead).

247. lanceolatus, Pursh.
Boone, (Galloway), Jackson, (Bush), St. Louis, (Letterman) Western Missouri, (Broadhead).

248. **Ceanothus** Americanus, L. New Jersey Tea.
Common everywhere.

249. ovalis, Bigel.
Northern and Western Missouri, (Broadhead).

VITACEÆ.

Grape Family.

250. **Vitis** æstivalis, Michx. Summer Grape.
Rare West, common elsewhere.

251. bipinnata, Torr. & Gray.
Common Southeast.

252. cinerea, Engelm. Ashy Grape.
Common on river bottoms.

253. cordifolia, Michx. Frost Grape.
Common.

254. indivisa, Wild.
Common Southward.

255. palmata, Vahl.
Banks of Mississippi above St. Louis, (Eggert.)

256. riparia, Michx. Frost Grape.
Common everywhere.

257. rupestris, Scheele. Sand Grape.
Banks of the Missouri river Southward.

258. vulpina, L. Muscadine.
Montgomery, Maries and Southward, (Broadhead).

259. **Ampelopsis** quinquefolia, Michx. Virginia Creeper.
Common everywhere.

SAPINDACEÆ.

Soapberry Family.

260. **Æsculus** flava, Ait. Sweet Buckeye.
Common.

261. glabra, Willd. Ohio Buckeye.
Common, excepting Westward.

262. Pavia, L, Red Buckeye.
S. E. Missouri, (Letterman).

263. **Acer** dasycarpum, Ehrh. Soft Maple.
Common in low grounds.

264. Pennsylvanicum, L. Striped Maple.
Iron, (Galloway).

265. rubrum, L. Red Maple.
Callaway to S. E. Missouri.

266. saccharinum, Wang. Sugar Maple.
Common elsewhere but not found west of Nodaway river.
267. var. nigrum, Gray. Black Maple.
Boone, (Tracy), Jackson, (Bush),
268. **Negundo** aceroides, Mœnch, Box Elder.
Common everywhere.
269. **Staphylea** trifolia, L. Bladder-Nut.
Common.

ANACARDIACEÆ.

Cashew Family.

270. **Rhus** aromatica, Ait. Fragrant Sumach.
Common everywhere except extreme Northwest.
271. copallina, L. Dwarf Sumach.
Common everywhere.
272. cotinoides, Nutt.
Mississippi, (Galloway), St. Louis, (Broadhead).
273. glabra, L. Smooth Sumach.
Common.
274. Toxicodendron, L. Poison Sumach.
Common.
275. var. radicans, Torr.
Jackson, (Bush), Miller, (Winick).
276. typhina, L. Staghorn Sumach.
Common.
277. venenata, DC. Poison Dogwood.
Greene, (Shepard.

LEGUMINOSÆ.

Pulse Family.

278. **Baptisia** alba, R. Br. False Indigo.
Miller, (Winick), Sullivan, (Broadhead).
279. australis, R. Br. Blue False Indigo.
Benton, (Swallow), Greene, (Bush).
280. leucantha, Torr. & Gray.
Common.
281. leucophæa, Nutt.
Common.
282. tinctoria, R. Br. Wild Indigo.
Lewis, (Egeling).

283. **Crotalaria** sagittalis, L. Rattlebox.
Franklin & St. Louis, (Letterman), Jackson, (Bush), Pike, (Pech), common in S. W. Mo. (Broadhead).

284. **Lupinus** perennis, L. Wild Lupine.
Mississippi, (Galloway), St. Louis, (Murtfeldt).

285. **Medicago** *sativa*, L. Lucerne.
Spontaneous about old gardens.

286. *lupulina*, L.
Pettis, (McCluney).

287. **Melilotus** *alba*, Lam. White Melilot.
Common about old gardens.

288. *officinalis*, Willd. Yellow Melilot.
Jackson, (Bush).

289. **Trifolinm** *arvense*, L. Rabbit-foot Clover.
Mississippi, (Galloway).

290. *pratense*, L. Red Clover.
Common everywhere.

291. *procumbens*, L. Hop Clover.
Boone, (Galloway).

292. reflexum, L. Buffalo Clover
Boone, (Tracy), Greene, (Shepard), Pike, (Pech), St. Louis, (Letterman).

293. repens, L. White Clover.
Common everywhere.

294. stoloniferum, Muhl. Running Buffalo Clover.
Common everywhere.

295. **Psoralea** canescens, Michx.
Pike, (Pech).

296. esculenta, Pursh.
Bates & Cass, *rare*—(Broadhead), Miller, (Winick), St. Louis, (Letterman).

297. melilotoides, Michx.
Bates, (Broadhead), Miller, (Winick), St. Louis, (Letman).

298. Onobrychis, Nutt.
Pike, (Pech), St. Louis, (Letterman).

299. tenuiflora, Pursh.
Common.

300. **Amorpha** canescens, Nutt. Lead Plant.
Common everywhere.

301. fruticosa, L. False Indigo.
Common everywhere.

302. **Dalea** alopecuroides, Willd.
Cass, (Broadhead), Jackson, (Bush), St. Louis, along R. R., (Letterman).

303. aurea, Nutt.
On White River. (Nuttall).

304. **Petalostemon** candidus, Michx. Prairie Clover.
Common everywhere.

305. villosus, Nutt.
Mississippi, (Broadhead).

306. violaceus, Michx.
Common everywhere.

307. **Tephrosia** Virginiana, Pers. Goat's Rue.
Common everywhere.

308. **Wistaria** frutescens, DC. Wistaria.
Mississippi, (Swallow), Ray, (Broadhead).

309. **Robinia** Pseudacacia, L. Black Locust.
Common everywhere.

310. **Astragalus** Canadensis, L. Vetch.
Common everywhere.

311. caryocarpus, Ker. Ground Plum.
Boone, (Tracy), common in Western Missouri, (Broadhead).

312 distortus, Torr. & Gray.
Franklin, (Letterman), Greene, (Shepard), Pettis, (McCluney), West. Mo., (Broadhead).

313. gracilis, Nutt.
(Watson, in King's Fifth Report).

314. Mexicanus, A. DC.
Common everywhere.

315. microlobus, Gray.
(Watson, in King's Fifth Report)

316. Plattensis, Nutt.
Greene, (Shepard).

317. racemosus, Pursh.
On White River, (Nuttall).

318. **Oxytropis** Lamberti, Pursh. Loco.
Atchison (Broadhead).

319. **Glycyrrhiza** lepidota, Nutt. Wild Licorice.
Platte & Vernon, (Bush), St. Louis, (Letterman).

320. **Stylosanthes** elatior, Swartz. Pencil Flower.
Common.

321. **Desmodium** acuminatum, DC. Tick-trefoil.
Common.

322. Canadense, DC.
Jackson, (Bush).

323. canescens, DC.
Boone, (Galloway), Jackson, (Bush), St. Louis, (Murtfeldt).

324. var villosissimum, T & G.
Cass, (Broadhead), Pike, (Pech), St. Louis, (Drummond).

325. ciliare, DC.
Greene, (Shepard).

326. cuspidatum, T. & Gray.
Jackson, (Bush), Pike, (Pech).

327. Dillenii, Darl.
Jackson, (Bush). Pike, (Pech).

328. Illinoense, DC.
Jackson, (Bush & Mann).

329. lævigatum.
Pettis, (McCluney).

330. Marilandicum, Boott.
Jackson, (Bush), Pike, (Pech).

331. nudiflorum, DC.
Greene, (Shepard), Jackson, (Bush), Pike, (Pech).

332. paniculatum, DC.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

333. pauciflorum, DC.
Greene, (Shepard), Jackson, (Bush), Pike, (Pech).

334. rigidum, DC.
Jackson, (Bush), Pettis, (McCluney), Pike, (Pech).

335. rotundifolium, DC.
Greene & Wright, (Bush).

336. sessilifolium, Torr. & Gr.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

337. tenuifolium, Torr. & Gr.
Greene, (Shepard).

338. viridiflorum, Beck.
Cass, (Broadhead), Pike, (Pech).

339. **Lespedeza** capitata, Michx. Bush Clover
Common.

340. hirta, Ell.
Wright, (Bush).

341. procumbens, Michx.
Mississippi, (Galloway).

342. repens, Torr. & Gray.
Common.

343. reticulata, Pers.
Jackson, (Bush).

344. var. angustifolia, Maxim.
Jackson, (Bush), St. Louis, (Murtfeldt).

345. Stuvei, Nutt.
Marion, (Broadhead).

346. violacea, Pers.
Common.

347. var. divergens, Gray.
Jackson, (Bush).

348. var. angustifolia, Gray.
Jackson & Wright, (Bush).

349. **Vicia** Americana, Muhl. Vetch.
Jackson, (Bush).

350. Caroliniana, Walt.
Boone, (Galloway), Greene, (Shepard), Iron, (Broadheac).

351. **Lathyrus** maritimus, Big. Beach Pea.
Pike, (Pech).

352. palustris, L. Marsh Vetchling.
Boone, (Tracy), Pike, (Pech), Ray, (Swallow).

353. **Clitoria** Mariana, L. Butterfly Pea.
Boone, (Galloway), Iron & Madison, (Broadhead).

354. **Amphicarpæa** monoica, Nutt. Hog Pea-nut.
Cass & Jackson, (Broadhead), Pike, (Pech), St. Louis, (Murtfeldt); also a white variety in Cass & Jackson, (Broadhead).

355. **Apios** tuberosa, Mœnch. Ground-nut.
Common

356. **Phaseolus** diversifolius, Pers. Wild Bean.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

357. helvolus, L.
Jackson, (Bush).

358. pauciflorus, Benth.
Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).

359. **Gymnocladus** Canadensis, Lam. Kentucky Coffee-tree.
Common everywhere.

360. **Gleditschia** monosperma, Walt. Water-Locust.
Howell, (Tracy), Mississippi & New Madrid, (Galloway), Wright, (Bush); mouth of Missouri & Meramec Rivers, (Letterman).

361. triacanthos, L. Honey Locust.
Common everywhere.

362. **Cassia** Chamæcrista, L. Partridge Pea.
Common.

363. Marilandica, L. Wild Senna.
Common.

364. nictitans, L. Wild Sensitive Plant.
Greene, (Shepard), Pike, (Pech), St. Louis, (Murtfeldt), Wright, (Bush).

365. obtusifolia, L.
St. Louis, (Riehl).

366. **Cercis** Canadensis, L. Red-bud.
Common everywhere.

367. **Desmanthus** brachylobus, Benth.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Louis, (Letterman).

368. **Schrankia** uncinata, Willd. Sensitive Briar
Common everywhere.

ROSACEÆ.

Rose Family.

369. **Prunus** Americana, Marshall. Wild Plum.
Common.

370. Chicasa, Michx. Chickasaw Plum.
Eastern, Central and Southern, but not in Northwest.

371. Pennsylvanica, L. Wild Red Cherry.
Adair, (Broadhead), Pike, (Pech), St. Louis, (Murtfeldt).

372. pumila, L. Dwarf Cherry.
Missouri, (Torr. & Gray).

373. serotina, Ehrh. Wild Black Cherry.
Common Northwest.

374. Virginiana, L. Choke Cherry.
Common everywhere.

375. umbellata, Ell.
Miller, (Winick).

376. **Spiræa** Aruncus, L Goat's Beard.
Pike, (Pech), St. Louis, (Letterman), Wright, (Bush.)

377. betulifolia, Pallas.
Putnam, (Swallow).

378. salicifolia, L. Meadow Sweet.
Boone, (Tracy), Greene, (Shepard), Jackson, (Bush).

379. tomentosa, L. Steeple-Bush.
Boone, (Tracy), Clark and Cooper, (Swallow), Harrison, (Broadhead).

380. **Neillia** opulifolia, Benth & Hook. Nine-Bark.
Boone, (Tracy), Jackson, (Bush), Eastern and Southern Mo., (Broadhead).

381. **Gillenia** stipulacea, Nutt. American Ipecac.
Boone, (Tracy), Pike, (Pech), Common South of Missouri river.

382. trifoliata, Mœnch. Bowman's Root.
St. Louis and Iron, (Letterman).

383. **Rubus** Canadensis, L. Dewberry.
Common everywhere.

384. cuneifolius, Pursh. Sand Blackberry.
Pike, (Pech).

385. occidentalis, L. Black Raspberry.
Common.

386. strigosus, Michx. Red Raspberry.
Common.

387. trivialis, Michx. Low Bush Blackberry.
Common.

388. villosus, Ait. High Blackberry.
Common.

389. var. frondosus, Torr.
Jackson, (Bush).

390. **Geum** album, Gmelin. Avens.
Common in dry woods.

391. macrophyllum, Willd.
Nodaway, (Broadhead).

392. rivale, L. Purple Avens.
Pike, (Pech), St. Louis, (Riehl).

393. triflorum, Pursh. Three-Flowered Avens.
(Watson in King's 5th Report.

394. vernum, Torr. & Gray.
Common in Southeast.

395. Virginianum, L.
Jackson, (Bush), Pike (Pech), St. Louis, (Murtfeldt).

396. **Fragaria** vesca, L. Strawberry.
Greene, (Shepard).

397. Virginiana, Ehrh. Strawberry.
Common.

398. var. Illinoensis, Gray.
Jackson, (Bush), Miller, (Winick), St. Louis, (Murtfeldt), Pettis, (McCluney).

399. **Potentilla** argentea, L. Silvery Cinque-foil.
Greene, (Shepard).

400. arguta, Pursh.
(Torrey & Gray.)

401. millegrana, Engelm.
Jackson, (Bush).

402. Canadensis, L. Five-finger.
Common everywhere.

403. var. simplex, T. & Gray.
Boone, (Tracy), Greene, (Shepard).

404. Norvegica, L.
Common.

405. paradoxa, Nutt.
Jackson, (Bush), St. Louis, (Letterman).

406. rivalis, Nutt.
Jackson, (Bush).

407. var. pentandra, Watson.
Jackson, (Bush).

408. supina, L.
Jackson, (Bush), St. Louis, (Riehl).

409. **Agrimonia** Eupatoria, L. Agrimony.
Common everywhere.

410. parviflora, Ait. Small-flowered Agrimony.
Jackson, (Bush), St. Louis, (Murtfeldt.)

411. **Rosa** blanda, Ait. Early Wild Rose.
Common.

412. Carolina, L. Swamp Rose.
Boone, (Tracy), Common South of the Missouri river.

413. lucida, Ehrh. Dwarf Wild Rose.
Common everywhere.

414. nitida, Wild.
Jackson, (Bush).

415. *rubiginosa*, L. Sweet Brier.
Naturalized in Boone, (Tracy).

416. setigera, Michx. Climbing Rose.
Common. Occasionally found with very double flowers.

417. **Pirus** angustifolia, Ait. Narrow-leaved Crab Apple.
Jackson, (Bush), Mississippi, (Galloway), St. Louis, (Tracy).

418. arbutifolia, L. Choke-Berry.
Holt, (Broadhead).

419. coronaria, L. Crab-Apple.
Common everywhere.

420. **Cratægus** apiifolia, Michx. Hawthorn.
Butler, (Letterman).

421. arborescens, Ell.
Mouth of Meramec river, (Letterman), St. Louis. (Engelmann),

422. coccinea, L. Scarlet-Fruited Thorn.
Common.

423. var. viridis, T. & G.
Miller, (Winick).

424. cordata, Ait. Washington Thorn.
Boone. (Tracy), St. Charles, (Broadhead).

425. Crus-galli, L. Cockspur Thorn.
Common.

426. flava, Ait. Summer Haw.
Boone, (Tracy), Putnam, (Swallow).

427. *Oxyacantha*, L. English Hawthorn.
Boone, (Tracy), Montgomery, (Broadhead).

428. spathulata. Michx.
Boone, (Tracy), Miller, (Winick), St. Charles, (Broadhead).

429. subvillosa, Schrad.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Letterman).

430. tomentosa, L. Black Thorn.
Common everywhere.

431. var. pyrifolia, Gray.
Boone, (Tracy), Jackson, (Bush).

432. var. punctata, Gray.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

433. **Amelanchier** Canadensis, Torr & Gray.
Boone, (Tracy), Pike, (Pech).
Common South of Missouri river, but rare North.

434. var. alnifolia, Gray.
Jackson, (Bush).
435. var. oblongifolia, Gray.
Greene, (Shepard).

SAXIFRAGACEÆ.

Saxifrage Family.

436. **Saxifraga** Forbesii, Vasey.
St. Louis, (Letterman).
437. **Mitella** diphylla, L. Bishop's Cap.
Jefferson, (Letterman), St. Louis, (Kellogg).
438. **Heuchera** Americana, L. Alum Root.
Marion, (Broadhead).
439. hispida, Pursh.
Cass, (Broadhead), Greene, (Shepard), St. Charles, (Egeling).
440. villosa, Michx.
Pike, (Pech), St. Louis, (Murtfeldt).
441. **Hydrangea** aborescens, L. Wild Hydrangea.
Missouri River bluffs, (Broadhead), Pike, (Pech), St. Louis, (Tracy).
442. radiata, Walt.
Greene, (Shepard).
443. **Itea** Virginica, L.
Pike, (Swallow).
444. **Ribes** aureum. Parsh. Missouri Currant.
Common in rocky woodlands.
445. Cynosbati, L. Gooseberry.
Boone, (Tracy), Gasconade, (Broadhead).
446. gracile, Michx.
"Independence Co." (Nuttall).
447. rotundifolium, Michx. Gooseberry.
Common everywhere.

CRASSULACEÆ.

Orpine Family.

448. **Sedum** *acre*, L. Mossy Stone-crop.
Gentry, (Broadhead).
449. pulchellum, Michx.
Common.

450. stenopetalum, Pursh.
Greene, (Shepard).

451. Torreyi, Don.
Southwest, (Broadhead).

452. **Penthorum** sedoides, L. Ditch Stone-crop.
Common in wet places.

HAMAMELACEÆ.

Witch-Hazel Family.

453. **Hamamelis** Virginica. Witch-Hazel.
Iron, (Letterman), Only Southeast, (Broadhead).

454. **Liquidambar** Styraciflua, L. Sweet Gum.
Common Southeast.

HALORAGEÆ.

Water-Milfoil Family.

455. **Myriophyllum** scabratum, Michx.
Jackson, (Bush), Pike, (Pech).

MELASTOMACEÆ.

456. **Rhexia** Mariana, L. Deer Grass.
Mississippi, (Tracy).

457. Virginica, L.
St. Louis, (Geyer).

LYTHRACEÆ.

Loosestrife Family.

458. **Ammania** humilis, Michx.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

459. latifolia, L.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).

460. **Didiplis** linearis, Raf.
Greene, (Bush).

461. **Cuphea** viscosissima, Jacq. Clammy Cuphea.
Cass and Jackson, (Broadhead), Miller, (Winick), Mississippi, (Galloway), St. Louis, (Riehl).

462. **Lythrum** alatum, Pursh. Loosestrife.
Common.

463. **Nesæa** verticillata, H. B. K. Swamp Loosestirfe.

ONAGARACEÆ.

Evening Primrose Family.

464. **Epilobium** angustifolium, L. Great Willow Herb.
Pemiscot, (Swallow).

465. coloratum, Muhl.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

466. **Jussiæa** pilosa, H. B. K.
St. Charles, (Egeling).

467. **Ludwigia** alata, Ell. False Loosestrife.
Jackson, (Bush).

468. alternifolia, L. Seed Box.
Pike, (Pech), Common South of Mo. River.

469. linearis, Walt.
Pike, (Pech).

470. palustris, Ell. Water Purslane.
Jackson, (Bush), St. Louis, (Riehl).

471. polycarpa, Short & Peter.
Jackson, (Bush).

472. **Œnothera** biennis, L. Evening Primrose.
Common everywhere.

473. var. grandiflora, Lindl.
(Watson, in King's 5th Report).

474. fruticosa, var. linearis, Watson. Sundrops.
Jefferson, (Tracy).

475. glauca, Michx.
Webster, (Swallow).

476. linifolia, Nutt.
Cass and Webster, (Broadhead), Franklin, (Letterman).

477. Missouriensis, Sims.
St. Louis and Ozark Mountain region.

478. riparia, Nutt.
Mississippi, (Galloway).

479. serrulata, Nutt.
Atchison & Vernon, (Broadhead).

480. sinuata, L.
Clay & Jackson, (Bush), Pettis, (McCluney), Pike, (Pech), Vernon, (Broadhead).

481. var. minima, Nutt.
Jackson, (Bush).

482. speciosa, Nutt.
Cass & Jackson, (Broadhead).

483. **Gaura** biennis, L.
Common.

484. filipes, Spach.
Pettis, (McCluney).

485. parviflora, Dougl.
Jackson, (Bush).

486. **Circaea** Lutetiana, L. Enchanter's Nightshade.
Common.

LOASACEÆ.

487. **Mentzelia** oligosperma, Nutt.
Not rare on dry plains.

PASSIFLORACEÆ.

Passion Flower Family.

488. **Passiflora** incarnata, L. Passion Flower.
Mississippi, (Tracy), Pemiscot, (Swallow).

489. lutea, L.
Common from St. Louis South and West.

CUCURBITACEÆ.

Gourd Family.

490. **Echinocystis** lobata, Torr. & Gray. Wild Balsam Apple.
Common.

491. **Sicyos** angulatus, L. Star Cucumber.
Common.

CACTACEÆ.

Cactus Family.

492. **Opuntia** Missouriensis, DC. Prickly Pear.
Found occasionally, (Broadhead).

493. Rafinesquii, Engelm.
Greene, (Shepard), Jackson, (Bush).

494. vulgaris, Mill.
St. Louis, (Murtfeldt).

FICOIDEÆ.

495. **Mollugo** verticillata, L. Carpet Weed.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech), St. Louis, (Riehl).

UMBELLIFERÆ.

Parsley Family.

496. **Eryngium** prostratum, Nutt.
Butler, (Letterman).

497. yuccæfolium, Michx. Rattlesnake Weed,
Common.

498. **Sanicula** Canadensis, L. Black Snakeroot.
Jackson, (Bush), Miller, (Winick), St. Louis, (Murtfeldt).

499. Marilandica, L.
Common.

500. **Erigenia** bulbosa, Nutt. Harbinger of Spring.
Common in woodlands.

501. **Bupleurum** *rotundifolium*, L. Through-wax.
Southwest, (Broadhead).

502. **Cicuta** maculata, L. Musquash Root.
Common.

503. **Sium** cicutæfolium, Gmel. Water Parsnip.
Cass, (Broadhead). Jackson, (Mann), Pike, (Pech).

504. **Pimpinella** integerrima, DC.
Common.

505. **Cryptotænia** Canadensis, DC. Honewort.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

506. **Osmorrhiza** brevistylis, D. C. Hairy Sweet Sicily.
Pike, (Pech), St. Louis, (Letterman).

507. longistylis, DC. Smooth Sweet Sicily.
Common in rich woods.

508. **Chærophyllum** procumbens, Lam. Chervil.
Common.

509. Teinturieri, Hook. & Arn.
Jackson, (Bush).

510. **Discopleura** Nuttallii, DC. Mock Bishop-weed.
Common everywhere.

511. **Ligusticum** actæifolium, Michx. Angelico.
St. Louis, (Letterman).

512. **Thaspium** aureum, Nutt. Meadow Parsnip.
Common.

513. barbinode, Nutt.
Boone, (Tracy), Cass, (Broadhead), Greene, (Shepard).

514. trifoliatum, Gray.
Johnson and Madison, (Broadhead).

515. var. atropurpureum, T. & Gray.
Jackson, (Bush).

516. **Angelica** Curtisii, Buckl. Angelica.
Pike, (Pech).

517. **Archangelica** atropurpurea, Hoffm. Great Angelica.
Jackson, (Bush).

518. Gmelini, DC.
Pike, (Pech).

519. hirsuta, Torr & Gray.
Greene, (Shepard), Iron, (Letterman).

520. **Peucedanum** fœniculaceum, Nutt.
Cass, (Broadhead), Jackson, (Bush).

521. **Archemora** rigida, D. C. Cowbane.
Greene, (Shepard).

522. **Heracleum** lanatum, Michx. Cow-Parsnip.
Cass, Clinton and Linn, (Broadhead).

523. **Polytænia** Nuttallii, DC.
Jackson, (Bush).

524. **Conioselenium** Canadense, T. & G. Hemlock Parsley.
Boone, (Tracy), Sullivan, (Broadhead).

525. **Daucus** *Carota*, L. Carrot.
Occasionally persistent in old fields.

526. **Pastinaca** *sativa*, L. Parsnip.
Occasionally naturalized.

ARALIACEÆ.

Ginseng Family.

527. **Aralia** nudicaulis, L. Wild Sarsaparilla.
Boone, (Tracy), Pike, (Pech).

528. quinquefolia, Gray. Ginseng.
Common in rich woodlands.

529. racemosa. L. Spikenard.
Iron, (Broadhead), Pike, (Pech), St. Louis, (Letterman.)
530. spinosa, L. Hercules' Club.
Becoming common South.

CORNACEÆ.

Dogwood Family.

531. **Cornus** asperifolia, Michx. Rough-leaved Dogwood.
Common.
532. circinata, L'Her. Round-leaved Dogwood.
Bluffs of Miss. and Mo. Rivers in Eastern part of State.
533. florida, L. Flowering Dogwood.
Common, except Northwest.
534. paniculata, L'Her. Panicled Cornel.
Common.
535. sericea, L. Kinnikinnick.
Common.
536. stolonifera, Michx. Red-osier Dogwood.
Johnson, (Bush), Mississippi, (Galloway).
537. **Nyssa** multiflora, Wang. Sour Gum.
Common South.
538. uniflora, Walt. Large Tupelo.
Common Southeast.

CAPRIFOLIACEÆ.

Honeysuckle Family.

539. **Sambucus** Canadensis, L. Common Elder.
Common everywhere.
540. **Viburnum** dentatum, L. Arrow wood.
Common.
541. lantanoides, Michx. Hobble-bush.
Madison, (Broadhead), St. Louis, (Tracy).
542. Lentago, L. Sheep-berry.
Jackson, Greene, (Bush), Miller, (Winick), St. Louis, (Letterman).
543. Opulus, L. Cranberry-tree.
St. Louis, (Murtfeldt).

544. prunifolium, L. Black Haw.
Not found west of Gentry and Buchanan, (Broadhead), common Eastward.

545. **Triosteum** perfoliatum, L. Fever-wort.
Common.

546. angustifolium, L. Narrow-leaved Fever-wort.
Miller, (Winick).

547. **Smyphoricarpus** vulgaris, Michx. Buck-bush.
Common everywhere.

548. **Lonicera** flava, Sims. Yellow Honeysuckle.
Common.

549. glauca, Hill.
Buchanan, (Broadhead), Jackson, (Bush).

550. grata, Ait. American Woodbine.
Daviess, (Broadhead).

551. hirsuta, Eaton. Hairy Honeysuckle.
Ralls, (Broadhead).

552. parviflora, Lam. Small Honeysuckle.
Jackson, (Bush), Pike, Pech), Ralls, (Broadhead).

553. sempervirens, Ait. Trumpet Honeysuckle.
Jackson, (Bush).

RUBIACEÆ.

Madder Family.

554. **Houstonia** angustifolia, Michx.
Bates, Butler, (Broadhead), Wright, (Bush).

555. cærulea, L. Bluets.
Clay, (Broadhead).

556. minima, Beck. Small Bluets.
Pike. (Pech), St. Louis, (Geyer).

557. purpurea, L. Purple Bluets.
St. Louis. (Riehl), common Southwest, (Broadhead).

558. var. ciliolata, Gray.
Greene, (Shepard).

559. var. longifolia, Gray.
Laclede, (Broadhead), (Miller, (Winick), St. Louis, (Geyer).

560. var. tenuifolia, Gray.
St. Louis, (Murtfeldt).

561. **Oldenlandia** glomerata, Michx.
Greene, (Shepard), Pike, (Pech).
562. **Cephalanthus** occidentalis, L. Button Bush.
Common along streams.
563. **Diodia** Virginana, L. Button Weed.
Mississippi, (Galloway).
564. teres, Wait.
Common Southward.
565. **Galium** Aparine, L. Goose Grass.
Common everywhere.
566. asprellum, Michx. Rough Bedstraw.
Cass, (Broadhead), St. Louis, (Riehl).
567. Arkansanum, Gray.
(Engelmann).
568. circæzans, Michx. Wild Licorice.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Riehl).
569. concinnum, T. & Gray.
Common.
570. latifolium, Michx.
Boone, (Tracy,) Greene, (Bush).
571. pilosum, Ait.
Pike, (Pech).
572. trifidum, L. Small Bedstraw.
Cass, (Broadhead), Jackson, (Bush), St. Louis, (Riehl).
573. triflorum, Michx. Sweet-scented Bedstraw.
Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).
574. virgatum, Nutt.
Iron, Jefferson, St. Louis, Washington, (Letterman).

VALERIANACEÆ.

575. **Valeriana** pauciflora, Michx. Valerian.
(Gray in Flora of N. A.)
576. **Valerianella** radiata, Michx. Corn Salad.
Bates (Broadhead), Boone, (Tracy), Jackson, (Bush).
577. stenocarpa, Krok.
Jackson, (Bush).
578. chenopodifolia, DC.
Boone, (Galloway).

DIPSACEÆ.

Teasel Family.

579. **Dipsacus** *sylvestris,* Mill. Wild Teasel.
Franklin, St. Louis, (Letterman), Greene, (Shepard).

COMPOSITÆ.

Sunflower Family.

580. **Elephantopus** Carolinianus, Willd. Elephant's Foot.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech), St. Louis, (Letterman).

581. **Vernonia** Arkansana, DC. Ironweed.
Common Southward.

582. altissima, Nutt.
Cass, Pettis, (Broadhead), Jackson, (Bush)

583. Baldwinii, Torr.
Eastern Mo., (Gray).

584. fasciculata, Michx.
Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).

585. Noveboracensis, Willd.
Common.

586. var. latifolia, Gray,
Greene and Jackson, (Bush).

587. **Eupatorium** ageratoides, L. White Snake-root.
Common.

588. altissimum, L.
Common.

589. aromaticum L.
Jackson, rare, (Bush), Pettis, (McCluney).

590. cœlestinum, L.
Pike, (Pech), St. Louis, (Tracy), Southern Mo., (Broadhead).

591. perfoliatum, L. Thoroughwort.
Common everywhere.

592. var. cuneatum, Eng.
Eastern Mo., (Engelmann).

593. purpureum, L. Joe Pye Weed.
Common.

594. serotinum, Michx.
Jackson, (Bush), Pettis, (McCluney), Pike, (Pech), St. Louis, (Murtfeldt).

595. sessilifolium, L. Upland Boneset.
Boone, (Galloway), Wright, (Bush).

596. **Kuhnia** eupatorioides, L.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech), St. Francois, (Galloway).

597. **Liatris** cylindracea, Michx. Blazing Star.
Common.

598. elegans, Willd.
Boone, (Galloway), Nodaway, Pike, Ralls, (Broadhead).

599. graminifolia, Pursh. var. dubia, Gray.
Pike, (Pech).

600. punctata, Hook.
Jackson, (Bush).

601. pycnostachya. Michx.
Audrain, (Tracy), Cass, (Broadhead), Jackson, (Bush). Pettis, (McCluney), St. Louis, (Murtfeldt).

602. scariosa, Willd.
Common everywhere.

603. spicata, Willd.
Jackson, (Mann).

604. squarrosa, Willd.
Common.

605. **Aphiachyris** dracunculoides, Nutt.
Common Westward, (Broadhead).

606. **Grindelia** lanceolata, Nutt.
Wright, (Bush).

607. squarrosa, Dunal.
In a few Southwestern counties.

608. var. nuda, Gray.
St. Louis, (Gray in Flora of N. A).

609. **Aplopappus** ciliatus, DC.
(Gray in Flora of N. A).

610. **Solidago** bicolor, L. Golden Rod.
Boone, (Galloway).

611. var. concolor, Torr. & Gray.
Wright, (Bush).

612. Canadensis, L.
Common.

613. var. scabra, Torr. & Gray.
Jackson, (Bush).

614. Drummondii, Torr. & Gray.
Boone, (Tracy) St. Louis, (Drummond).

615. Gattingeri, Chapm.
St. Louis, (Letterman), Wright, (Bush).

616. lanceolata, L.
Jackson, (Bush).

617. latifolia, L.
Pike, (Pech), St. Louis, (Letterman).

618. Missouriensis, Nutt.
Common on dry prairies.

619. nemoralis, Ait.
Boone, (Galloway), Jackson, (Bush), St. Louis, (Murtfeldt).

620. patula, Muhl.
(Gray in Flora N. A).

621. petiolaris, Ait.
Greene. (Shepard), Wright, (Bush).

622. puberula, Nutt.
Butler, (Letterman).

623. radula, Nutt.
Jackson, (Bush).

624. Riddellii, Frank.
St. Charles, (Egeling), St. Louis, (Engelmann).

625. rigida, L.
Common.

626. rupestris, Raf.
Jackson, (Bush).

627. serotina, Ait.
Jackson, (Bush), St. Louis, (Murtfeldt).

628. var. gigantea, Gray.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

629. Shortii, Torr. & Gray.
Wright, (Bush).

630. speciosa, Nutt.
Common Westward.

631. var. rigidiuscula, Torr. & Gray.
Jackson, (Bush), St. Louis, (Engelmann).

632. tenuifolia. Pursh.
Common Westward.

633. ulmifolia, Muhl.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).
634. **Chaetopappa** asteroides, DC.
(Gray in Flora N. A.)
635. **Boltonia** asteroides, L'Her.
Jackson, (Bush), Pike, (Pech).
636. var. decurrens, Engelm.
St. Louis, (Eggert).
637. latisquama, Gray.
Cass, (Broadhead), Jackson, (Parry), Pettis, (McCluney.
638. **Aster** anomalus, Engelm.
St. Louis, (Engelmann), Wright, (Bush).
639. azureus, Lindl.
Common.
640. cordifolius, L.
Boone, (Tracy), Cass, (Broadhead), Pike, (Pech).
641. diffusus, Ait.
Cass, (Broadhead), Pike, (Pech).
642. Drummondii, Lindl.
Jackson, (Bush), St. Louis, (Torr. & Gray.)
643. ericoides, L.
Jackson and Wright, (Bush), St. Louis, (Tracy).
644. var. villosus, T. & G.
(Gray in Flora, N. A.)
645. grandiflorus, L.
Pike, (Pech).
646. junceus, Ait.
Greene, (Shepard).
647. lævis, L.
Common.
648. linariifolius, L.
Wright, (Bush).
649. longifolius, Lam.
St. Louis, (Murtfeldt).
650. multiflorus, Ait.
Common.
651. Novæ-Angliæ, L.
Common.
652. olongifolius, Nutt.
Cass, (Broadhead), Jackson, (Bush),

653. paludosus, Ait.
(Gray in Flora, N. A.)
654. patens, Ait.
Greene, (Shepard), Wright, (Bush).
655. paniculatus, Lam.
Cass, (Broadhead), Jackson, (Bush).
656. ptarmicoides, T. & Gray.
Common Southward.
657. recticulatus, Pursh.
Cass and Jackson, (Broadhead.)
658. sagittifolius, Willd.
Greene, (Shepard), St. Louis, (Drummond).
659. salicifolius, Ait.
Cass, (Broadhead), Jackson, (Bush).
660. var. subasper.
St. Louis, (Drummond).
661. sericeus, Vent.
Common.
662. Shortii, Boot.
Pike, (Pech.)
663. tenuifolius, L.
Jackson, (Bush), St. Louis, (Murtfeldt).
664. Tradescanti, L.
Boone, (Galloway), Jackson, (Bush).
665. turbinellus, Lindl.
Common everywhere.
666. undulatus, L.
Boone, (Galloway).
667. **Erigeron** annuus, Pers. Fleabane.
Common everywhere.
668. bellidifolius, Muhl.
Common.
669. Canadensis, L.
Common.
670. divaricatus, Michx.
Common.
671. glabellus, Nutt.
"Missouri," (Nuttall).
672. Philadelphicus, L.
Common everywhere.
673. strigosus, Muhl.
Common.

674. **Pluchea** camphorata, DC. Salt-marsh Fleabane.
St. Louis, (Murtfeldt).

675. **Antennaria** plantaginifolia, Hook. Everlasting.
Common.

676. **Gnaphalium** decurrens, Ives. Everlasting.
Boone, (Galloway).

677. polycephalum, Michx.
Boone, (Tracy), Green and Jackson, (Bush), Pettis, (McCluney), St. Louis, (Riehl).

678. purpureum, L. Purple Cudweed.
St. Louis, (Riehl).

679. **Inula** *Helenium*, L.
Boone, (Tracy), Jackson, (Bush).

680. **Polymnia** Canadensis, L. Leaf Cup.
Pike, (Pech), St. Louis, (Letterman).

681. var. radiata, Gray.
Jackson, (Mann).

682. Uvedalia, L.
Butler and St. Louis, (Letterman.)

683. **Silphium** integrifolium, Michx.
Common.

684. laciniatum, L. Rosin Weed.
Common on dry prairies.

685. perfoliatum, L. Cup-Plant.
Common.

686. terebinthinaceum, L. Compass Plant.
Common on wet prairies.

687. **Berlandiera** Texana, DC.
Southwest Missouri, (Gray).

688. tomentosa, T. & Gray.
(Gray in Flora, N. A.)

689. **Parthenium** integrifolium, L.
Common.

690. ciliata, Willd. Hairy Marsh Elder.
Greene, Jackson, (Bush), Pike, (Pech).

691. frutescens, L.
Boone, (Galloway).

692. xanthiifolia, Nutt. Marsh Elder.
Common.

693. **Ambrosia** bidentata, Michx. Ragweed.
Cass, (Broadhead), Greene, (Shepard), Iron, (Letterman).

694. trifida, L. Great Ragweed.
Common everywhere.
695. var integrifolia, T. & G.
Jackson, (Bush).
696. artemisiæfolia, L. Bitterweed.
Common.
697. psilostachya, DC.
Common Southward.
698. **Xanthium** Canadense, Mill. Cocklebur.
Common everywhere.
699. var. echinatum, Gray.
Boone, (Tracy), Cass, (Broadhead), Jackson, (Bush).
700. *spinosum*, L.
Perry, (Demetrio).
701. **Heliopsis** lævis, Pers. Ox-eye.
Miller, (Winick), St. Louis, (Tracy).
702. gracilis, Nutt.
Wright, (Bush).
703. scabra, Dunal.
Jackson, (Bush).
704. **Eclipta** alba, Hasskarl.
Jackson, (Bush), Pettis, (McCluney), Pike, (Pech), St. Louis, (Riehl).
705. **Echinacea** angustifolia, DC. Purple Cone-Flower.
Common everywhere.
706. purpurea, Mœnch.
Common.
707. **Rudbeckia** bicolor, Nutt. Cone-Flower.
Wright, (Bush).
708. fulgida, Ait.
Common.
709. hirta, L.
Common.
710. laciniata, L.
Common everywhere.
711. speciosa, Wend.
Jackson, (Bush), Pettis, (McCluney), St. Louis, (Riehl).
712. subtomentosa, Pursh.
Jackson, (Bush), Pike, (Pech).
713. triloba, L.
Common.

714. **Lepachys** pinnata, Torr. & Gray.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).
715. **Helianthus** angustifolius, L. Sunflower.
Ralls, Vernon, (Broadhead.)
716. *annuus*, L. Common Sunflower.
Very common West, and becoming so East.
717. decapetalus, L.
Pike, (Pech).
718. divaricatus, L.
St. Louis, (Riehl).
719. doronicoides, Lam.
Common westward.
720. giganteus, L.
Pettis, (McCluney), Pike, (Pech), St. Louis, (Engelmann).
721. grosse-serratus, Martins.
Common.
722. hirsutus, Raf.
Cass, (Broadhead), Jackson, (Mann).
723. lætiflorus, Pers.
Cass, (Broadhead), Pettis, (McCluney), St. Louis, (Murtfeldt).
724. Maximiliani, Schrad.
Wright, (Bush).
725. mollis, Lam.
Common.
776. occidentalis, Riddell..
(Gray in Flora of N. A.)
777. orgyalis, D. C.
Vernon, (Broadhead).
778. petiolaris, Nutt.
Jackson, (Bush).
779. rigidus, Desf.
Common.
780. strumosus, L.
Jackson, (Bush).
781. tracheliifolius, Willd.
(Jackson, (Bush).
782. *tuberosus*, L. Artichoke.
Occasionally escaped.
783. var. subcanescens, Gray.
St. Louis, (Engelmann).

784. **Verbesina** helianthoides, Mx. Crownbeard.
Common everywhere.

785. Virginica, L.
Iron. (Letterman).

786. **Actinomeris** squarrosa, Nutt.
Jackson, (Bush), Pettis, (McCluney), Pike, (Pech), St. Louis, (Murtfeldt).

787. alba, T. & G.
Perry. (Demetrio).

788. **Coreopsis** aristosa, Michx. Tick-seed
Common.

789. var. mutica, Gray.
Jackson, (Bush).

790. auriculata, L.
Greene, (Shepard), Pettis, (McCluney), St. Louis, (Riehl).

791. discoida, Torr & Gray.
Pike, (Pech).

792. gladiata, Walt.
Newton, (Broadhead).

793. grandiflora, Nutt.
Common Southwest.

794. involucrata, Nutt.
Greene, Jackson, (Bush).

795. lanceolata, L.
Greene, Wright, (Bush), St. Louis, (Letterman).

796. palmata, Nutt.
Common.

797. pubescens, Ell.
(Gray in Flora of N. A.)

798. senifolia, Michx.
St. Louis, (Drummond).

799. tinctoria, Nutt.
Common about old gardens.

800. trichosperma, Michx. Tick-seed Sunflower.
Boone, (Tracy), Pike, (Pech).

801. tripteris, L. Tall Coreopsis.
Cass, (Broadhead), Jackson, (Bush), Lewis, (Egeling).

802. verticillata, L.
Lewis, (Egeling), Pettis, (McCluney).

803. **Bidens** Beckii, Torr. Water Marigold.
St. Louis, (Beck).

804. bipinnata, L. Spanish Needles.
Common everywhere.

805. cernua, L. Small Bur-Marigold.
Common.

806. chrysanthemoides, Mx Large Bur-Marigold.
Jackson, (Bush), Pike, (Pech).

807. connata, Muhl. Swamp Beggar-ticks.
Common everywhere.

808. frondosa, L. Common Beggar-ticks.
Common everywhere.

809. **Hymenopappus** tenuifolius, Pursh.
(Watson in King's 5th Report).

810. **Helenium** autumnale, L. Sneeze-weed.
Common.

811. nudiflorum, Nutt.
Pike, (Pech), St. Louis, (Letterman).

812. tenuifolium, Nutt.
Jackson, (Bush). Migrating toward St. Louis along I. M. R. R., (Letterman).

813. **Gaillardia** aristata, Pursh.
(Gray in Flora of N. A).

814. pinnatifida, Torr.
(Gray in Flora of N. A.).

815. **Dysodia** chrysanthemoides, Lag. Fetid Marigold.
Common.

816. **Anthemis** *arvensis*, L. Chamomile.
Waste places, St. Louis, (Murtfeldt).

817. *Cotula*, L. May-weed.
Along roadsides everywhere.

818. **Achillea** Millefolium, L. Milfoil.
Common everywhere, and becoming a troublesome weed Westward.

819. **Matricaria** discoidea, DC. Wild Chamomile.
St. Louis, (Engelmann).

820. **Chrysanthemum** *Leucanthemum*, L. Ox-eye Daisy.
Boone, (Galloway), Jackson and Randolph, (Bush), Pettis, (McCluney), St. Louis, (Murtfeldt).

821. **Tanacetum** *vulgare*, L. Tansy.
Common in old gardens.

822. **Artemisia** *annua*, L. Wormwood.
Jackson, (Bush).

823. biennis, Wild. Biennial Wormwood.
Jackson, (Bush), St. Louis, (Riehl).

824. Canadensis, Michx.
Pike, (Pech).

825. caudata, Michx.
(Torrey & Gray).

826. dracunculoides, Pursh.
Jackson, (Bush), St. Louis, (Engelmann).

827. frigida, Wild.
(Torrey & Gray).

828. Ludoviciana, Nutt. Western Mugwort.
Common.

829. *vulgaris*, L. Common Mugwort.
Common westward.

830. **Senecio** aureus, L. Squaw-weed.
Common everywhere.

831. var. Balsamita, T. & G.
Jackson, (Bush).

832. lobatus, Pers. Butter-weed.
Common.

833. tomentosus, Mx. Wooly Ragwort.
Pike, (Pech).

834. *vulgaris*, L. Common Groundsel
Boone. (Tracy).

835. **Cacalia** atriplicifolia, L Pale Indian Plantain.
Common in damp woods.

836. reniformis, Muhl. Great Indian Plantain.
Boone, (Tracy).

837. suaveolens, L. Indian Plantain.
Pike, (Pech).

838. tubrosa, Nutt. Tuberous Indian Plantain.
Common.

839. **Erechthites** hieracifolia, Raf. Fireweed.
Common.

840. **Artium** *Lappa*, L. Burdock.
Common in rich ground.

841. **Cnicus** altissimus, Willd. Tall Thistle.
Common.

842. var. discolor, Gray.
Jackson (Bush).

843. *arvensis*, Hoff. Canada Thistle.
Very rare, but has been found in Cass, Jackson and one or two other counties.

844. *lanceolatus*, Hoff. Common Thistle.
Common.

845. Virginianus, Pursh.
Greene, (Shepard).

846. **Apogon** humilis, Ell.
Bates, Cass, (Broadhead).

847. **Krigia** Virginica, Willd. Dwarf Dandelion.
Common Eastward.

848. Dandelion, Nutt.
St. Louis, (Engelmann).

849. **Cichorium** *Intybus*, Cichory.
Greene, (Shepard).

850. **Hieracium** Canadense, Michx. Canada Hawkweed.
Cass, (Broadhead).

851. Gronovii, L. Hairy Hawkweed.
Pike, (Pech), Wright, (Bush).

852. longipilum, Torr. Long-bearded Hawkweed.
Greene and Jackson, (Bush).

853. scabrum, Michx. Rough Hawkweed.
Wright, (Bush).

854. **Prenanthes** aspera, Mx. Rattlesnake Root.
Common.

355. altissima, L, Tall White Lettuce.
Wright, (Bush).

856. racemosa, Mx.
Greene, (Shepard).

857. crepidinea, Mx.
Pike, (Pech), St. Louis, (Riehl).

858. **Troximon** cuspidatum, Pursh.
Common.

859 **Taraxacum** officinale, Weber. Dandelion.
Common everywhere.

860. **Pyrrhopappus** Carolinianus, DC. False Dandelion.
Greene, (Shepard), Madison, (Broadhead), Mississippi, (Galloway).

861. scaposus, DC.
Bates and Vernon, (Broadhead)

862. **Lactuca** *scariola*, L. Prickly Lettuce.
Jackson, (Bush) "Thoroughly naturalized in St. Louis during the last eight years, and has now taken to the woods."—(Letterman.)

863. Canadensis, L.
Common.

864. integrifolia, T. & G.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Murtfeldt).

865. hirsuta, Muhl.
Jackson, (Bush).

866. Ludoviciana, DC.
Jackson, (Bush).

867. Floridana, Gærtn.
Common along old fences.

868. acuminata, Gray.
Jackson, (Bush), St. Louis, Murtfeldt.

869. **Sonchus** *oleraceus*, L. Sow thistle.
Common.

870. *asper*, Vill. Spiny-leaved Sow-thistle.
Common everywhere.

871. *arvensis*, L. Field Sow-thistle.
Boone, (Galloway).

LOBELIACEÆ.

Lobelia Family.

872. **Lobelia** cardinalis, L. Cardinal Flower.
All parts, but becoming rare.

873. inflata, L Indian Tobacco.
Boone, (Tracy), Jackson, (Bush), Pettis, (McCluney), Pike (Pech), St. Louis, (Murtfeldt).

874. Kalmii, L.
Knox, (Broadhead).

875. leptostachys, A. DC.
Common.

876. puberula, Michx.
St. Louis, (Tracy).

877. spicata, Lam.
Common.

878. syphilitica, L. Blue Lobelia.
Common everywhere.

CAMPANULACEÆ.

Campanula Family.

879. **Specularia** leptocarpa, Gray.
Common Westward.

880. perfoliata, A. DC. Venus' Looking-glass.
Common everywhere.

881. **Campanula** Americana, L. Tall Bell-flower.
Common.

ERICACEÆ.

Heath Family.

882. **Gaylussacia** resinosa, T. & G. Black Huckleberry.
Miller, (Winick).

883. dumosa, T. & G. Dwarf Huckleberry.
Newton, (Broadhead).

884. **Vaccinium** arboreum, Marshall. Farkleberry.
Common South and Southeast.

885. corymbosum, L. Swamp Blueberry.
Greene, (Shepard), Iron, (Broadhead).

886. Pennsylvanicum, Lam. Dwarf Blueberry.
Common Southeast.

887. stamineum, L. Deerberry.
Iron, (Letterman).

888. vacillans, Solander. Low Blueberry.
Boone, Howard. Greene and Southeast.

889. **Arctostaphylos** Uva-ursi, Spreng. Bearberry.
Southeast, (Broadhead).

890. **Leucothoe** racemosa, Gray.
Madison, (Broadhead).

891. **Rhododendron** nudiflorum, Torr. Purple Azalea.
Madison, (Broadhead).

892. **Schweinitzia** odorata, Ell. Sweet Pinesap.
St. Louis, (Murtfeldt).

893. **Monotropa** uniflora, L. Indian Pipe.
Common from Pike, Boone and Jackson Southward.

PRIMULACEÆ.

Primrose Family.

894. **Dodecatheon** Meadia, L. Shooting Star.
Common.

895. **Androsace** occidentalis, Pursh.
Franklin, St. Louis, (Letterman), Jackson, (Bush), Pike, (Pech).

896. **Steironema** ciliatum, Raf. Loosestrife.
Common

897. lanceolatum, Gray.
Cass, (Broadhead), St. Louis, (Riehl).

898. var. hybridum, Gray.
Jackson, Randolph, (Bush), Miller, (Winick).

899. longifolium, Gray.
Boone, (Tracy), Greene, (Shepard), Madison, (Broadhead).

900. **Lysimachia** stricta, Ait.
St. Louis, (Murtfeldt).

901. *nummularia*, L. Moneywort.
Escaped from gardens in damp ground.

902. **Anagallis** *arvensis*, L. Pimpernel.
Jackson, (Bush), St. Louis, (Murtfeldt).

903. **Samolus** Valerandi, L. Water Pimpernel.
Pike, (Pech).

904. var. Americanus, Gray.
Greene, (Bush), St. Louis and Southeast, (Letterman).

SAPOTACEÆ.

Sapodilla Family.

905. **Bumelia** lanuginosa, Pers. Bumelia.
Occasionally from Missouri River bluffs Southward.

906. lycioides, Gærtn. Southern Buckthorn.
St. Louis and Southward, (Letterman).

907. tenax, Willd.
Miller, (Winick).

EBENACEÆ.

Ebony Family.

908. **Diospyros** Virginiana, L. Persimmon.
Common except Northwest.

OLEACEÆ.

Ash Family.

909. **Fraxinus** Americana, L. White Ash.
The most common species.

910. pubescens, Lam. Red Ash.
Jackson, (Bush), Saline, (Galloway).

911. quadrangulata, Michx. Blue Ash.
Common Eastward from Chariton, Howard and Greene.

912. sambucifolia, Lam. Black Ash.
Boone, (Galloway), Callaway and Cedar, (Broadhead).

913. viridis, Michx. f. Green Ash.
Boone, (Galloway), Jackson, (Bush), Ralls, (Broadhead).

914. **Forestiera** acuminata, Poir.
Pike, (Pech), Bank of Mississippi at mouth of Meramec River, (Letterman).

915. **Chionanthus** Virginica, L. White Fringe.
Mississippi, (Galloway).

APOCYNACEÆ.

Dogbane Family.

916. **Amsonia** Tabernæmontana, Walt.
Common.

917. **Apocynum** androsæmifolium, L.
Boone, (Galloway), Greene, (Shepard), Jackson, (Bush), St. Louis, (Murtfeldt).

918. cannabinum, L. Indian Hemp.
Common everywhere.

919. var. hypericifolium, Gray.
Pike, (Pech), Putnam, (Swallow).

ASCLEPIADACEÆ.

Milkweed Family.

920. **Anantherix** connivens, Gray.
Franklin & St. Louis, (Letterman), Miller, (Winick).

921. **Asclepiodora** viridis, Gray.
Jackson, (Bush).

922. **Asclepias** Cornuti, Decaisne. Silkweed.
Common everywhere.

923. incarnata, L. Swamp Milkweed.
Common.

924. Meadii, Torr.
Cass, (Broadhead), Jackson, (Bush), Putnam, (Swallow).

925. obtusifolia, Michx.
Cass, (Broadhead), Jackson, (Bush).

926. paupercula, Michx.
Gentry, (Swallow).

927. perennis, Walt.
Mississippi, (Galloway).

928. phytolaccoides, Pursh. Poke Milkweed.
Iron, (Broadhead).

929. purpurascens, L. Purple Milkweed.
Common.

930. quadrifolia, Jacq. Four-leaved Milkweed.
Common.

931. rubra, L. Red Milkweed.
Boone, (Galloway), St. Louis, (Murtfeldt).

932. Sullivantii, Engelm.
Cass & Daviess, (Broadhead), Jackson, (Bush).

933. tuberosa, L. Pleurisy Root.
Common everywhere.

934. variegata, L.
Boone, (Galloway).

935. verticillata, L. Whorled Milkweed.
Common.

936. viridula, Chapm.
Miller, (Winick).

937. **Acerates** lanuginosa. Decaisne. Green Milkweed.
White River, (Nuttall).

938. longifolia, Ell.
Common.

939. viridiflora, Ell.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).
940. var. lanceolata, Gray.
Jackson, (Bush).
941. var. linearis, Gray.
Jackson, (Bush).
942. **Enslenia** albida, Nutt.
Jackson, (Bush), Lawrence, (Swallow), St. Louis, (Murtfeldt).
943. **Vincetoxicum** *nigrum*, Mœnch.
Jackson, (Tracy).
944. **Gonolobus** Carolinensis, R. Br.
Franklin, Iron and St. Louis, (Letterman).
945. lævis, Michx. var. macrophyllus, Gray.
Greene, (Shepard).
946. obliquus, R. Br.
Madison, (Broadhead).

LOGANIACEÆ.

Logania Family.

947. **Spigelia** Marilandica, L. Pink Root.
Madison, (Broadhead), St. Francois, (Tracy).

GENTIANACEÆ.

Gentian Family.

948. **Sabbatia** angularis, Pursh. American Centaury.
Common.
949. stellaris, Pursh.
Clay, (Mann).
950. **Gentiana** alba. Muhl. White Gentian.
Common Westward.
951. Andrewsii, Griseb. Closed Gentian.
Jackson, (Bush), St. Louis, (Letterman).
952. angustifolia, Michx. Narrow-leaved Gentian.
Pettis, (McCluney), Ripley, (Broadhead).
953. puberula, Michx.
Common.
954. quinqueflora, Lam. Five flowered Gentian.
Adair, (Broadhead).

955. **Bartonia** tenella, Muhl.
Collected in Missouri by Swallow. No locality given.

956. **Limnanthemum** lacunosum, Griseb. Floating Heart.
"Missouri," (Meehan).

POLEMONIACEÆ.

Polemonium Family.

957. **Phlox** amœna, Sims. Sweet William.
Greene, (Shepard), Livingston, (Broadhead), Miller, (Winick).

958. bifida, Beck.
(Gray's Manual, 5th Ed).

959. divaricata, L.
Common everywhere.

960. glaberrima, L.
Clay and Saline, (Broadhead), Jackson, (Bush), St. Louis, (Letterman).

961. maculata, L. Common Wild Sweet William.
Common everywhere.

962. paniculata, L.
Common.

963. pilosa, L.
Common.

964. procumbens, Lehm.
Boone, (Galloway).

965. reptans, Michx.
Boone, (Tracy), Clay, (Broadhead), Knox, (Linn), Pike, (Pech).

966. **Polemonium** reptans, L. Greek Valerian.
Common in damp places.

HYDROPHYLLACEÆ.

Waterleaf Family.

967. **Hydrophyllum** appendiculatum, Michx. Waterleaf.
Common.

968. macrophyllum, Nutt.
Jackson, (Bush).

969. Virginicum, L.
Common.

970. **Ellisia** Nyctelea, L.
Common in damp soils.

971. **Phacelia** bipinnatifida, Michx..
"Missouri," (Meehan).

972. fimbriata. Michx.
Pike, (Pech), St. Louis, (Riehl).

973. parviflora, Pursh.
Greene, (Shepard).

974. var. hirsuta, Gray.
Greene, (Shepard), Jasper, (Broadhead).

975. Purshii, Buckl.
Clay, (Broadhead).

976. **Hydrolea** affinis, Gray.
Butler, (Lettermann).

977. quadrivalvis, Walt.
Mississippi, (Galloway).

BORRAGINACEÆ.

Borrage Family.

978. **Heliotropium** tenellum, Torr. Wild Heliotrope.
Franklin, Greene, Iron and St. Louis, (Letterman), Wright, (Bush).

979. *Indicum*, L. Indian Heliotrope.
Butler and St. Louis, (Letterman), Mississippi, (Galloway).

980. **Cynoglossum** *officinale*, L. Hound's Tongue.
Common about old gardens.

981. Virginicum, L. Wild Comfrey.
Boone, (Tracy), Jackson, (Bush).

982. **Echinospermum** Virginicum, Lehm. Stickseed.
Common.

983. **Mertensia** Virginica, DC. Virginian Cowslip.
Common in damp woods.

984. **Myosotis** arvensis, Hoffm. Forget-me-not.
Pike, (Pech).

985. verna, Nutt.
St. Louis, (Geyer).

986. **Lithospermum** *arvense*, L. Corn Gromwell.
Jackson, (Bush), St. Louis, (Murtfeldt).

987. angustifolium, Michx. Narrow-leaved Puccoon.
Common.

988. canescens, Lehm. Alkanet.
Common on dry hills.

989. hirtum, Lehm. Hairy Puccoon.
Common.

990. latifolium, Michx. Wide-leaved Puccoon.
Jackson, (Bush), Miller, (Winick).

991. **Onosmodium** Carolinianum, DC. False Gromwell.
Jackson, (Bush), St. Louis, (Murtfeldt).

992. var. molle, Michx.
Cass, (Broadhead), Jackson, (Bush).

993. Virginianum, DC.
Jackson, (Bush), Pike, (Pech).

994. **Echium** *vulgare*, L. Blue-weed.
Jackson, (Bush).

995. **Symphytum** *officinale*, L. Comfrey.
Boone, (Galloway).

CONVOLVULACEÆ.

Morning Glory Family.

996. **Ipomœa** coccinea, L. Cypress-vine.
Jackson, (Bush).

997. hederacea, Jacq.
Jackson, (Bush), Miller, (Winick), St. Louis, (Murtfeldt).

998. lacunosa, L.
Common.

999. pandurata, Meyer. Man-of-the Earth.
Common.

1000. purpurea, Lam. Morning Glory.
A troublesome weed.

1001. Quamoclit, L.
Greene, (Shepard).

1002. **Convolvulus** sepium, L. Bindweed.
Common.

1003. spithamæus, L.
Greene, (Shepard).

1004. **Brewerıa** aquatica. Gray.
Scotland, (Swallow).

1005. **Evolvulus** argenteus, Pursh.
Franklin and St. Louis, (Letterman), Potosi in Washington (Gray's Manual, 5th Ed.)

1006. **Cuscuta** arvensis, Beyrich. Dodder.
Greene, (Shepard).

1007. chlorocarpa, Engelm.
Jackson, (Bush).

1008. compacta, Juss.
Boone, (Tracy).

1009. cuspidata, Engelm.
St. Louis, (Eggert).

1010. glomerata, Chois.
Common.

1011. Gronovii, Willd.
Pike, (Pech).

1012. tenuiflora, Engelm.
(Watson in King's 5th Report).

SOLANACEÆ.

Nightshade Family.

1013. **Solanum** Carolinense, L. Horse-Nettle.
Common everywhere.

1014. *Dulcamara,* L.
Boone, (Tracy), Jackson, (Bush), Pettis (McCluney), St. Louis, (Murtfeldt).

1015. *nigrum*, L. Nightshade.
Common.

1016. rostratum, Dunal.
Very common in Western Missouri, and spreading Eastward along railroads. Sometimes erroneously called "Canada Thistle."

1017. **Physalis** angulata, L. Ground Cherry.
St. Louis, (Riehl).

1018. Philadelphica, Lam.
Jackson, (Bush).

1019. pubescens, L.
Boone, (Tracy), Jackson, (Bush).

1020. lanceolata, Gray.
Cass and Jackson, (Broadhead), St. Louis, (Geyer).

1021. var. hirta, Gray.
Jackson, (Bush).

1022. var. lævigata, Gray.
Jackson, (Bush).

1023. Virginiana, Mill.
Jackson, (Bush).

1024. viscosa, L.
Common everywhere.

1025. **Nicandra** *physaloides*, Gærtn. Apple of Peru,
Boone, (Galloway), Jackson, (Bush), Pike, (Pech), St. Louis, (Murtfeldt).

1026. **Lycium** *vulgare*, Dunal. Matrimony Vine.
Common about old gardens.

1027. **Datura** *Stramonium*, L. Jamestown Weed.
Common Northwest.

1028. *Tatula*, L.
Common.

1029. **Nicotiana** longiflora. Wild Tobacco.
Jackson, (Mann).

SCROPHULARIACEÆ.

Figwort Family.

1030. **Verbascum** *Blattaria*, L. Moth Mullein.
Common along roadsides.

1031. *Thapsus*, L. Mullein.
Common in old fields.

1032. **Linaria** *Elatine*, Miller. Toad Flax.
St. Louis, along Mo. Pac. R. R. (Letterman).

1033. *vulgaris*, Miller. Butter-and-eggs.
Common.

1034. **Collinsia** verna. Nutt.
Common.

1035. violacea, Nutt.
Bates & Jasper, (Broadhead).

1036. **Scrophularia** nodosa, L., var. Marilandica, Gray. Figwort.
Common.

1037. **Chelone** glabra, L. Snake-head.
Pike, (Pech) St. Louis, (Letterman).

1038. **Pentstemon** gracilis, Nutt. Beardtongue.
Greene, (Shepard).
1039. grandiflorus, Nutt.
Atchison, (Broadhead).
1040. lævigatus, Solander
Banks of Mississippi River.
1041. var. Digitalis, Gray.
Common.
1042. pubescens, Solander.
Common Eastward, rare Westward.
1043. **Mimulus** alatus, Solander. Monkey Flower.
Common.
1044. Jamesii, T. & G.
Greene, (Shepard).
1045. ringens, Gray.
Boone & St. Louis. (Tracy), Jackson, (Bush).
1046. **Conobea** multifida, Benth.
Jackson, (Bush), Pike, (Pech), St. Louis, (Riehl).
1047. **Herpestis** rotundifolia, Pursh.
Cass, (Broadhead), Jackson, (Bush).
1048. **Gratiola** aurea, Muhl. Hedge Hyssop.
St. Louis, (Geyer).
1049. sphærocarpa, Ell.
Jackson, (Bush).
1050. Virginiana, L.
Cass & Knox, (Broadhead), Pike, (Pech), Randolph, (Bush).
1051. **Ilysanthes** gratioloides, Benth. False Pimpernel.
Common.
1052. **Limosella** aquatica, L. Mudwort.
Jackson, (Bush).
1053. **Veronica** *agrestis*, L. Field Speedwell.
St. Louis, (Tracy).
1054. Anagallis, L. Water Speedwell.
Greene, (Shepard), Jackson, (Bush).
1055. *arvensis*, L. Corn Speedwell.
Common.
1056. peregrina, L. Purslane Speedwell.
Very common in cultivated ground.
1057. serpyllifolia, L. Thyme leaved Speedwell.
Boone, (Tracy), Marion, (Broadhead), Pike, (Pech).
1058. Virginica, L. Culver's Physic.
Common.

1059. **Buchnera** Americana, L. Blue Hearts.
Barton & Bates, (Broadhead), Greene, (Shepard), St. Louis, (Riehl).

1060. **Seymeria** macrophylla, Nutt. Mullein Foxglove.
Boone & St. Louis, (Tracy), Cass, (Broadhead), Jackson, (Bush).

1061. **Gerardia** auriculata, Michx. Gerardia.
Cass, (Broadhead), Jackson, (Bush), St. Louis, (Murtfeldt).

1062. flava, L. Downy Foxglove.
Pike, (Pech), Wright, (Bush).

1063 grandiflora, Benth.
Greene, (Shepard), Miller, (Winick).

1064. pedicularia, L.
Greene, (Shepard).

1065. purpurea, L. Purple Gerardia.
Common.

1066. quercifolia, Pursh. Smooth Foxglove.
Osage, (Swallow), Pike, (Pech).

1067. setacea, Walt.
Wright, (Bush).

1068. Skinneriana, Wood.
Jackson, (Bush).

1069. tenuifolia, Vahl. Slender Gerardia.
Common.

1070. **Castilleia** coccinea, Spreng. Painted Cup.
Common everywhere.

1071. sessiliflora, Pursh.
Greene, (Shepard).

1072. **Pedicularis** Canadensis, L. Lousewort.
Common in rich woods.

1073. lanceolata, Michx.
Greene, (Shepard).

OROBANCHACEÆ.

Broomrape Family.

1074. **Aphyllon** uniflorum, T. & G. One Flowered Cancer Root.
Common.

1075. **Epiphegus** Virginiana, Bart. Cancer Root.
Missouri, (Meehan).

LENTIBULACEÆ.

Bladderwort Family.

1076. **Utricularia** minor, L. Small Bladderwort.
St. Louis, (Riehl).

1077. vulgaris, L. Great Bladderwort.
Common in ponds.

BIGNONIACEÆ.

Bignonia Family.

1078. **Bignonia** capreolata, L.
Common Southeast.

1079. **Tecoma** radicans, Juss. Trumpetvine.
Common South of Pike, Boone, Pettis and Bates.

1080. **Catalpa** bignonioides, Walt. Common Catalpa.
Common.

1081. speciosa, Warder. Hardy Catalpa.
Undoubtedly indigenous along Black River where Letterman procured logs three feet in diameter. Also found frequently in other localities, where perhaps it has been planted.

PEDALIACEÆ.

1082. **Martynia** proboscidea, Glox. Unicorn Plant.
Common.

ACANTHACEÆ.

Acanthus Family.

1083. **Calophanes** oblongifolia, Don.
St. Louis, (Riehl).

1084. **Ruellia** ciliosa, Pursh.
Common.

1085. var. longiflora, Gray.
Jackson, (Bush), St. Louis, (Murtfeldt).

1086. strepens, Nees.
Common from Pike and Cass Southward.

1087. **Dianthera** Americana, L. Water Willow.
Common.

VERBENACEÆ.

Vervain Family.

1088. **Phryma** Leptostachya, L. Lopseed.
Common in rocky woods.

1089. **Verbena** angustifolia. Michx. Narrow-leaved Vervain.
Common on dry hills.

1090. Aubletia, L.
Common South and West.

1091. bracteosa, Michx.
Common along roadsides.

1092. hastata, L. Blue Vervain.
Common in waste places.

1093. *officinalis*, L. European Vervain.
Mississippi, (Galloway), Pike, (Pech).

1094. stricta, Vent. Hoary Vervain.
Common.

1095. urticifolia, L. White Vervain.
Common along roadsides.

1096. **Lippia** lanceolata, Michx. Fog-fruit.
Common.

1097. nodiflora, Michx.
St. Louis, (Riehl).

1098. **Callicarpa** Americana, L. French Mulberry.
Miller, (Winick).

LABIATÆ.

Mint Family.

1099. **Trichostema** dichotomum, L. Blue Curls.
St. Louis, (Riehl).

1100. **Isanthus** cæruleus, Michx. False Pennyroyal.
Common on barrens.

1101. **Teucrium** Canadense, L, Wood Sage.
Common everywhere.

1102. **Collinsonia** Canadensis, L. Horse Balm.
Iron and Wayne, (Letterman).

1103. **Mentha** Canadensis, L. Wild Mint.
Common on low grounds.

1104. var. glabrata, Benth.
Jackson, (Bush).

1105. *piperita*, L. Peppermint.
Common about gardens.

1106. *viridis*, L. Spearmint.
Jackson, (Bush), St. Louis, (Murtfeldt).

1107. **Lycopus** rubellus, Mœnch. Water Horehound.
Greene, (Shepard).

1108. sinuatus, Ell.
Common.

1109. Virginicus, L.
Common on river bottom lands.

1110. **Cunila** Mariana, L. Dittany.
Common from Pike and Callaway South and West.

1111. **Pycnanthemum** lanceolatum, Pursh. Mountain Mint.
Greene, (Shepard), Pike, (Pech).

1112. leptopodon, Gray.
Greene, (Shepard).

1113. linifolium, Pursh.
Common.

1114. muticum, Pers. var. pilosum. Gray.
Greene, (Shepard), Jackson, (Bush).

1115. Torreyi, Benth.
Jackson, (Bush).

1116. **Calamintha** glabella, Benth. Calaminth.
Miller, (Winick).

1117. Nutallii, Benth.
Greene, (Shepard).

1118. **Melissa** *officinalis*, L. Common Balm.
Common.

1119. **Hedeoma** hispida, Pursh. Mock Pennyroyal.
Common in dry, rocky places.

1120. pulegioides, Pers.
Common everywhere.

1121. **Salvia** azurea, Lam. Sage,
Cass, (Broadhead).

1122. var. grandiflora, Benth.
Jackson, (Bush), St. Louis, (Murtfeldt).

1123. lanceolata, Willd.
Common.

1124. lyrata, L. Lyre-leaved Sage.
Cass and St. Charles, (Broadhead), Iron and Wayne, (Letterman), St. Louis, (Murtfeldt).

1125. **Monarda** Bradburiana. Beck. Horse-mint.
Common everywhere.

1126. fistulosa, L. Wild Bergamot.
Common everywhere.

1127. punctata, L. Horse-mint.
Greene, (Shepard), Mississippi, (Galloway), Pettis, (McCluney).

1128. **Blephilia** ciliata, Raf.
Common.

1129. hirsuta, Benth.
Common in damp, open woods.

1130. **Lophanthus** nepetoides, Benth. Giant Hyssop.
Common along fences.

1131. scrophulariæfolius, Benth.
Cass and Jackson, (Broadhead), Pettis, (McCluney).

1132. **Nepeta** *Cataria*, L. Catnip.
Common about old gardens.

1133. *Glechoma*, Benth. Ground Ivy.
Common in damp places.

1134. **Scutellaria** canescens, Nutt. Skullcap.
Common on hillsides.

1135. galericulata, L.
Jackson, (Bush).

1136. lateriflora, L.
Common.

1137. nervosa, Pursh.
Pike, (Pech).

1138. parvula, Michx.
Common everywhere.

1139. pilosa, Michx.
Wright, (Bush).

1140. saxatilis, Riddell.
Miller, (Winick).

1141. versicolor, Nutt.
Common along river banks.

1142. **Brunella** vulgaris, L Self-heal.
Common in pastures.

1143. **Physostegia** Virginiana, Benth. False Dragon-head.
Common.

1144. var. speciosa, Gray.
Common Westward.

1145. **Marrubium** *vulgare*, L. Horehound,
Common about old gardens.
1146. **Leonurus** *Cardiaca*, L. Motherwort.
Boone, (Tracy), Jackson, (Bush), Pettis, (McCluney), St. Louis, (Riehl).
1147. *Marrubiastrum*, L.
Pike, (Pech).
1148. **Lamium** *amplexicaule*, L. Dead Nettle.
Cass, (Broadhead).
1149. **Stachys** aspera, Michx. Hedge Nettle
Common.
1150. var. glabra, Gray.
Jackson, (Bush)
1151. cordata, Riddell.
Jackson, (Bush).
1152. hyssopifolia, Michx.
"Missouri," (A. Wood)
1153. palustris, L.
Common.

PLANTAGINACEÆ.

Plantain Family.

1154. **Plantago** cordata, Lam. Plantain.
Not rare.
1155. heterophylla, Nutt.
Boone, (Tracy).
1156. *lanceolata*, L. Ribgrass.
Boone, (Tracy), Jackson, (Bush).
1157. *major*, L. Common Plantain.
About dooryards everwhere.
1158. Patagonica, Jacq.
Boone (Galloway), St. Louis, (Kellogg).
1159. var. gnaphalioides, Gray.
Clay and Jackson, (Bush)
1160. var. aristata, Gray.
Boone, (Tracy), Jackson,—*rare*—(Bush), Lewis (Egeling), Pike. (Pech).
1161. pusilla, Nutt.
Common.

1162. Rugellii, Decaisne.
Franklin, Jefferson, and St. Louis, (Letterman), Greene, (Shepard).

1163. Virginica, L.
Common.

1164. var. longifolia, Gray.
Jackson, (Bush), St. Louis, (Murtfeldt).

ARISTOLOCHIACEÆ.

Birthwort Family.

1165. **Asarum** Canadense, L. Wild Ginger.
Common in rich woods.

1166. **Aristolochia** Serpentaria, L. Virginia Snakeroot.
Boone (Galloway), Greene and Jackson, (Bush), St. Louis, (Tracy).

1167. Sipho, L'Her. Dutchman's Pipe.
Mississippi, (Galloway).

1168. tomentosa, Sims.
Common Southward.

NYCTAGINACEÆ.

Four o'clock Family.

1169. **Oxybaphus** albidus, Sweet.
Jackson, (Bush).

1170. angustifolius, Sweet.
Common Westward.

1171. hirsutus, Sweet.
Jackson, (Bush).

1172. nyctagineus, Sweet.
Common.

PHYTOLACCACEÆ.

Poke Family.

1173. **Phytolacca** decandra, L. Poke-root.
Common in rich soil.

CHENOPODIACEÆ.

Goosefoot Family.

1174. **Cycloloma** platyphyllum, Moquin. Winged Pigweed.
Clay and Jackson, (Bush), Franklin and St. Louis along Meramec River, (Letterman).

1175. **Chenopodium** *album*, L. Pigweed.
Common everywhere.

1176. var. viride, L.
Jackson, (Bush), Pike, (Pech).

1177. *ambrosioides*, L. Mexican Tea.
Common.

1178. var. *anthelminticum*, Gray. Wormseed.
Jackson, (Bush), St. Louis, (Riehl).

1179. *Boscianum*, Moq.
Jackson, (Bush).

1180. *Botrys*, L. Jerusalem Oak.
Along river bottoms.

1181. capitatum, Watson. Strawberry Blite.
Boone, (Tracy).

1182. *hybridum*, L. Maple-leaved Goosefoot.
Common.

1183. *murale*, L.
Jackson, (Bush).

1184. urbicum, L.
Common.

AMARANTACEÆ.

Amaranth Family.

1185. **Amarantus** *albus*, L, Pigweed.
Boone, (Tracy), Jackson, (Bush), St. Louis, (Murtfeldt).

1186. Blitum, L.
Cass, (Broadhead).

1187. hybridus, L.
Common.

1188. *hypochondriacus*, L. Red Amaranth.
Boone, (Tracy), Pike, (Pech).

1189. *paniculatus*, L.
Jackson, (Bush).

1190. *retroflexus*, L.
Jackson, (Bush).

1191. *spinosus* L. Thorny Amaranth.
Common everywhere.

1192. **Acnida** rusocarpa, Gray. Water-leaf.
Jackson, (Bush).

1193. tuberculata, Gray.
Jackson, (Bush).

1194. **Iresine** celosioides, L.
Butler, Jefferson and St. Louis, (Letterman).

POLYGONACEÆ.

Buckwheat Family.

1195. **Rumex** *Acetosella*, L. Sheep Sorrel.
Common everywhere.

1196. Britannica, L. Pale Dock.
Greene, (Shepard), Jackson, (Bush), Pike, (Pech).

1197. *conglomeratus*, Murr. Small Green Dock.
Boone, (Galloway), Pike, (Pech).

1198. *crispus*, L. Curled Dock.
Common.

1199. Engelmanni, Ledeb.
"Missouri," (A. Wood).

1200. maritimus, L. Golden Dock.
Along Missouri river.

1201. *obtusifolius*, L Bitter Dock.
Common.

1202. Salicifolius, Weinm. White Dock.
Jackson, (Bush).

1203. verticillatus, L. Swamp Dock.
St Louis, (Kellogg).

1204. **Polygonum** acre, H. B. K. Water Smartweed.
Common.

1205. amphibium, L. Water Persicaria.
Cass, (Broadhead).

1206. arifolium, L. Halberd-leaved Tear-thumb.
Greene, (Shepard).

1207. aviculare, L. Goose-grass.
Common about door-yards.

1208. *Convolvulus*, L. Black Bindweed.
Common.

1209. dumetorum, L. Climbing False Buckwheat.
Common.

1210. var. scandens, Gray.
Jackson, (Bush).

1211. erectum, L.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

1212. Hydropiper, L. Common Smartweed.
Common everywhere.

1213. hydropiperoides, Michx. Wild Water Pepper.
Common.

1214. incarnatum, Ell.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

1215. Muhlenbergii, Watson.
Jackson, (Bush).

1216. *orientale*, L. Princes' Feather.
Escaped from gardens.

1217. Pennsylvanicum, L.
Common.

1218. *Persicaria*, L. Lady's Thumb.
Boone, (Tracy), Jackson, (Bush) St. Louis, (Murtfeldt).

1219. ramosissimum, Michx.
Common.

1220. sagittatum, L. Arrow-Leaved Tear-Thumb.
Pike, (Pech), St. Francois, (Galloway).

1221. tenue, Michx.
Greene, (Shepard).

1222. Virginianum, L
Common.

1223. **Fagopyrum** *esculentum*, Mœnch. Buckwheat.
Occasionally escaped.

LAURACEÆ.

Laurel Family.

1224. **Sassafras** officinale, Nees. Sassafras.
Common, except Northwest. A tree cut by Galloway in Mississippi county, was 125 feet high to where the top had been broken off, and measured eighteen feet in circumference at seven feet above the ground.

1225. **Lindera** Benzoin, Meisner. Spice Bush.
Common.

1226. melissæfolia, Blume.
Greene, (Shepard).

THYMELEACEÆ.

Mezereum Family.

1227. **Dircapa** lustris, L. Leatherwood.
Common Eastward.

ELÆAGNACEÆ.

Oleaster Family.

1228. **Shepherdia** argentea, Nutt. Buffalo Berry.
"Missouri," (A. Wood).

SANTALACEÆ.

Sandalwood Family.

1229. **Comandra** umbellata, Nutt. Bastard Toad-flax.
Common.

LORANTHACEÆ.

Mistletoe Family.

1230. **Phoradendron** flavescens, Nutt. American Mistletoe.
Common in extreme Southeast.

SAURURACEÆ.

Lizzard's-Tail Family.

1231. **Saururus** cernuus, L. Lizzard's Tail.
Common.

CERATOPHYLLACEÆ.

Hornwort Family.

1232. **Ceratophyllum** demersum, L. Hornwort.
Jackson, (Bush), Pike, (Pech).

CALLITRICHACEÆ.

Water Starwort Family.

1233. **Callitriche** Austini. Engelm. Water Starwort.
"Missouri," (Gray's Manual, 5th Ed).

1234. heterophylla, Pursh.
Greene, (Shepard).

1235. verna, L.
Jackson, (Bush), Pike, (Pech).

EUPHORBIACEÆ.

Spurge Family.

1236. **Euphorbia** commutata, Engelm.
Franklin, Jefferson & St. Louis, (Letterman).

1237. corollata, L.
Common.

1238. dentata, Michx.
Common.

1239. dictyosperma, F. & M.
Clay & Jackson, (Bush).

1240. discoidalis, Chapm.
Franklin, Jefferson & St. Louis, (Letterman).

1241. Geyeri, Engelm,
Jackson, (Bush).

1242. heterophlla, L.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

1243. humistrata, Engelm.
Common.

1244. hypericifolia, L.
Common.

1245. maculata.
Common.

1246. *marginata*, Pursh.
Introduced from the West.
1247. obtusata, Pursh.
Pike, (Pech).
1248. petaloidea, Engelm.
Cass, (Broadhead).
1249. serpens, M. B. K.
Common.
1250. serpyllifolia, Pers.
Miller, (Winick).
1251. **Croton** capitatus, Michx.
Common.
1252. glandulosus, L.
Franklin, Jefferson & St. Louis, (Letterman), Greene, (Shepard).
1253. monanthogynus, Michx.
Common.
1254. Texensis, Mull.
Jackson, (Bush),
1255. **Acalypha** Virginica, L. Three-seeded Mercury.
Common.
1256. var. gracilens, Gray.
Jackson, (Bush).
1257. Caroliniana, Walt.
Greene, (Shepard), Pike, (Pech).
1258. **Ricinus** *communis*, L. Castor Bean.
Occasionally persistent about gardens.
1259. **Sebastiana** ligustrina, Mull.
St. Louis, (Geyer).
1260. **Tragia** macrocarpa, Willd.
Henry, (Bush).
1261. urticæfolia, Michx.
Greene, (Shepard), Miller, (Winick).
1262. **Crotonopsis** linearis, Michx.
Franklin, Jefferson and St. Louis, (Letterman).

URTICACEÆ.

Nettle Family.

1263. **Ulmus** alata, Michx. Winged Elm.
Common from Callaway and Cole Southeast.

1264. Americana, L. White Elm.
Common everywhere.

1265. fulva, Michx. Slippery Elm.
Common.

1266. racemosa, Thomas. Corky White Elm.
Boone, (Tracy), Jackson, (Bush).

1267. **Celtis** occidentalis, L. Hackberry.
Common.

1268. **Morus** rubra, L. Red Mulberry.
Common.

1269. *alba*, L.
Occasionally escaped.

1270. **Maclura** aurantiaca.
Newton, (Swallow), Spring river, (Tracy).

1271. **Urtica** *dioica*, L. Stinging Nettle.
Common.

1272. gracilis, Ait.
Common on moist ground.

1273. **Laportea** Canadensis, Gaudich. Wood Nettle.
Common.

1274. **Pilea** pumila, Gray. Clearweed.
Common in shady places.

1275. **Bœhmeria** cylindrica, Willd. False Nettle.
Boone, (Tracy), Jackson, (Bush), Pike, (Pech).

1276. **Parietaria** Pennsylvanica, Muhl. Pellitory.
Common on rocky banks.

1277. **Cannabis** *sativa*, L. Hemp.
Common.

1278. **Humulus** Lupulus, L. Hops.
Common.

PLATANACEÆ.

Sycamore Family.

1279. **Platanus** occidentalis, L. Sycamore.
Common along streams.

JUGLANDACEÆ.

Walnut Family.

1280. **Juglans** cinerea, L. Butternut.
Common except West and Northwest.

1281. nigra, L. Black Walnut.
Common.

1282. **Carya** alba, Nutt. Shell-bark Hickory.
Common.

1283. amara, Nutt. Bitter-nut Hickory.
Common.

1284. aquatica, Nutt.
Butler and common in low lands Southeast, (Letterman).

1285. olivæformis, Nutt. Pecan.
Common along rivers except in Northwest.

1286. porcina, Nutt. Pig-nut Hickory.
Common.

1287. sulcata, Nutt. Large Shell-bark Hickory.
Common along streams.

1288. tomentosa, Nutt. Mockernut.
Common except West and Northwest.

——? From four localities in the State I have received nuts which are apparently from a hybrid of C. alba and C. olivæformis. They are certainly different from any recognized species, but more study is necessary to determine their true relationship. (Tracy).

CUPULIFERÆ.

Oak Family.

1289. **Quercus** alba, L. White Oak.
Common except West of the Nodaway River.

1290. aquatica, Catesby. Water Oak.
Common Southeast.

1291. bicolor, Willd. Swamp White Oak.
Common except in extreme Northwest.

1292. Catesbæi, Michx.
"Missouri," (Engelmann).

1293. cinerea, Michx. Upland Willow Oak.
(Swallow in Geol. Survey Rep.)

1294. coccinea, Wang. Scarlet Oak.
Common.

1295. falcata, Michx. Spanish Oak.
Common Southward.

1296. heterophylla, Michx. Bartram Oak.
Cooper, DeKalb, Shelby and Sullivan, (Broadhead), Pettis, (Swallow).

1297. imbricaria, Michx. Laurel Oak.
Boone, (Tracy), Miller, (Swallow), St. Louis to Butler, (Letterman).

1298. Leana, Nutt. Lea's Oak.
Butler, St. Louis and Washington, rare, (Letterman). Pettis, (Swallow.)

1299. lyrata, Walt.
Common in Butler and swamps of S. E. Mo. Six trees found near Allenton in 1883, the first time observed so far North, (Letterman).

1300. macrocarpa, Michx. Bur Oak.
Low lands South and on high lands North.

1301. Michauxii, Nutt. Cow Oak.
Butler and swamps of Southeast, (Letterman).

1302. Muhlenbergii, Engelm. Chestnut Oak.
Common.

1303. nigra, L. Black-jack Oak.
Common.

1304. obtusiloba, Michx. Post Oak.
Not West of Liberty and Maryville. Common elsewhere. (Broadhead).

1305. palustris, Du Roi. Pin Oak.
Common except Northwest.

1306. Phellos, L. Willow Oak.
Common Southeast.

1307. prinoides, Willd.
Common Northwest.

1308. rubra, L. Red Oak.
Common.

1309. var. runcinata, Engelm.
Miller, (Swallow), St. Louis, (Engelmann).

1310. tinctoria, Bart. Black Oak.
Common.

1311. tridentata, Engelm.
St. Louis, (Engelmann).

1312. quinqueloba, Engelm.
St. Louis, (Engelmann).

1313. **Castanea** pumila, Michx. Chinquapin.
Barry, Cedar and Jasper, (Broadhead).

1314. vulgaris, var. Americana, Walt. Chestnut.
Swallow reports one large tree in New Madrid.
1315. **Fagus** ferruginea, Ait. Beech.
In Southeast only.

CORYLACEÆ.

Hazel Family.

1316. **Ostrya** Virginica, Willd. Hop Tree.
Common.
1317. **Carpinus** Caroliniana, Walt.
Common except Northwest.
1318. **Corylus** Americana, Walt. Hazel Nut.
Common.

BETULACEÆ.

Birch Family.

1319. **Betula** alba, var. populifolia, Sp. White Birch.
Common along streams.
1320. nigra, L. Red Birch.
Common except Westward.
1321. **Alnus** incana, Willd. Speckled Alder.
Mississippi, (Galloway).
1322. serrulata, Ait. Smooth Alder.
Common except Northwest.

SALICACEÆ.

Willow Family.

1323. **Salix** *alba*, L. White Willow.
Introduced.
1324. var. vitellina, Gray. Golden Willow.
Introduced.
1325. amygdaloides, And.
Jackson, (Bush).
1326. candida, Willd. Hoary Willow.
Iron, (Broadhead.)

1327. cordata, Muhl. Heart-leaved Willow.
(Watson in King's 5th Report).
1328. var. rigida, Muhl.
St. Louis, (Geyer).
1329. var. angustata, And.
Putnam, (Swallow).
1330. discolor, Muhl. Glaucous Willow.
Greene, (Shepard), Southern Mo., (Sargent).
1331. humilis, Marsh. Prairie Willow.
Boone, (Tracy), Greene, (Shepard), Jackson, (Bush), St. Louis, (Geyer).
1332. longifolia, Muhl. Long-leaved Willow.
Boone, (Tracy), Jackson, (Bush), Putnam, (Swallow).
1333. lucida, Muhl. Shining Willow.
Jackson, (Bush).
1334. nigra, Marsh. Black Willow.
Common.
1335. petiolaris, Smith. Petioled Willow.
Jackson, (Bush).
1336. sericea, Marsh. Silky Willow.
Jackson, (Bush), St. Louis, (Murtfeldt).
1337. tristis, Ait. Dwarf Gray Willow.
Pike, (Pech).
1338. **Populus** alba, L. Silver Poplar.
Introduced.
1339. angulata, Ait. Angled Cottonwood.
Jackson, (Bush).
1340. balsamifera, L. Balsam Poplar.
Boone, (Galloway).
1341. grandidentata, Michx. Large-toothed Aspen.
Boone, (Tracy), Wright, (Bush).
1342. heterophylla, L. Downy Poplar.
Common Southeast.
1343. monilifera, Ait. Cottonwood.
Common, especially Northwest.
1344. tremuloides, Michx. American Aspen.
Common Northward.

CONIFERÆ.

Pine Family.

1345. **Juniperus** communis, L. Juniper.
Greene, (Shepard).

1346. Virginiana, L. Red Cedar.
Common on hilly woodlands.

1347 **Pinus** mitis, Michx. Yellow Pine.
Letterman reports this from nineteen counties in the Ozark region.

1348. **Taxodium** distichum, Richard. Cypress.
Common in the swamps of the Southeast.

ARACEÆ.

Arum Family.

1349. **Arisæma** Dracontium, Schott. Dragon Root.
Boone and St. Louis, (Tracy), Jackson, (Bush).

1350. triphyllum, Torr. Indian Turnip.
Common.

1351. **Orontium** aquaticum, L. Golden Club.
Boone, (Tracy).

1352. **Acorus** Calamus, L. Sweet Flag.
Common.

LEMNACEÆ.

Duckweed Family.

1353. **Lemna** gibba, L.
Pike, (Pech).

1354. paucicostata, Hegel.
Jackson, (Bush), St. Louis, (Gray).

1355. Torreyi, Austin.
(Gray's Manual, 5th Ed).

1356. **Speirodela** polyrrhiza, Schleid.
Cass, (Broadhead), Jackson, (Bush), Pike, (Pech).

TYPHACEÆ.

Cat-tail Family.

1357. **Sparganium** eurycarpum, Engelm. Bur-reed.
Common.

1358. var. androcladum, Gray.
Greene, (Shepard).
1359. var. Nuttallii, Gray.
Cass, (Broadhead).
1360. **Typha** angustifolia, L. Narrow-leaved Flag.
The most common specie. Westward.
1361. latifolia, L. Common Cat-tail Flag.
Common elsewhere, but rare Westward.

NAIADACEÆ.

1362. **Naias** indica, var. grabillima, Braun.
"Missouri," (Engelmann).
1363. **Zannichella** palustris, L.
Pike, (Pech).
1364. **Potamogeton** hybridus, Michx. Pond Weed.
Boone. (Tracy), Jackson, (Bush), Perry, (Demetrio).
1365. var. spicatus, Engelm.
St. Louis, (Geyer).
1366. natans, L.
Common.
1367. pulcher, Tuck.
St. Louis, (Engelmann).
1368. pusillus, L.
Jackson, (Bush), Perry, (Demetrio).
1369. Spirillus, Tuck.
Boone, (Tracy).

ALISMACEÆ.

Water Plantain Family.

1370. **Alisma** Plantago, L., var. Americanum, Gr. Water-Plantain.
Common.
1371. **Echinodorus** parvulus, Engelm.
"Missouri," (A. Wood).
1372. radicans, Engelm.
Pike, (Pech).
1373. rostratus, Engelm.
Jackson, (Bush).
1374. **Sagittaria** calycina, Engelm. Arrowhead.
Greene, (Shepard).

1375. graminea, Michx.
Jackson, (Bush), Pike, (Pech).

1376. heterophylla; Pursh.
Jackson, (Bush), Pike, (Pech).

1377 lancifolia, L.
Putnam, (Swallow), St. Louis, (Tracy).

1378. variabilis, Engelm.
Common.

1379. uligniosum, Engelm.
St. Louis, (Engelmann).

HYDROCHARIDACEÆ.

Frog's bit Family.

1380. **Limnobium** Spongia, Richard. Frog's-bit.
Marion, (Swallow).

1381. **Anacharis** Canadensis, Planchon. Water Weed.
Jackson, (Bush).

1382. **Vallisneria** spiralis, L. Eel Grass.
St. Louis, (Tracy).

ORCHIDACEÆ.

Orchis Family.

1383. **Orchis** spectabilis. Showy Orchis.
Boone, (Tracy), Greene, (Shepard), Perry (Demetrio), Pike, (Pech).

1384. **Habenaria** cristata, R. Br. Rein Orchis.
Perry, (Demetrio).

1385. lacera, R. Br. Ragged Fringed Orchis.
Pike, (Pech).

1386. leucophæa, Gray.
Cass, (Broadhead). Jackson, Bush).

1387. virescens, Spreng.
Miller, (Winick), Ralls, (Broadhead), St. Louis, (Letterman).

1388. **Spiranthes** cernua, Richard. Ladies' Tresses.
Jackson and Wright, (Bush), Mississippi, (Galloway), Pike (Pech).

1389. gracilis, Big.
Boone, (Galloway), Jackson and Wright, (Bush).
1390. graminea, Lindl., var. Walteri. Gray.
Not rare Southward.
1391. **Pogonia** pendula, Lindl.
Clay, (Mann), Jackson, (Bush), Pike, (Pech).
1392. **Calopogon** pulchellus, Nutt.
Greene, (Shepard).
1393. **Bletia** aphylla, Nutt.
St. Louis, near Allenton, rare, (Letterman).
1394. **Microstylis** ophioglossoides, Nutt. Adder's Mouth.
Pike, (Pech).
1395. **Liparis** liliifolia, Richard. Twayblade.
Greene, (Shepard), Marion, (Swallow), Miller, (Winick), Pike, (Pech).
1396. **Corallorhiza** multiflora, Nutt. Coral-root.
St. Louis, (Letterman).
1397. odontorhiza, Nutt.
Pike, (Pech), St. Louis, (Kellogg).
1398. striata, Lindl.
Perry, (Demetrio).
1399. **Applectrum** hyemale, Nutt. Putty-root.
Boone, (Tracy), Jackson, (Bush), Jefferson and St Louis, (Letterman). Rare.
1400. **Cypripedium** candidum, Muhl. White Lady's Slipper.
Common.
1401. parviflorum, Salisb. Small Yellow Lady's Slipper.
Common.
1402. pubescens, Willd. Large Yellow Lady's Slipper.
Common.
1403. spectabile, Swartz. Showy Lady's Slipper.
Cass, Linn and Mercer, (Broadhead), Putnam, (Swallow).

AMARYLLIDACEÆ.

Amaryllis Family

1404. Hymenocallis maritimum.
Butler, (Letterman)
1405. **Agave** Virginica, L. False Aloe.
Madison, (Broadhead), Wright, (Bush).

1406. **Hypoxys** erecta, L. Star Grass.
Common everywhere.

IRIDACEÆ.

Iris Family

1407. **Iris** cuprea, Pursh. Yellow Iris.
Jackson, (Frye).

1408. versicolor, L. Large Blue Flag.
Common.

1409. Virginica, L. Slender Blue Flag.
St. Louis, (Letterman).

1410. **Pardanthus** *Chinensis*, Ker. Blackberry Lily.
Common about old gardens.

1411. **Sisyrinchium** anceps, L. Blue-eyed Grass.
Common everywhere.

1412. **Nemastylis** gemmiflora.
" Missouri," (T. Gardner).

DIOSCOREACEÆ.

Yam Family.

1413. **Dioscorea** villosa, L. Wild Yam.
Common.

SMILACEÆ.

Smilax Family.

1414. **Smilax** glauca, Walt. Greenbrier.
" Missouri," (Swallow).

1415. herbacea L. Carrion Flower.
Common.

1416. var lasioneuron, Hook.
Montgomery, (Broadhead).

1417. var. pulverulenta, Gray.
Jackson, (Bush).

1418. hispida, Muhl.
Boone, (Tracy), Callaway, (Broadhead), Greene, (Shepard), Pike, (Pech).

1419. Pseudo-China, L.
Boone, (Galloway,) Pemiscot, (Swallow).

1420. rotundifolia, L.
Common.

1421. tamnifolia, Michx.
"Missouri," (Swallow).

1422 tamnoides, L.
Mississippi, (Galloway).

LILIACEÆ.

Lily Family.

1423. **Allium** Canadense, Kalm. Wild Garlic.
Common.

1424. cernuum, Roth. Wild Onion.
Common.

1425. mutabile, Michx.
Jackson, (Bush).

1426 stellatum, Nutt.
Greene and Jackson, (Bush).

1427. **Northoscordum** striatum, Kunth.
Common.

1428. **Muscari** *botryoides* Mill. Grape Hyacinth.
Escaped from gardens.

1429. **Camassia** Fraseri, Torr. Squill.
Common.

1430. **Polygonatum** biflorum, Ell. Small Solomon's Seal.
Common.

1431. giganteum, Dietrich. Great Solomon's Seal.
Common.

1432. latifolum, Desf.
Pike, (Pech).

1433. **Asparagus** *officinalis*, L. Asparagus.
Escaped from gardens.

1434. **Smilacina** racemosa, Desf. False Spikenard.
Common

1435. stellata, Desf. False Solomon's Seal.
Pike, (Pech), St. Louis, (Tracy).

1436. **Yucca** angustifolia, Pursh. Bear Grass.
Atchison, (Broadhead).

1437. **Lilium** Canadense, L. Wild Yellow Lily.
Cass and Iron, (Broadhead), Pike, (Pech).

1438. Catesbæi, Walt. Southern Red Lily.
Clark, (Broadhead).

1439. Philadelphicum, L. Wild Orange-red Lily.
Common.

1440. superbum, L. Turks-cap Lily.
Jackson, (Bush), St. Louis, (Murtfeldt).

1441. var. Carolinianum, Chapm.
Jackson, (Bush).

1442. **Erythronium** albidum, Nutt. White Dog-tooth Violet.
Common.

1443. Americanum, Smith. Yellow Adder's Tongue.
Knox, (Linn), Pettis, (McCluney).

1444. **Ornithogalum** *umbellatum*, L. Star-of-Bethlehem.
About old gardens.

1445. **Uvularia** grandiflora, Smith. Bellwort.
Boone & St. Louis, (Tracy), Jackson, (Bush).

1446. perfoliata, L.
Common in rich woods.

1447. **Trillium** cernuum, L. Nodding Trillium.
St. Charles, (Broadhead).

1448. erythrocarpum, Michx. Painted Trillium.
Pike, (Pech).

1449. erectum, L. Purple Trillium.
Boone, (Galloway), St. Charles and St. Louis, (Broadhead).

1450. grandiflorum, Salisb. Large White Trillium.
St. Louis, (Kellogg).

1451. recurvatum, Beck.
St. Charles, (Broadhead).

1452. sessile, L.
Common.

1453. **Melanthium** Virginicum, L Bunch-flower.
Common.

1454. **Veratrum** viride, Ait. Indian Poke.
Boone, (Tracy).

1455. Woodii, Robbins.
Pike, (Pech in 1842). Abundant along the Meramec in Jefferson county, "now the only known locality," (Letterman).

1456. parviflorum, Michx.
Marion (Swallow), Pike, (Broadhead).
1457. **Zygadenus** glaberrimus, Michx.
St. Louis, (Murtfeldt).
1458. **Tofieldia** glabra, Nutt. False Asphodel.
Miller, (Winick).

JUNCACEÆ.

Rush Family.

1459. **Luzula** campestris, DC.
Boone, (Tracy).
1460. **Juncus** acuminatus, Mich. Rush.
St. Louis, (Murtfeldt).
1461. var. debilis, Engelm.
Jackson, (Bush).
1462. var. robustus, Engelm.
"Missouri," (Engelmann).
1463. var. legitimus, Engelm.
Jackson, (Bush).
1464. brachycarpus, Engelm.
Vernon, (Broadhead).
1465. marginatus, Rosth.
Miller, (Winick), Vernon, (Broadhead).
1466. nodosus, L.
Common.
1467. var. megacephalus, Torr.
Jackson, (Bush).
1468. scirpoides, Lam.
Pike, (Pech).
1469. var. polycephalus, Engelm.
St. Louis, (Riehl).
1470. setaceus, Rostk.
Pike. (Broadhead).
1471. tenuis, Willd.
Common.

PONTEDERIACEÆ.

Pickerel-weed Family.

1472. **Pontederia** cordata, L. Pickerel Weed.
Common.

1473. **Heteranthera** graminea. Water Star-grass.
Maries, (Broadhead), Pike, (Pech).
1474. limosa, Vahl. Mud Plaintain.
Jackson, (Bush).

COMMELYNACEÆ.

Spiderwort Family.

1475. **Commelyna** Virginica, L. Day Flower.
Common.
1476. hirtella, Vahl.
Mississippi, (Galloway).
1477. Cayennensis, Richard.
Mississippi, (Galloway).
1478. **Tradescantia** rosea, Vent. Spiderwort.
Boone, (Tracy), Greene, Ralls and Texas, (Broadhead).
1479. Virginica, L. Common Spiderwort.
Common.
1480. var. flexuosa, Watson.
Common.

XYRIDACEÆ.

Yellow-eyed Grass Family.

1481. **Xyris** flexuosa, Muhl.
Common.

CYPERACEÆ.

Sedge Family.

1482. **Cyperus** acuminatus, Torr.
Cass, (Broadhead), Jackson, (Bush).
1483. compressus, L.
Jackson, (Bush).
1484. dentatus, Torr.
Pike, (Pech).
1485. diandrus, Torr.
Boone, (Tracy), Callaway, (Broadhead), Jackson, (Bush), Pike, (Pech).
1486. Engelmanni, Steud.
Jackson, (Bush).

1487. erythrorhizos, Muhl.
Jackson, (Bush), St. Louis, (Riehl).

1488. filiculmis, Vahl.
Jackson, (Bush), Pike, (Pech).

1489. flavescens, L.
St. Louis, (Riehl).

1490. inflexus, Muhl.
Jackson, (Bush), Pike, (Pech), St. Louis, (Riehl).

1491. Michauxianus, Schult.
Jackson, (Bush).

1492. ovularis, Torr.
St. Louis, (Murtfeldt), Vernon, (Broadhead).

1493. phymatodes, Muhl.
Common.

1494. rotundus, L., var. Hydra, Gray.
St. Louis, (Riehl).

1495. Schweinitzii, Torr.
Jackson, (Bush), St. Louis, (Letterman).

1496. strigosus, L.
Boone, (Tracy), Jackson, (Bush), Vernon, (Broadhead).

1497. tetragonus, Ell.
St. Louis, (Riehl).

1498. **Kyllingia** pumila, Michx.
Jackson, (Bush), Pike, (Peck), St. Louis, (Letterman).

1499. **Dulichium** spathaceum, Pers.
Cass, (Broadhead), Franklin, Jefferson and St. Louis, (Letterman).

1500. **Hemicarpha** subsquarrosa, Nees.
Jackson (Bush).

1501. **Eleocharis** acicularis, R. Br. Spike-Rush.
Jackson, (Bush).

1502. compressa, Sulliv.
Jackson, (Bush), Pike, (Pech).

1503. intermedia, Schultes.
Jackson, (Bush).

1504. obtusa, Schultes.
Common.

1505. palustris, R. Br.
Jackson, (Bush), Pike, (Pech).

1506. tenuis, Schultes.
Jackson, (Bush), St. Louis, (Geyer).

1057. **Scirpus** atrovirens, Muhl. Bulrush.
Jackson, (Bush), Pike, (Pech), St. Louis, (Riehl).
1508. fluviatilis, Gray.
Bates and Jackson, (Bush).
1509. lineatus, Michx.
Common Eastward.
1510. polyphyllus, Vahl.
Pike, (Pech), Vernon, (Broadhead).
1511. pungens, Vahl.
Boone, (Tracy), Jackson, (Bush).
1512. sylvaticus, L.
Pike, (Pech).
1513. supinus L. var. Hallii, Gray.
St. Louis, (Engelmann).
1514. Torreyi, Olney.
Jackson, (Bush).
1515. validus, Vahl.
Jackson, (Bush), Pike, (Pech).
1516. **Eriophorum** gracile, Koch. Cotton Grass.
Pike, (Pech).
1517. **Fimbristylis** autumnalis, R. & S.
Common.
1518. capillaris, Gray.
Common Eastward.
1519. spadicea, Vahl., var. castanea, Gray.
Jackson, (Bush).
1520. **Rhynchospora** corniculata, Gray. Beak Rush.
Butler, (Letterman).
1521. **Scleria** triglomerata, Michx. Nut Rush.
Jackson, (Bush).
1522. **Carex** aperta, Boott. Sedge.
Jackson, (Bush).
1523. acutiformis, Ehrh.
Jackson, (Bush).
1524. arida, Schw. & Torr.
Pike, (Pech).
1525. aristata, R. Br.
Pike, (Pech).
1526. bromoides, Schk.
Pike, (Pech).
1527. crus-corvi, Shutt.
Bates, (Bush).

1528. conjuncta, Boot.
Jackson, (Bush).
1529. Cherokeensis, Schw.
Missouri, (A. Wood).
1530. cristata, Schw.
Pike, (Pech), St. Louis, (Geyer).
1531. conoida, Schk.
Pike, (Pech).
1532. cephalaphora, Muhl.
Jackson, (Bush), Pike, (Pech).
1533. Davisii, Schw. & Torr.
Jackson, (Bush), Pike, (Pech).
1534. echinata, Murr.
Jackson, (Bush).
1535. eburnea, Boot.
Pike, (Pech).
1536. filiformis, L.
Pike, (Pech).
1537. grisea, Wahl.
Jackson, (Bush).
1538. granularis, Muhl.
Jackson, (Bush).
1539. Hitchcockiana, Dew.
Jackson, (Bush).
1540. hystricina, Willd.
St. Louis, (Riehl).
1541. intumescens, Rudge.
Pike, (Pech).
1542. lagopodioides, Schk.
Jackson, (Bush).
1543. lupulina, Muhl.
Jackson, (Bush), Pike, (Pech).
1544. laxiflora, Lam.
Jackson, (Bush), St. Louis, (Riehl).
1545. var. blanda, Boot.
Jackson, (Bush), Pike, (Pech).
1546. var. intermedia, Boot.
Jackson, (Bush).
1547. var. latifolia, Boot.
Jackson (Bush).
1548. Meadii, Dew.
Jackson, (Bush), St. Louis, (Geyer).

1549. Muhlenbergii, Schk.
Jackson, (Bush), Pike, (Pech).
1550. monile, Tuck.
Jackson, (Bush).
1551. Novæ-Angliæ, Schw.
Pike, (Pech).
1552. oligocarpa, Schk.
Jackson, (Bush), St. Louis, (Riehl).
1553. pubescens, Muhl.
Jackson, (Bush), St. Louis, (Riehl).
1554. Pennsylvanica, Lam.
Jackson, (Bush).
1555. riparia, Curtis,
Jackson, (Bush).
1556. Richardsonii, R. Br.
Jackson, (Bush).
1557. retroflexa, Muhl.
Jackson, (Bush).
1558. rosea, Schk.
Common.
1559. var. minor, Boot.
Jackson, (Bush).
1560. var. radiata, Dew.
Jackson, (Bush), Pike, (Pech).
1561. stenolepis, Torr.
Jackson, (Bush).
1562. Steudelii, Kunth.
Jackson, (Bush).
1563. sparganoides, Muhl.
Jackson, (Bush).
1564. var. minor, Boot.
Jackson, (Bush).
1565. squarrosa, L.
Common.
1566. Shortiana, Dew.
Jackson, (Bush), St. Louis, (Geyer).
1567. straminea, Schck.
Cass, (Broadhead), Jackson, (Bush).
1568. siccata, Dew.
Pike, (Pech).
1569. stipata, Muhl.
Common.

1570. sterilis, Willd.
Jackson, (Bush).

1571. stricta, Lam.
Common.

1572. striata, Michx.
Jackson, (Bush).

1573. trichocarpa, Muhl.
Jackson, (Bush).

1574. Tuckermani, Boot.
Pike, (Pech),

1575. tentaculata, Muhl.
Pike, (Pech).

1576. triceps, Michx.
Common Eastward.

1577. tetanica, Schk.
Jackson, (Bush), St. Louis, (Riehl).

1578. umbellata, Schk.
Common.

1579. virescens, Muhl.
Greene, (Shepard).

1580. vulpinoidea, Michx.
Common.

1581. Vaseyi, Dew.
Jackson, (Bush).

1582. varia, Muhl.
Common Eastward.

1583. Willdenovii, Schck.
St. Louis, (Geyer).

GRAMINEÆ.

Grass Family.

1584. **Paspalum** fluitans, Kth.
Jackson, (Bush).

1585. læve, Michx.
Common.

1586. setaceum, Mich.
Common everywhere.

1587. **Panicum** agrostoides, Muhl. Panic Grass.
Common.

1588. amarum, Ell.
Cass, (Broadhead), Jackson, (Bush).
1589. antumnale, Bosc.
Boone and Mississippi, (Galloway).
1590. capillare, L. Old-witch Grass.
Common everywhere.
1591. clandestinum, L
Common.
1592. crusgalli, L. Barn-yard Grass.
Common everywhere.
1593. var. hispidum, Gray.
Common everywhere.
1594. depauperatum, Muhl.
Common.
1595. dichotomum, L.
Common everywhere.
1596. glabrum, Gaud.
Boone, (Galloway), Jackson, (Bush).
1597. latifolium, Muhl.
Common from Boone Southeast.
1598. microcarpum, Muhl.
Jackson, (Bush), Jefferson, (Tracy), Mississippi, (Galloway).
1599. var. sphærocarpon, Vasey.
Jackson, (Bush).
1600. proliferum, Lam.
Common.
1601. *sanguinale*, L. Crab Grass.
Common.
1602. scoparium, Lam.
Mississippi, (Galloway).
1603. virgatum, L. Switch Grass.
Common along streams.
1604. viscidum, Ell.
Jackson, (Bush).
1605. **Setaria** *glauca*, Beauv. Foxtail.
Common.
1606. *Italica*, Kunth. Millet.
Common in cultivation, occasionally escaped.
1607. verticillata, Beauv. Brown Foxtail.
Common.
1608. viridis, Beauv. Green Foxtail.
Common.

1609. **Cenchrus** tribuloides, L. Sand bur Grass.
Common Northwest.

1610. **Spartina** cynosuroides, Willd. Cord Grass.
Common in damp soils.

1611. **Coix** *lachryma*, L. Job's Tears.
Cultivated and occasionally persistent.

1612. **Tripsacum** dactyloides, L. Gama Grass.
Cass, (Broadhead), Jackson, (Bush), St. Louis, (Galloway).

1613. **Zizania** aquatica, L. Wild Rice.
Common in swampy lands.

1614. **Leersia** lenticularis, Michx. Fly-catch Grass.
Boone and Mississippi, (Galloway).

1615. oryzoides, Swz. False Rice.
Common.

1616. Virginica, Willd. Cut Grass.
Common.

1617. **Erianthus** saccharoides, Michx.
Occasionally in swampy lands Southeast.

1618. **Andropogon** dissitiflorus, Michx. Blue joint Grass.
Common.

1619. macrourus, Michx.
Madison, (Broadhead).

1620. provincialis, Lam.
Common.

1621. scoparius, Michx.
Common.

1622. **Chrysopogon** nutans, Benth. Wild Sorghum.
Common.

1623. **Sorghum** *halepense*, L. Guinea Grass, or Johnson Grass.
Introduced and sparingly naturalized.

1624. **Phalaris** aruudinacea, L. Reed Canary Grass.
Common.

1625. *Canariensis*, *L.*
Occasional about dwellings.

1626. **Anthoxanthum** odoratum, L. Sweet Vernal Grass.
Common in door-yards.

1627. **Alopecurus** geniculatus, L. Water Fox-tail.
Common in cultivated ground.

1628. var. aristulatus, Munro.
Jackson (Bush).

1629. pratensis, L. Meadow Foxtail.
Common from Boone Southwest.

1630. **Aristida** gracilis, Ell. Poverty Grass.
Common in rich soil.

1631. oligantha, Michx.
Common on thin soil.

1632. purpurascens, Poir.
Common along roadsides.

1633. purpurea, Nutt.
Common along roadsides.

1634. ramosissima, Engelm.
Greene, (Bush), Mississippi, (Galloway).

1625. var. uniseta, Engelm.
(Vasey in "Grasses of U. S.")

1636. **Stipa** avenacea, L. Black Oat-Grass.
Livingston, (Galloway).

1637. spartea, Trin. Porcupine Grass.
Cass, (Broadhead).

1638. **Oryzopsis** melanocarpa, Muhl. Mountain Rice.
Pike, (Pech).

1639. **Millium** effusum, L. Millet Grass.
Pike, (Pech).

1640. **Muhlenbergia** capillaris, Kunth. Hair Grass.
Common in Boone, (Galloway).

1641. diffusa, Schreb. Nimble-Will.
Common.

1642. glomerata, Trin.
Howell, (Tracy), Jackson, (Bush), Lafayette, (Galloway).

1643. Mexicana, Trin.
Common.

1644. var. filiformis, Muhl.
With the preceding.

1645. sobolifera, Trin.
Common.

1646. sylvatica, T. & G.
Jackson, (Bush).

1647. Willdenovii, Trin.
Common Westward.

1648. **Brachyletrum** aristatum, Beauv.
Common.

1649. **Phleum** pratense. L. Timothy.
Common in cultivation, and occasionally naturalized.
1650. **Sporobolus** asper, Kunth.
Jackson, (Bush).
1651. cryptandrus, Gray.
Boone, (Galloway), Jackson, (Bush).
1652. heterolepis, Gray.
Common on prairies.
1653. vaginæflorus, Torr.
Common southward.
1654. **Agrostis** elata, Trin. Bent Grass.
Boone, (Galloway), Schuyler, (Tracy).
1655. perennans, Tuck. Twin Grass.
Common.
1656. scabra, Willd. Hair Grass.
Common.
1657. vulgaris, Michx. Red Top.
Common on damp soil.
1658. var. alba, Vasey.
Common.
1659. **Cinna** arundinacea, L. Wood Reed-Grass.
Common.
1660. **Deyeuxia** Canadensis, Beauv. Blue Stem.
Jackson, (Bush), St. Louis, (Galloway).
1661. confinis. Kunth.
Jackson, (Bush), St. Louis, (Galloway).
1662. **Ammophila** longifolia, Benth.
Lafayette, (Galloway).
1663. **Deschampsia** cæspitosa, Beauv.
St. Louis, (Galloway).
1664. flexuosa, Trin.
St. Louis, (Murtfeldt).
1665. **Holcus** lanatus, L.
St. Louis, (Galloway).
1666. **Danthonia** spicata, Beauv.
Common.
1667. **Cynodon** dactylon, Pers.
St. Louis, (Galloway).
1668. **Schedonnardus** Texanus, Steud.
Mississippi, (Galloway).
1669. **Bouteloua** hirsuta, Lag.
Saline, (Galloway).

1670. racemosa, Lag.
Boone, (Galloway), Jackson, (Bush).

1671. **Eleusine** *Indica*, Gaert. Yard Grass.
Common.

1672. **Leptochloa** mucronata, Kunth.
Jackson, (Bush).

1673. **Triodia** sesleroides, Torr.
Common.

1674. **Arundo** *Donax*.
About old gardens.

1675. **Phragmites** communis, Trin. Reed-Grass.
Common Southward in wet places.

1676. **Kœleria** cristata, Pers.
Common.

1677. **Eatonia** obtusata, Gray.
Common.

1678. Pennsylvanica, Gray.
Common.

1679. **Eragrostis** capillaris, L.
Common.

1680. Frankii, Meyer.
Common.

1681. *major*, Host.
Common.

1682. *minor* Host.
Common.

1683. pectinacea, Gray.
Common.

1684. var. spectabilis, Gray.
Boone, (Galloway), Jackson, (Bush).

1685. pilosa, L.
Common.

1686. Purshii, Schrad.
Common.

1687. reptans, Nees.
Boone, (Galloway).

1688. tenuis, Gray.
Boone, (Galloway), Jackson, (Bush).

1689. **Melica** mutica, Walt. Melic Grass.
Common Northward.

1690. **Diahrrhena** Americana, Beauv.
Boone and St. Francois, (Galloway).

1691. **Uniola** latifolia, Michx.
Common in rich woods.

1692. **Dactylis** glomerata, L. Orchard Grass.
Common in cultivation and occasionally naturalized.

1693. **Poa** alsoedes, Gray. Meadow Grass.
Boone, (Galloway),

1694. annua, L, Low Spear Grass.
Common everywhere in cultivated ground.

1695. arachnifera, Torr. Texas Blue Grass.
Introduced from Texas and apparently becoming naturalized.

1696. brevifolia, Muhl.
Boone, (Galloway).

1697. compressa, L. Wire Grass.
Common.

1698. debilis, Torr.
Boone, (Galloway).

1699. flexuosa, Muhl.
Common.

1700. nemoralis, L.
Boone, (Galloway).

1701. pratensis, L. Blue Grass.
Common everywhere.

1703. serotina, Ehrh. Fowl Meadow Grass.
Common.

1704. sylvestris, Gray.
Boone, (Galloway), Jackson, (Bush).

1705. *trivialis*, L. Rough Meadow Grass.
Jackson, (Bush), St. Louis, (Galloway).

1706. **Glyceria** arundinacea, Kunth. Reed Meadow Grass.
Boone, (Galloway).

1707. Canadensis, Trin.
Boone, (Galloway), Jackson, (Bush).

1708. fluitans, R. Br.
Jackson, (Bush).

1709. nervata, Trin.
Common.

1710. **Festuca** duriuscula, L. Fescue.
Boone, (Galloway), Jackson, (Bush).

1711. elatior, L. Meadow Fescue.
Boone, (Galloway).

1712. nutans, Willd.
Common.

1713. *ovina*, L. Sheep's Fescue.
Boone and St. Louis, (Galloway), Jackson, (Bush).
1714. Shortii, Kunth.
(Dr. Vasey in "Grasses of U. S.")
1715. tenella, Willd.
Boone, (Galloway), St. Francois, (Tracy).
1716. **Bromus** ciliatus, L.
Common.
1717. var. purgans, Gray.
Jackson, (Bush).
1718. Kalmii, Gray. Wild Chess.
Boone, (Galloway).
1719. racemosus, L. Upright Chess.
Common.
1720. *secalinus*, L. Cheat or Chess.
Common everywhere.
1721. *sterilis*, L.
Boone, (Galloway).
1722. **Lolium** *perenne*, L. Rye-Grass.
Naturalized.
1723. var. *Italicum*, Vasey. Italian Rye-Grass.
Sparingly naturalized.
1724. **Agropyrum** caninum, R. & S.
Boone, (Galloway).
1725. repens, Beauv. Couch-Grass.
Found occasionally where it has been introduced.
1726. **Hordeum** jubatum, Huds. Squirrel-tail Grass.
Occasional Westward.
1727. pulsillum, Nutt.
Occasional about old gardens.
1728. **Elymus** Canadensis, L. Wild Rye.
Common.
1729. var. glucifolius, Gray.
Common along river banks.
1730. Sitanion, Schultz.
Jackson, (Bush).
1731. striatus. Small Wild Rye.
Common.
1732. var. villosus, Gray.
Jackson, (Bush), St. Francois, (Tracy).
1733. Virginicus, L. Wild Rye.
Common.

1734. **Asprella** hystrix, Willd. Hedge-hog Grass.
Common.

1735. **Arundinaria** tecta, Muhl. Cane.
Common in extreme Southeast.

EQUISETACEÆ.

Horsetail Family.

1736. **Equisetum** arvense, L. Horsetail.
Common.

1737. sylvaticum, L.
Greene, (Shepard).

1738. robustum, Braun,
Jackson, (Bush), St. Louis, (Letterman).

1739. var. affine, Engelm.
Jackson, (Bush).

1740. hyemale, L.
Common.

OPHIOGLOSSACEÆ.

1741. **Ophioglossum** vulgatum, L.
Iron, Jefferson & St. Louis, (Letterman), Jackson, (Bush).

1742. **Botrychium** ternatum, Swz.
Vernon, (Broadhead).

1743. var. lunarioides, Milde.
Common.

1744. Virginianum, Swz.
Butler & St. Louis, (Letterman), Jackson, (Bush).

1745. matricariæfolium, Braun.
Iron, (Broadhead).

FILICES.

Fern Family.

1746. **Polypodium** incanum, Swz.
Mississippi, (Galloway), St. Louis, (Letterman).

1747. vulgare, L.
Boone, (Tracy), Mississippi, (Swallow), St. Louis, (Letterman).

1748. **Notholæana** dealbata, Kunze.
Boone, (Tracy), Jackson, (Bush).

1749. **Adiantum** capillus-veneris, L.
Christian, Greene and Stone, (Shepard), Madison, (Broadhead).

1750. pedatum, L.
Common.

1751. **Pteris** aquilina, L.
Common Southward.

1752. **Cheilanthes** lanuginosa, Nutt.
Common.

1753. tomentosa, Link.
Cole. (Wheeler's Report.).

1754. vestita, Swz.
Common Southward..

1755. **Pellea** atropurpurea, Link.
Common.

1756. gracilis, Hook.
Boone, (Galloway), Newton, (Broadhead).

1757. **Woodwardia** Virginica, Smith.
Common.

1758. **Asplenium** angustifolium, Michx.
Common.

1759. ebeneum, Ait.
Common.

1760. ebenoides, Scott.
Franklin, Iron, Jefferson and St. Louis, (Letterman)

1761. Filix fœmina, Bernh.
Miller, (Winick), St. Louis, (Letterman).

1762. parvulum, M. & G.
Christian, (Shepard), Greene and Jackson, (Bush).

1763. pinnatifidum, Nutt.
Greene, (Shepard).

1764. thelypteroides, Mich.
Common.

1765. trichomanes, L.
Miller, (Winick), St. Louis, (Letterman).

1766. **Camptosorus** rhizophyllus, Link.
Common everywhere.

1767. **Phegopteris** hexagonoptera, Fee.
Common from Boone Eastward.

1768. **Aspidium** acrostichoides, Swz.
Common.

1769. Lonchitis, Swz.
Madison, (Broadhead), Miller, (Winick).

1770. marginale, Swz.
St. Louis, near Allenton, (Letterman).

1771. spinulosum, Swz.
Butler and St. Louis, (Letterman).

1772. Thelypteris, Swz.
Butler and St. Louis, (Letterman).

1773. **Cystopteris** bulbifera, Bernh.
Common.

1774. fragilis, Bernh.
Common.

1775. **Onoclea** sensibilis, L.
Jackson, (Bush), St. Louis, (Letterman), Scotland, (Broadhead).

1776. **Woodsia** obtusa, Torr.
Jackson, (Bush), St. Louis, (Geyer).

1777. **Dicksonia** pilosiuscula, Willd.
Scotland, (Broadhead).

1778. **Osmunda** cinnamonea, L.
Franklin, (Letterman).

1779. Claytoniana, L.
Pike, (Pech).

1780. regalis, L.
Butler and St. Louis, (Letterman).

SALVINIACEÆ.

1781. **Azolla** Caroliniana, Willd.
Howell, (Swallow), Jackson, (Bush).

LYCOPODIACEÆ.

Club-Moss Family.

1782. **Lycopodium** dendroideum, Michx.
Madison, (Broadhead).

SELAGINELLACEÆ.

1783. **Selaginella** rupestris, Spring.
Adair, (Broadhead), Jefferson and St. Louis, (Letterman).

ISOETACEÆ.

1784. **Isœtes** echinospora, Durien, var. Braunii, Engelm.
Jackson, (Bush).
1785. Engelmanni, Braun.
"Missouri," (Gray's Manual, 5th Ed.)