# Transactions of the Wisconsin State Agricultural Society, including proceedings of the state agricultural convention, held in February, 1881, with practical and useful papers. Vol. XIX 1880/1881

Wisconsin State Agricultural Society
Madison, Wisconsin: David Atwood, State Printer, 1880/1881

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# TRANSACTIONS

OF THE

# WISCONSIN STATE AGRICULTURAL SOCIETY,

INCLUDING PROCEEDINGS

OF THE

## STATE AGRICULTURAL CONVENTION,

*Held in February, 1881.*

WITH

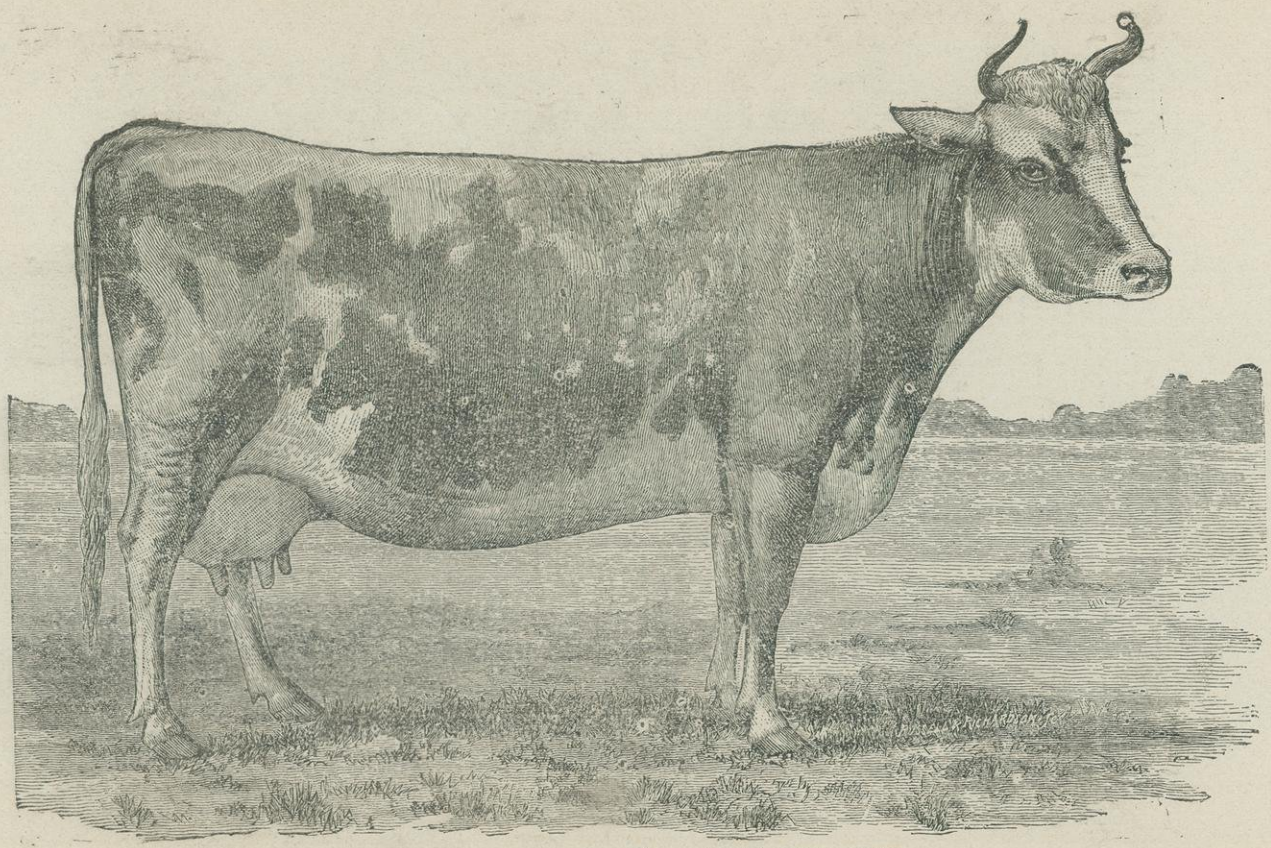
## PRACTICAL AND USEFUL PAPERS.

VOL. XIX.—1880-81.

PREPARED BY

GEORGE E. BRYANT, SECRETARY.

MADISON, WIS.:
DAVID ATWOOD, STATE PRINTER.
1881.



Kenerson's Jersey Queen.

I am indebted to Josiah S. Kenerson, of Barnet, Vermont, for the engraving of "Kenerson's Jersey Queen of Barnet," No. 4201, American Jersey Herd Book. This cow was dropped January 2, 1874, and she has the best butter record of any cow in the world. She is the "Maud S." of *Cowdom*. She made seven hundred and forty-six pounds of butter in the year ending March 15, 1880. She calved May 17, 1881, and from the 20th day of May, 1881, to the 20th day of November, 1881 (six months), she has made four hundred and fifty-nine pounds and one ounce of butter. She made during the *week* ending November 19, 1881, seventeen and three-fourths pounds of butter.

G. E. B.

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# CONSTITUTION.

## ARTICLE I.

### OF THE NAME AND OBJECT OF THE SOCIETY.

This society shall be known as the "Wisconsin State Agricultural Society." Its objects shall be to promote the advancement of agriculture, horticulture, and the mechanical and household arts.

## ARTICLE II.

### OF THE MEMBERS.

The society shall consist of life members, who shall pay, on subscribing, twenty dollars, and of honorary and corresponding members, who shall be elected by a two-thirds vote of all the members of the executive board, at any regular meeting. The presidents of county agricultural societies shall be members, *ex-officio*, entitled to the same privileges as life members, and, together, shall be known as the general committee of the society.

## ARTICLE III.

### OF THE OFFICERS.

The officers of the society shall consist of a president, one vice-president for each congressional district of the state, a secretary, a treasurer, and seven additional members, who shall hold their respective offices for the term of one year from the first day of January next succeeding the date of their election, and until their successors shall have been elected; and all of whom, together with the ex-president latest in office, and the president and general secretary of the Wisconsin Academy of Sciences, Arts and Letters, shall constitute the executive board.

## ARTICLE IV.

### OF THE POWERS AND DUTIES OF OFFICERS.

The presidents and vice-presidents shall perform such duties as are common to such officers in like associations, as may be required by the executive board.

The secretary shall keep the minutes of all meetings, and have immediate charge of the books, papers, library, and collections, and other property of the society. He shall also attend to its correspondence, and prepare and

superintend the publication of the annual report of the society, required by law.

The treasurer shall keep the funds of the society and disburse the same on the order of the president, or a vice-president, countersigned by the secretary, and shall make report of all receipts and expenditures at the regular meeting of the society in December.

The executive board shall have power to make suitable by-laws to govern the action of the several members thereof. They shall have general charge of all the property and interests of the society, and make such arrangements for the holding and management of general and special exhibitions as the welfare of the society and the interests of industry shall seem to require.

The general committee shall be charged with the interests of the society in the several counties where they respectively reside, and constitute a medium of communication between the executive board and the public at large.

## ARTICLE V.

### OF MEETINGS AND ELECTIONS.

The annual meeting of the society for the transaction of general business, shall be held in its rooms in Madison, on the first Wednesday in December, at nine o'clock A. M., in each year, and ten days' notice thereof shall be given by the secretary, in one or more papers printed in the city of Madison.

The election of officers of the society shall be held each year during and at the general exhibition, and the exact time and place of the election shall be notified by the secretary in the official list of premiums, and in all the general programmes of the exhibition.

Special meetings of the society will be called by order of the executive board, on giving twenty days' notice in at least three newspapers of general circulation in the state, of the time, place and object of such meetings.

At any and all meetings of the society, ten members shall constitute a quorum for the transaction of business, though a less number may adjourn from time to time.

## ARTICLE VI.

### OF AMENDMENTS.

This constitution may be amended by a vote of two-thirds of the members attending any annual meeting; all amendments having been first submitted in writing at the previous annual meeting, recorded in the minutes of the proceedings, and read by the secretary in the next succeeding meeting for the election of officers. All amendments proposed shall be subject to amendment by a majority vote at the meeting when presented, but not thereafter.

# BY-LAWS

## SECTION I.

### OF OFFICERS.

The officers of the society shall, *ex-officio*, fill the corresponding offices in the executive committee.

## SECTION II.

### OF THE DUTIES AND POWERS OF OFFICERS.

*The duties of the President*, in addition to those defined by the constitution and the by-laws regulating the duties of the permanent committee, shall be as follows, to wit:

1. To inspect the fair grounds after they shall have been prepared for the annual exhibition by the special committee of arrangements, appointed for that purpose, and suggest such modifications or further preparations as he may deem necessary.

2. To formally open the annual fair of the society, at such time as the executive committee may prescribe, with an appropriate address.

3. As the executive head of the society, to have a general supervision and control of the entire exhibition, subject only to the authority of the executive committee.

*The duties of the Secretary*, more especially defined than in the constitution, shall be as follows:

1. To make a faithful record of each meeting of the executive committee, and keep such record in a condition for the convenient reference of any member thereof, at any time; also to make a record of every order drawn on the treasurer, and delivered to parties in whose favor they were so drawn — separately entering and numbering the orders drawn to pay premiums and those to pay general expenses, and so defining them — and of all moneys due the society; in all cases holding the parties so indebted responsible therefor until they shall have presented him a certificate from the treasurer, showing that the same has been paid.

2. To open and carry on such correspondence as may be advantageous to the society or to the common cause of agricultural improvement, not only with individual agriculturists and eminent practical and scientific men of

other industrial pursuits, but also with other societies or associations whose objects are kindred to ours, whether in this country or in foreign lands, and to preserve a journal of such correspondence in the archives of the society.

3. To collect and arrange for convenient examination, standard agricultural works and periodical publications, together with such models, machines and implements as may be donated to, or otherwise acquired by the society.

4. To investigate, as far as practicable, the nature of fertilizers, indigenous and cultivated plants, insects injurious to vegetation, etc., and to collect and preserve such specimens thereof as will illustrate the natural history and agricultural resources, condition and progress of the state.

5. To institute, and collect reports therefrom, needed experiments relative to the preparation of the various soils of the state for economical culture, the cultivation of different grains, fruits and garden vegetables, the breeding and raising of stock, etc.

6. To visit, by the advice of the executive committee, or as his own judgment may direct, the various portions of the state, and to give lectures on the science and practice of agriculture, wherever and whenever they may be deemed most necessary or desirable.

7. To co-operate with the superintendent of public instruction and the agent of the normal school board, for the introduction and use in the schools of Wisconsin, of standard works on agriculture and the other industrial arts and sciences.

8. To attend as many as possible of the industrial exhibitions of this country, particularly the county fairs of Wisconsin; to co-operate with the president and special committee of arrangements, for the judicious preparation and management of our state exhibition; and to have the sole supervision and control of the office of entry thereat.

9. To carefully prepare and superintend the publication of the annual report of the society to the governor of the state, embodying therein the proceedings of the State Agricultural Society, an abstract of the reports of the incorporated county agricultural societies of the state, and such reports, essays and addresses, or other matter of information, as may be calculated to enhance the value of said report.

Finally, it shall be his duty, not only by the means above named, but also through such other instrumentalities as he may devise, and the committee approve, to devote himself faithfully and unreservedly to the promotion of the industrial interests of the state.

*It shall be the duty of the Treasurer —*

1. To receive primarily and exclusively all moneys due the society, from whatever source.

2. To keep a full and faithful record of all receipts of moneys coming into his hands, and of the sources whence derived, in a book specially furnished by and belonging to the society, and to have the same open at all reasonable times, to the inspection of any person or persons authorized by the executive committee to make such examination.

3. To likewise keep an exact record of every order by him paid; and such record must be verified by the proper vouchers, showing that the sums therein named have been by him so paid.

## SECTION III.

### OF MEETINGS.

*The Executive Committee* shall meet annually, on the day preceding the day on which the annual meeting of the society is held, on Monday preceding the first Tuesday of February, and again on the first day of the annual fair.

They shall also meet at the call of the secretary, the president and a vice-president of the society concurring — and may adjourn to any stated time.

## SECTION IV.

### OF A QUORUM.

At any meeting of the Executive committee, four members thereof shall constitute a quorum for the transaction of business.

## SECTION V.

### OF PERMANENT COMMITTEES.

There shall be two permanent committees of the Executive committee, which shall be respectively styled the *Standing Committee* and the *Finance Committee.*

*The Standing Committee* shall consist of the president, the secretary and the treasurer, who shall have power in the recess of the Executive committee to draw orders on the treasury for all necessary current incidental expenses. But the Executive committee shall have authority, and are hereby required to revise the proceedings or transactions of said Standing committee, and indorse or disapprove of the same.

*The Finance Committee* shall consist of the president and treasurer, and it shall be their duty to suggest means for increasing the revenues of the society.

They shall also have authority to invest any portion of the funds of the society that may from time to time be set apart by the Executive committee for investment, disposing of such funds upon such terms and conditions as may be prescribed by the said Executive committee.

Each of the above named sub-committees shall be responsible for the faithful discharge of their duties to the Executive committee, to whom an appeal may at any time be taken from their acts or decisions.

The auditing, adjusting, allowing or rejecting of all bills, claims or demands, of whatsoever nature, against the society, and the issuing of orders upon the treasurer for payment of the same — except for the current inci-

dental expenses of the society, as by this section already provided for — shall devolve upon the Executive committee; and it shall be the duty of said committee to annually examine the books, papers and vouchers of the treasurer and secretary, and compare the same, and adjust the accounts between those officers and the society, and to report thereon at the annual meeting in December.

## SECTION VI.

### OF THE ORDER OF BUSINESS.

The following order of business shall be observed at all meetings of the Executive committee:

1. Reading the minutes of the preceding meeting.
2. Reading the minutes and reports of t e Standing committee.
3. Reading the minutes and reports of the Finance committee.
4. Report of Auditing committee.
5. Reports from special committees.
6. Communications from the secretary.
7. Communications from members of the committees.
8. Unfinished business.
9. Miscellaneous business.

This order of business may be suspended, however, at any time, by a vote of the majority of the members present.

## SECTION VII.

### OF THE FISCAL YEAR.

The fiscal year of this society shall commence on the first Wednesday of December in each year, and all annual reports of the year previous shall be made up to that time.

## SECTION VIII.

### OF THE EXPIRATION OF THE TERMS OF OFFICE.

The terms of office of all the officers of this society shall expire on the 31st day of December, in each year.

## SECTION IX.

### OF AMENDMENTS.

These by-laws may be amended at any regular meeting of the Executive committee by a vote of eight of the members thereof.

# LIFE MEMBERS.

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Adams, James | Janesville. | Bonnell, James | Milwaukee. |
| Adams, L. L | Stoners Prairie | Bonnell, Lansing | Milwaukee. |
| Alexander, O | Milwaukee. | Boorse, Henry | Granville. |
| Allen, J. W | Janesville. | Boyce, A. A | Lodi. |
| Allen, W. C | Delavan. | Boyd, R. B | Milwaukee. |
| Allen, H. M | Evansville. | Bowen, J. B | Madison. |
| Allis, Edward P | Milwaukee. | Bowman, J. M | Madison. |
| Angell, R. R | Janesville. | Bradley, C. T | Milwaukee. |
| Angell, W. H | Sun Prairie. | Braley, A. B | Madison. |
| Atkins, Albert R | Milwaukee. | Brazen, Benj | Wauwatosa. |
| Atwood, David | Madison. | Brichener, G. H | Sheboygan F's. |
| Atwood, Wm. T | San Francisco. | Briggs, F | Madison. |
| Atwood, R. J | Madison. | Brockway, E. P | Ripon. |
| Armour, P. D | Milwaukee. | Brodhead, E. H | Milwaukee. |
| Armstrong, L. G | Boscobel. | Brown, Jas. J | Madison. |
| Arnold, I. M | Milwaukee. | Brown, J. A | Milwaukee. |
| Arnold, A. A | Galesville. | Brown, Wm. W | Merton. |
| Aspinwall, D. M | Farmington. | Brown, Frank G | Madison. |
| Ayres, J. W | Kenosha. | Bruce, A. T | Milwaukee. |
| | | Bryan, John | Cross Plains. |
| Barron, H. D | St. Croix Falls. | Bryant, D. D | Madison. |
| Babbitt, Clinton | Beloit. | Bryant, G. E | Madison. |
| Babbitt, D. H | Janesville. | Bull, Stephen | Racine. |
| Bacon, I. P | Westport. | Bullard, James | Evansville. |
| Bacon, W. D | Waukesha. | Bump, N. P | Janesville. |
| Bailey, A. P | Oshkosh. | Bunker, Geo | Madison. |
| Bailey, M. T | Madison. | Burgess, J. M | Janesville. |
| Baker, Robt. H | Racine. | Bush, Samuel | Milwaukee. |
| Barlass, Andrew | Emerald Grove | Button, Henry H | Milwaukee. |
| Barlass, David | Emerald Grove | Burnham, Miles | Danville. |
| Barnes, George | Janesville. | Burnham, A. Jr | Milwaukee. |
| Barrows, E. S | Chicago. | Burnham, J. L | Milwaukee. |
| Baxter, Geo | Windsor. | Byrne, John A | Madison. |
| Bates, A. C | Janesville. | Bryant, G. E. Jr | Madison. |
| Beecroft, W. G | Madison. | | |
| Bement, E | Oregon. | Casar, Wm | Janesville. |
| Bemis, Jervis | Footville. | Camp, H. H | Milwaukee. |
| Benedict, J. D | Bristol. | Cantwell, M. J | Madison. |
| Benedict, S. G | Providence, R.I. | Capron, Geo | Boston, Mass. |
| Benedict, W. G | Milwaukee. | Carleton, W. D | Sun Prairie. |
| Benson, S. W | Bloomfield. | Carpenter, J. A | Waukesha. |
| Bigelow, F. G | Milwaukee. | Carpenter J. E | Windsor. |
| Billings, Earl | Madison. | Carpenter, J. H | Madison. |
| Bird, I. W | Jefferson. | Carpenter, S. D | Carthage, Mo. |
| Bird, T. E | Madison. | Carr, N. B | Madison. |
| Bishop, John C | Fond du Lac. | Carr, Joseph S | Eau Claire. |
| Black, John | Milwaukee. | Carter, A. M | Johnstown. |
| Blair, Franklin J | Milwaukee. | Carter, Guy | Janesville. |
| Blanchard, Willard. | Windsor. | Carver, P. S | Delavan. |
| Bostwick, J. M | Janesville. | Cary, J | Milwaukee. |
| Bostwick, R. M | Janesville. | Case, J. I | Racine. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Chandler, Joseph C. | Madison. | Davis, N. P ..... | Pierceville. |
| Chandler, Samuel... | Milwaukee. | Davis, S. B ..... | Milwaukee. |
| Chapman, T. A .... | Milwaukee. | Davis, W..... | Center. |
| Chase, Enoch ..... | Milwaukee. | Dean, E. B..... | Madison. |
| Chase H..... | Milwaukee. | Dean, John S..... | Madison. |
| Cheney, Rufus..... | Whitewater. | De Hart, J. L..... | West Lima. |
| Children, E..... | Lancaster. | De La Matyr, W.A. | Middleton. |
| Chipman, A..... | Sun Prairie. | Delaplaine, G. P.. | Madison. |
| Chipman, C. R..... | Waunakee. | De Mor, A. B..... | Milwaukee. |
| Church, Wm. A .... | Milwaukee. | Dewey, Nelson ... | Cassville. |
| Clapp, G. W ..... | Fitchburg. | DeWolf, E ..... | Fitchb'rg, Mass. |
| Clark, C. M ..... | Whitewater. | Devoe, A. B ..... | McFarland. |
| Clark, Lewis..... | Beloit. | Dexter, W. W .... | Janesville. |
| Clark, Satterlee .... | Horicon. | Dickerman, J. A.. | Verona. |
| Cochrane, John .... | Waupun. | Dickson, J. P.... | Janesville. |
| Coggswell, A. W.... | Brookfield. | Dodge, J. E ..... | Lancaster. |
| Colby, Charles ..... | Janesville. | Dodge, H. S ..... | Milwaukee. |
| Coleman, W. W .... | Milwaukee. | Doolittle, W. J... | Janesville. |
| Colladay, Wm. M... | Stoughton. | Dore, J. S ..... | Neillsville. |
| Colton, John B..... | Madison. | Doris, John..... | Milwaukee. |
| Cooper, E. J ..... | Mineral Point. | Dorn, M. M ..... | Madison. |
| Cornell, James ..... | Oshkosh. | Dousman, T. C ... | Waterville. |
| Cornwell, H. H..... | Verona. | Dow, O. P..... | Palmyra. |
| Corrigan, John..... | Cedarburg. | Drakeley, S ..... | Madison. |
| Cottrill, J. P. C..... | Milwaukee. | Drury, E. W..... | Fond du Lac. |
| Cottrill, W. H..... | Appleton. | Dunlap, S .. .... | Burke. |
| Cottrill, C. M ..... | Milwaukee. | Dunn, Andrew.... | Portage City. |
| Cory, J ..... | Footville. | Dunn, Wm ..... | Madison. |
| Crampton, N. B .... | Madison. | Dunning, Abel.... | Madison. |
| Crawford, J. B ..... | Baraboo. | Durkee, H ..... | Kenosha. |
| Crawl, John..... | Center. | Dutcher, J. A..... | Milwaukee. |
| Crilley, John J..... | Milwaukee. | Dwinnell, J. B ... | Lodi. |
| Crocker, Hans ..... | Milwaukee. | | |
| Crosby, J. B ..... | Janesville. | Eaton, J O..... | Lodi. |
| Cross, J. B..... | Milwaukee. | Echlin, J. O..... | Janesville. |
| Crossett, B. F ..... | Janesville. | Edgerton, E. W... | Summit. |
| Culver, Caleb E .... | Shopiere. | Edmunds, F. W... | Madison. |
| Cummings, Wm.... | Fitchburg. | Elderkin, Ed ..... | Elkhorn. |
| Curtis, L. S ..... | Wauwatosa. | Elliott, E..... | Lone Rock. |
| Curtis, F. C..... | Rocky Run. | Elliott, Jos. T..... | Racine. |
| Curtis, Seymour.... | Fitchburg. | Ellis, J. A... .... | Chicago. |
| Curtis, D. W ..... | Fort Atkinson. | Ellsworth, O..... | Milwaukee. |
| Curtis, Dexter..... | Madison. | Ellsworth, L..... | Milwaukee. |
| Cutting, J. W ..... | Harmony. | Ellsworth, W. J... | Madison. |
| | | Elmore, A. E..... | Green Bay. |
| Daggett, M. L..... | Madison. | Elmore, R. P .... | Milwaukee. |
| Dahlman, Anthony. | Milwaukee. | Eldred, John E... | Milwaukee. |
| Dahlman, John .... | Milwaukee. | Elson, Charles.... | Milwaukee. |
| Dann, Obed..... | Janesville. | Emmons, N. J.... | Milwaukee. |
| Danks, E. P..... | Stoughton. | Enos, Elihu .. .... | Waukesha. |
| Daniells, W. W .... | Madison. | Esterly, Geo. W... | Whitewater. |
| Darling, K. A..... | Fond du Lac. | | |
| Darwin, A. G..... | Brooklyn, N. Y. | Fairbanks, E ..... | St. Johnsb'y, Vt. |
| Daubner, Geo. H .. | Brookfield Cen. | Farwell, L J..... | Chicago. |
| Davidson, Adam ... | Verona. | Fenn, G. W..... | Janesville. |
| Davis, G. L ..... | Milwaukee. | Ferguson, D..... | Milwaukee. |
| Davis, John ..... | Milwaukee. | Ferguson, Benj... | Fox Lake. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Fernly, Jno | La Grange. | Green, Richard | Middleton. |
| Field, Martin | Mukwanago. | Green, Samuel | Fitchburg. |
| Field, W. W | Boscobel. | Greene, N. S | Milford. |
| Fifield, L | Chicago. | Greenleaf, E. B | Milwaukee. |
| Fifield, D. E. | Janesville. | Greenman, C. H | Milton. |
| Fifield, E. G | Janesville. | Greenman, H. D | Milwaukee. |
| Finch, Lorin | Bradford. | Gregory, J. C | Madison. |
| Firmin, F. H | Madison. | Grinnell, J. G | Adams. |
| Fisher, C. C. | Center. | Groom, John | Madison. |
| Fisher, Elijah | Newark. | Grubb, W. S | Baraboo. |
| Fisher, S. S. | Center. | Guernsey, Orrin | Janesville. |
| Fisher, Seth | Center. | Gurnee, J. D | Madison. |
| Fitch, D | Madison. | | |
| Fitch, W. F | Madison. | Haight, J. M | Sacram'to, Cal. |
| Fitch, W. G | Milwaukee. | Haight, Nicholas | Madison. |
| Fitzgerald, R. P. | Milwaukee. | Hall, Augustus | Janesville. |
| Fletcher, John | Springfield. | Hallock, Youngs | Middleton. |
| Flint, J. G., Jr | Milwaukee. | Hall, H. P. | Boston. |
| Folds, Geo. H. | Madison. | Hall, S. H. | Burke. |
| Foot, E. A. | Kansas. | Hanchett, A. M | Milwaukee. |
| Foote, A. E. | Milwaukee. | Hancock, Brad | Chicago. |
| Fowle, Jacob | Oshkosh. | Hanks, A. S. | Milwaukee. |
| Fowler, James S | Milwaukee. | Hammond, L. M. | Janesville. |
| Fox, W. H. | Fitchburg. | Hammond, E. S | Fond du Lac. |
| Fratt, N. D | Racine. | Harrington, N. H. | Delavan. |
| Frank, A. S. | Madison. | Harris, Jas. | Janesville. |
| Frank, Geo. R | Boscobel. | Harvey, J. W. | Knoxville, Ten. |
| Frankfurth, Wm | Milwaukee. | Hasbrouck, W. | Eau Claire. |
| Freeman C F | Milwaukee. | Hastings, S. D. | Madison. |
| Friedman, Ignatius. | Milwaukee. | Hausmann, Jos. | Madison. |
| French, Jonathan | Madison. | Hawes, J. F. | Madison. |
| Fuller, M. E. | Madison. | Hawes, W. N. | Verona. |
| Fuller, F. D | Madison. | Hayes, A. J. | Milwaukee. |
| Fuller, E. W. | Madison. | Hazleton, Geo. C. | Boscobel. |
| Furlong, Thos. T. | Chicago. | Hazen, Chester | Ladoga. |
| Furlong, John | Milwaukee. | Helfenstein, J. A. | Milwaukee. |
| | | Hempsted, H. N. | Milwaukee. |
| Gammons, Warren | Middleton. | Hicks, J. H | Oshkosh. |
| Gates, D. W. C | Madison. | Hibbard, W. D | Milwaukee. |
| Gaylord, Aug | New York City. | Hibbard, Wm. B. | Milwaukee. |
| Gernon, George | Madison. | Higbee, A. T | Stoughton. |
| Gibbs, Chas. R | Whitewater. | Hill, H. J. | Madison. |
| Gilbert, Thomas | Oregon. | Hill, James H | Madison. |
| Giles, H. H | Madison. | Hill, J. W. P | Belleville. |
| Gillett, R. E | Tomah. | Hill, P. B. | Milwaukee. |
| Gilman, H. | Burke. | Hill, Robert | Milwaukee. |
| Goodenow, H. D | Madison. | Helmer, A. M | Milwaukee. |
| Goodrich, Ezra | Milton. | Hinkley, B. R. | Summit. |
| Goodrich, G | Whitesville. | Hobart, L. J. | Milwaukee. |
| Gould, L. D. | Madison. | Hodge, Robert | Janesville. |
| Grady, F. M | Fitchburg. | Hodson, C. W | Janesville. |
| Graham, Alexander. | Janesville. | Hoellinger, Carl | Wausau. |
| Grant, S. B | Milwaukee. | Hogan, Gilbert | Janesville. |
| Grant, Albert | Milwaukee. | Hollister, R. M | Janesville. |
| Graves, R. A. | Ripon. | Holmes, A. M | Milwaukee. |
| Graves, S. W. | Rutland. | Holt, David | Madison. |
| Green, Anthony | Milwaukee. | Holton, Edward D. | Milwaukee. |
| Green, Geo. G. | Milwaukee. | Hoven, Matt | Madison. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Hopkins, Bedford B. | Milwaukee. | Landauer, Max. .. | Milwaukee. |
| Hopkins, James.... | Madison. | Lapham, Henry... | Summit. |
| Hopkins, E. C. .... | Milwaukee. | Larkin, B. F..... | Madison. |
| Hoskins, J. W. .... | Milwaukee. | Larkin, C. H ..... | Milwaukee. |
| Hoskins, Alfred.... | Jansville. | Larkin, Daniel ... | Madison. |
| Houston, Peter..... | Cambria. | Larkin, William... | Madison. |
| Hoyt, J. W..... | Madison. | Lawrence, W. A... | Janesville. |
| Hulbert, E..... | Oconomowoc. | Lawton, J. G. .... | Green Bay. |
| Hume, Wm..... | Oshkosh. | Lazier, Ed. ..... | Madison. |
| Hutson, J. S. ..... | Stoughton. | Learned, J. M..... | California. |
| Hudson, John..... | Madison. | Leidersdorf, B.... | Milwaukee. |
| Hyde, Edwin . .... | Milwaukee. | Leitch, W. T..... | Madison. |
| | | Leitch, W. T., Jr.. | Vienna. |
| Ilsley, Chas. F.. .... | Milwaukee. | Leslie John..... | Madison. |
| Inbusch, J. H..... | Milwaukee. | Lester, Waterman. | Janesville. |
| Ingham, A. C..... | New York. | Lewis, Herbert A.. | Madison. |
| | | Lewis, John L. .. | Madison. |
| Jacobs, William... | Madison. | Lindsey, E. J..... | Milwaukee. |
| Jackman, Hiram... | Chicago. | Little, Thos. S.... | Janesville. |
| Jeffery, Geo..... | Smithville. | Lloyd, Lewis .... | Cambria. |
| Jenks, S. R..... .... | Madison. | Lockwood, John.. | Milwaukee. |
| Jenkins J. C..... | Janesville. | Ludington, H..... | Milwaukee. |
| Jerdee, L. P... .... | Madison. | Ludington, James. | Milwaukee. |
| Jerdee, M. P. ..... | Madison. | Ludlow, A. ..... | Monroe. |
| Johnson, Jno., Jr... | Madison. | Lucy, O. K... ... | Columbus. |
| Johnson, M. B. .... | Janesville. | Lyman, H..... | Dakota |
| Johnson, Joseph. .. | Hartland. | Lynch, T. M..... | Janesville. |
| Johnston, John .... | Milwaukee. | Lynde, W. P..... | Milwaukee. |
| Johnson, John A... | Madison. | Lysaght, Wm..... | Belleville. |
| Johnson, Hugh L.. | Milwaukee. | | |
| Johnson, John ..... | Milwaukee. | Main, Alex. H ... | Madison. |
| Jones, C. H. ..... | Sun Prairie. | Mann, A. L..... | Fitchburg. |
| Jones, John N.... | Madison. | Mann, J. E..... | Sun Prairie. |
| Juneau, Paul..... | Juneau. | Mann, Henry..... | Milwaukee. |
| Janssen, E. H..... | Mequon. | Mann, Curtis. .... | Oconomowoc. |
| | | Macy, J. B..... | Fond du Lac. |
| Kellogg, Geo. J.... | Janesville. | Manwaring, Wm.. | Black Earth. |
| Kiewert, Emil..... | Milwaukee. | Marshall, Samuel. | Milwaukee. |
| Kent, A. C..... | Janesville. | Martin, A. C..... | Ashton. |
| Kershaw, C J ..... | Milwaukee. | Martin, C. L. ... | Janesville. |
| Kershaw, W. J..... | Milwaukee. | Martin, Nathaniel. | Monroe. |
| Keyes, E. W..... | Madison. | Martin, S. W. .... | Madison. |
| Kimball, M. G. ... | Sheboygan | Mason, Geo. A ... | Madison. |
| Kimball, John..... | Janesville. | Masters, E. D. .... | Jefferson. |
| Kingsley, Geo. P... | Springfield. | Mathews, A. K. .. | Milwaukee. |
| Kingston, J. T..... | Necedah. | Matteson, Clinton. | Rosendale. |
| Kiser, W. C..... | Madison. | Matts J. H. B..... | Verona. |
| Kiser, J. C..... | Oregon. | Maxson, O. T..... | Waukegan. |
| Klauber, Samuel... | Madison. | May, A. C..... | Milwaukee. |
| Knight, E..... | Sun Prairie. | Mayhew, T. J..... | Milwaukee. |
| Kneeland, Moses... | Milwaukee. | Mayhew, J. L..... | Milwaukee. |
| Kneeland, James... | Milwaukee. | McCarty, F. D.... | Fond du Lac. |
| Knowles, Geo..... | Milwaukee. | McConnell, T. J. . | Madison. |
| Knapp, J. G... .... | Tamps, Flor. | McCormick, J. G. | Madison. |
| Koss, Rudolph..... | Milwaukee. | McCullagh, And.. | Emerald Grove. |
| | | McDonald, A. ... | Alloa. |
| Ladd, M. L .. .... | Sugar Creek. | McDougal, G. W.. | Madison. |
| Lamb, F. J..... | Madison. | McDowell, H. C.. | Oconomowoc. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| McGeoch, P ..... | Milwaukee. | Pember, R. T..... | Janesville. |
| McLaren, Wm. P... | Milwaukee. | Perkins, P. M .... | Burlington. |
| McNiel, David ..... | Stoughton | Perrine, L. W..... | Janesville. |
| McGregor, Alex.... | Nepeuskun. | Perry, B. F..... | Madison. |
| McPherson, J. P.... | Springdale. | Pfister, Guido.... | Milwaukee. |
| Merrill, Alf..... | Madison. | Phelps, A. Warren | Milwaukee. |
| Merrill, S. S ..... | Milwaukee. | Pierce, C. L ..... | Milwaukee. |
| Miller, John..... | Madison. | Pilgrim, D. T..... | West Granville. |
| Mills, Simeon..... | Madison. | Pinney, S. U..... | Madison. |
| Miner, Cyrus..... | Janesville. | Pickney, B..... | Fond du Lac. |
| Miner, John B..... | Milwaukee. | Plankinton, John. | Milwaukee. |
| Mitchell, Alex..... | Milwaukee. | Plumb, J. C..... | Milton. |
| Mitchell, J. L..... | Milwaukee. | Plumb, T. D.. ... | Madison. |
| Morden, E..... | Madison. | Plummer, B. C ... | Wausau. |
| Morehouse, L. H.. . | Milwaukee. | Pond, Samuel A... | Albany. |
| Morrison, W. H.... | Elkhorn. | Porter, Wm. H.... | Marshall. |
| Morse, Samuel ..... | Milwaukee. | Porter, G. E ..... | Eau Claire. |
| Moseley, J. E ..... | Madison. | Post, David..... | Milwaukee. |
| Mosher, J. C..... | Lodi. | Power, D. G..... | Milwaukee. |
| Moxley, A. R..... | Madison. | Powers, D. J..... | Chicago. |
| Mullen, James..... | Milwaukee. | Powers, W. J..... | Black Earth. |
| Murray, George .... | Racine. | Pratt, E. E... .... | Chicago. |
| | | Pres. St. Peter's Val. Farmers' Club.. | Springfield. |
| Nash, C. D..... | Milwaukee. | Pritchard, P. M... | Fitchburg. |
| Nazro, John ..... | Milwaukee. | Proudfit, Andrew.. | Madison. |
| Needham, J. P..... | Wauwatosa. | | |
| Newcomb, S. B..... | Cold Spring. | | |
| Newton, Ephraim.. | Oregon. | Rawson, C. A..... | Madison. |
| Newton, I. S..... | East Middleton. | Ray, Charles ..... | Milwaukee. |
| Nicholas, L. T .... | Janesville. | Raymond, S. O.... | Geneva. |
| Norris, C. W..... | Milwaukee. | Riordan, Charles.. | Oshkosh. |
| Norton, J. B ..... | Madison. | Reed, Harrison... | Jacksonville, Fla. |
| Nowell, W. A..... | Milwaukee. | Ressigue, A. C.... | Janesville. |
| | | Reynolds, Thos... | Madison. |
| Ober, R. P..... | Milwaukee. | Reynolds, John... | Kenosha. |
| Ogilvie, Robert.... | Madison. | Rexford, J. D..... | Janesville. |
| Oliver, Joseph B.... | Milwaukee. | Rice, E. M ..... | Whitewater. |
| Olney, C. W..... | La Cygne, Kas. | Richards, Richard. | Racine. |
| Orr, G. H..... .... | Verona. | Richardson, D .... | Middleton. |
| Ott, Geo. V ..... | Madison. | Richardson, James | Buffalo, N. Y. |
| | | Richardson, R. J.. | Janesville. |
| Page, H. M ..... | Madison. | Richardson, H.... | Janesville. |
| Palmer, H. L..... | Milwaukee. | Richmond, A.... | Whitewater. |
| Palmer, J. Y ..... | Oregon. | Riebsam, C. R.... | Madison. |
| Palmer, O. M..... | Oregon. | Robbins, J..... | Vienna. |
| Palmer, Henry ..... | Oregon. | Robbins, J. V .... | New York. |
| Park, John W..... | Vernon. | Roddis, R..... | Milwaukee. |
| Park, Wm. J..... | Madison. | Rodgers Lawrence | Westport. |
| Parker, C. H..... | Beloit. | Roe, J. P..... | Franklin. |
| Parmley, Ira ..... | Center. | Rogers, C. H..... | Milwaukee. |
| Parsons, P. B..... | Madison. | Rodgers, D. J..... | Milwaukee. |
| Partridge, J. S..... | Whitewater. | Rogers, J. S..... | Burlington. |
| Patten, L. F..... | Janesville. | Rogers, Anson.... | Janesville. |
| Patton, Jas. E..... | Milwaukee. | Rogers, H. G..... | Milwaukee. |
| Paul, Geo. H..... | Milwaukee. | Ross, James... ... | Botany Bay. |
| Payne, Wm.... .... | Janesville. | Rowe, Richard W. | Madison. |
| Payne, H. C..... | Milwaukee. | Rowe, W. E..... | Mazomanie. |
| Peffer, G. P..... | Pewaukee. | Ruggles, J. D..... | San Francisco. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Russell, Harvey | Milwaukee. | Steensland, H | Madison. |
| Ryder, James K | Waterloo. | Stewart, C. K | Danville. |
| | | Stewart, G. H | Col. Sp'gs, Col. |
| Sage, E. C | New Lisbon. | Stilson, Eli | Oshkosh. |
| Salisbury, R. W | Fitchburg. | Stilson, Edgar | Oshkosh. |
| Salisbury, D. F | Fitchburg. | St. John, J. W | Janesville. |
| Sanderson, Edw | Milwaukee. | Stockman, John | Milton. |
| Sanderson, R. B | Madison. | Stone, G | Beloit. |
| Sarles, John H | Boscobel. | Storm, Wm | Madison. |
| Schute, Charles | Milwaukee. | Stowe, La Fayette | Sun Prairie. |
| Schutt, U | Janesville. | Street, Richard | Waukesha. |
| Scott, S. B | Milwaukee. | Sutherland, C | Syene. |
| Seville, James | Merrimac. | Swain, Wm. W | Madison. |
| Sexton, Kellogg | Milwaukee. | | |
| Sexton, W. F | Milwaukee. | | |
| Simmons, C. J | Monroe. | Tallman, W. H | Janesville. |
| Sinclair, Jeff | Milwaukee. | Taylor, E | Mukwanago. |
| Sharp, J. W | Iowa. | Taylor, W. R | Cottage Grove. |
| Shaw, J. B | Milwaukee. | Tenney, H. A | Madison. |
| Sheldon, A. H | Janesville. | Tenney, D. K | Chicago. |
| Sheldon, D. G | Madison. | Tenney, Samuel | Durham Hill. |
| Sheldon, S. L | Madison. | Terry, A. H | Milwaukee. |
| Shepherd, C | Milwaukee. | Terwilliger, Jas | Syene. |
| Sherman, Amaziah | La Prairie. | Thorson, John | Milwaukee. |
| Sherman, George | La Prairie. | Tibbits, Geo. M | Milwaukee. |
| Sherman, J. M | Burnett. | Tierney, K | California. |
| Sherwood J. C | Dartford. | Thompson, W. H | Chicago. |
| Shipman, S. V | Chicago. | Thorp, J. G | Eau Claire. |
| Skelley, Charles | Janesville. | Todd, J. G | Janesville. |
| Skinner, George J | Sio'x Falls, D.T. | Tolford, J. W | Neillsville. |
| Skinner, E. W | Turner, D. T. | Torgerson, Lars | Madison. |
| Slaughter, Geo. H | Madison | Torrey, R. D | Oshkosh. |
| Sloan, I. C | Madison. | Townley, John | Moundville. |
| Slocum, G. A | Chicago. | Treat, R. B | Chicago. |
| Smith, Wm. E | Milwaukee. | Treat, George E | Milwaukee. |
| Smith, Winfield | Milwaukee. | Twining, M. S | Magnolia. |
| Smith, Angus | Milwaukee. | | |
| Smith, Adam | Burke. | | |
| Smith, J. B | Milwaukee | Van Brunt, W. A | Horicon. |
| Smith, S. W | Janesville. | Van Cott, Albert B. | Chicago. |
| Smith, H. L | Janesville. | Van Etta, Jacob | Madison. |
| Smith, M. C | Janesville. | Van Kirk, N | Milwaukee. |
| Smith, S. B | Vernon. | VanNorstrand, A. H | Green Bay. |
| Smith, J. Maurice | Chicago. | Van Schaick, I. W. | Milwaukee. |
| Snell, H | Madison. | Van Slyke, N. B | Madison. |
| Spaulding, William | Janesville. | Vaughan, O. A | Lodi. |
| Spaulding, Joseph | Janesville. | Viall, Andrus | Madison. |
| Spencer, James C | Milwaukee. | Vilas, Chas. H | Cleveland, O. |
| Spencer, R. C | Milwaukee. | Vilas, L. M | Eau Claire. |
| Squier, Thomas H | Waterloo. | Vilas, Wm. F | Madison. |
| Stannard, A. C | Milton. | | |
| Stark, Charles A | Milwaukee. | Waggstaff, S | Oshkosh. |
| Steele, Chester | Milwaukee. | Wackerhagen, E | Racine. |
| Stevenson, Isaac | Marinette. | Wait, J. B | Waitsville. |
| Stevens, Geo. C | Milwaukee. | Warren, Albert | Madison. |
| Steyens J. T | Madison. | Warren, J. H | Albany. |

| Names. | Residence. | Names. | Residence. |
|---|---|---|---|
| Warren, W. R..... | Madison. | Williams, C. H. .. | Baraboo. |
| Webster, James..... | Danville. | Williams, D ..... | Darien |
| Webster, Martin .... | Fox Lake. | Williams, Daniel . | Summit. |
| Webb, James A..... | Janesville. | Williams, G. G ... | Whitewater. |
| Welch, W..... ... | Madison. | Williams, J. P.... | Janesville. |
| Wells, Daniel L .... | Milwaukee. | Williams Randall. | Janesville. |
| Werner, John ..... | Sauk. | Williams, S. B..... | Madison. |
| West, Henry..... | Madison. | Williams, S. G.... | Janesville. |
| West, S. C..... | Milwaukee. | Wilson, Wm..... | Westport. |
| West, Henry M..... | Milwaukee. | Wilson, Zebina.... | Palmyra. |
| Whaling, J. M..... | Milwaukee. | Wood, J. W.. .... | Baraboo. |
| Wheeler, Geo. F ... | Waupun. | Woolley, J. T..... | Milwaukee. |
| Wheeler, Guy..... | La Prairie. | Wootton, Robert.. | Madison. |
| Wheeler, W. A..... | Middleton. | Worthington, B M. | Madison. |
| Wheeler, L. A ..... | Milwaukee. | Worthington, Geo. | Milwaukee. |
| Wheelock, W. G... | Janesville. | Wright, D. H. ... | Madison. |
| Wheelwright, J..... | Middleton. | Wright, Geo..... | Mt. Horeb. |
| Whiting, W. F..... | Milwaukee. | Wright, J. S..... | Emerald Grove. |
| Whitney, W. F. .... | Milwaukee. | Wright, Josiah S.. | Janesville. |
| Wicks, Thomas..... | Milwaukee. | Wylie, Geo. W.... | Elkhorn. |
| Wight, O. W..... | Milwaukee. | | |
| Wightman, H..... | Black Earth. | | |
| Wilcox, C. T..... | Janesville. | Young, J. E ..... | Janesville. |
| Wilkins, A. W..... | Milwaukee. | | |
| Wiley, O. S..... ... | Benton Harbor, Mich. | Zwietusch, Otto... | Milwaukee. |

# OFFICERS OF THE SOCIETY.

1881.

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*PRESIDENT.*

HON. N. D. FRATT, RACINE.

*VICE-PRESIDENTS.*

1st Congressional District—C. L. MARTIN, JANESVILLE.
2d Congressional District—A. A. BOYCE, LODI.
3d Congressional District—J. H. WARREN, ALBANY.
4th Congressional District—D. T. PILGRIM, WEST GRANVILLE.
5th Congressional District—SATTERLEE CLARK, HORICON.
6th Congressional District—ELI STILSON, OSHKOSH.
7th Congressional District—JOHN S. DORE, NEILLSVILLE.
8th Congressional District—J. T. KINGSTON, NECEDAH.

*SECRETARY.*

GEORGE E. BRYANT, MADISON.

*TREASURER.*

CYRUS MINER, JANESVILLE.

*ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.*

DR. W. H. FOX, OREGON.
A. A. ARNOLD, GALESVILLE.
WM. C. KISER, SYENE.
CHESTER HAZEN, LADOGA.
W. W. FIELD, MADISON.
CLINTON BABBITT, BELOIT.
WM. H. MORRISON, ELKHORN.

# NINETEENTH ANNUAL REPORT

OF THE

# SECRETARY

OF THE

# STATE AGRICULTURAL SOCIETY.

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To His Excellency, WILLIAM E. SMITH,
*Governor of Wisconsin:*

SIR—I have the honor to submit for your consideration the annual report of the Wisconsin State Agricultural Society for the year 1880–1881.

For the Executive Board,
GEO. E. BRYANT,
*Secretary.*

# PROCEEDINGS.

## EXECUTIVE BOARD MEETINGS.

In accordance with the requirements of the by-laws of the Wisconsin State Agricultural Society, the executive board met at the agricultural rooms in the capitol, September 6, 1880.

Present, President Fratt, Vice-Presidents Boyce, Warren, Clark, Babbitt, Pilgrim, Stilson and Dore, and Treasurer Miner, and Messrs. Martin, Fox, Arnold, Kiser, Bacon, Field, Hazen, and Secretary Geo. E. Bryant.

President N. D. Fratt in the chair, who called to order and stated the board was convened for the purpose of acting upon such matters as might be deemed important relative to the annual fair.

The board met on each evening during the fair, adjusted all matters of difference which arose, giving such directions as were important, and adjourned on Saturday, after auditing and paying the premiums awarded and claims allowed.

## DECEMBER MEETING.

STATE AGRICULTURAL ROOMS,
November 30, 1880.

As provided by the by-laws and pursuant to published notice, the executive board met in their rooms in the capitol, December 3, 1880. Quorum present.

President Fratt in the chair, who stated that the meeting was for the purpose of settling with the treasurer, comparing his vouchers with the warrant account of the secretary, and any other general business.

Cyrus Miner, treasurer of the society, presented his report,

showing the financial exhibit of the society for the fiscal year ending December 3, 1880, and which may be found in the volume of transactions for 1880–81, under the head of "Annual Meeting." Which report was compared and examined with the books of the secretary by President Fratt and the finance committee, and affirmed.

On motion, adjourned.

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## FEBRUARY MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, January 31, 1881.

The executive board of the Wisconsin State Agricultural Society met in their rooms, in the capitol, at 7:30 P. M., as required by the by-laws.

Present, President N. D. Fratt, Vice-Presidents C. L. Martin, A. A. Boyce, D. T. Pilgrim, Satterlee Clark, John S. Dore, J. H. Warren and J. T. Kingston, and additional members, C. Babbitt, W. C. Kiser and W. H. Morrison, Wm. H. Fox, W. W. Field, A. A. Arnold, Chester Hazen, Treasurer Cyrus Miner, and Secretary George E. Bryant.

President N. D. Fratt in the chair.

Reports of superintendents were read to the board.

TUESDAY, February 1.

Board met at 9 o'clock A. M., President Fratt in the chair.

The premium list was examined and revised.

On motion the annual fair of 1881 was fixed for September 26 to 30.

On motion the President, Treasurer, Secretary and Vice President Clark and A. A. Arnold were appointed a committee to locate the next fair.

The following communication was presented to the board:

*To the President and the Members of the Executive Board of the State Agricultural Society:*

GENTLEMEN—Thanking you for the courteous replies received from many of you to our letter sent last August, with reference to your excluding *beer* from the Fair Grounds at the time of the State Fair, we wish again to call

your attention to the matter, and to earnestly urge that you make your regulation which forbids the sale of "ardent spirits" prohibit the sale of ale and beer, especially, as without doubt stronger drinks are sold under cover of the beer.

No more urgent reason for this appeal need be given, than the number of intoxicated persons, particularly young men and boys, seen at the fair last fall. Respectfully yours,

CLARISSA L. WARE.

*Committee of the Woman's Christian Temperance Union of Madison.*

February 1, 1881.

Upon request three women appeared before the board, and one of them (the secretary having never formed her acquaintance is unable to state her name) made a very able argument in favor of temperance, and most eloquently urged the board to prohibit the sale of intoxicating liquors and beers at their annual fairs. After the address of the lady the following resolution was introduced and discussed at some length:

*Resolved*, That beer of all kinds and all intoxicating liquors be excluded from the fair grounds of the Wisconsin State Fairs during all annual exhibitions.

The above resolution was disposed of by the board's voting that further consideration be postponed. That the sale of lager beer be permitted on the fair grounds, the same subject to the control of the officers of the society. But whisky, rum, gin, brandy and kindred intoxicating liquors be excluded in the future, as in the past.

On motion, the President, Vice President Kingston and Dr. W. H. Fox were appointed an auditing committee.

On motion, adjourned.

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## SOCIETY MEETINGS.

### ELECTION OF OFFICERS.

MADISON, September 9, 1880.

In accordance with the requirements of the constitution, and after due notice by the secretary, the life members of the Wisconsin State Agricultural Society convened at the agricultural rooms in the capitol, at Madison, at 8 o'clock P. M., to elect offi-

cers for 1881. President Fratt in the chair. The president said the society was convened for the purpose of electing officers for 1881, and other constitutional work.

Hon. W. W. Field moved that a committee of nine, to nominate officers, be appointed, one by the chair and one from each congressional district.

Hon. Sat. Clark moved to amend by voting *viva voce* for president.

Mr. N. B. Van Slyke moved that such vote be informal.

Mr. Geo. H. Daubner moved that an informal ballot be taken for president, which was declared by the chair carried, and which resulted as follows:

N. D. Fratt received fifty-one votes; Satterlee Clark received seventeen votes; scattering, eleven votes.

On motion, the ballot was declared formal, and Hon. N. D. Fratt president for 1881.

On motion of Mr. Daubner, Cyrus Miner was elected treasurer, and Geo. E. Bryant secretary.

Mr. Field moved that his motion be taken up.

Which motion prevailed, and the chair appointed as a committee:

| | |
|---|---|
| W. D. Bacon, | 1st District, |
| Wm. H. Fox, | 2d District, |
| J. H. Warren, | 3d District, |
| D. T. Pilgrim, | 4th District, |
| Sat. Clark, | 5th District, |
| Eli Stilson, | 6th District, |
| J. S. Dore, | 7th District, |
| J. T. Kingston, | 8th District, |

and W. W. Field from the State at Large.

The committee, having performed their duty, reported the following as vice presidents:

| | |
|---|---|
| C. L. Martin, | 1st District, |
| A. A. Boyce, | 2d District, |
| J. H. Warren, | 3d District, |
| D. T. Pilgrim, | 4th District, |
| Sat. Clark, | 5th District, |

Eli Stilson, - - - - 6th District,
J. S. Dore, - - - - 7th District,
J. T. Kingston, - - - - 8th District,

and the following as additional members of the Executive Board:

Clinton Babbitt, - - - Beloit,
W. H. Fox, - - - - Oregon,
A. A. Arnold, - - - Galesville,
W. H. Morrison, - - - - Elkhorn,
W. C. Kiser, - - - - Syene,
Chester Hazen, - - - - Ladoga,
W. W. Field, - - - Madison,

who, after some discussion, were severally elected for the year 1881.

On motion, adjourned.

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## ANNUAL MEETING.

STATE AGRICULTURAL ROOMS,
December 1, 1880.

As required by the constitution, the Wisconsin State Agricultural Society met in their rooms in the capitol at 9 o'clock A. M., President N. D. Fratt in the chair. Quorum present.

Cyrus Miner, the treasurer, presented his annual report, showing the financial condition of the society for the fiscal year ending December 1, 1880, bearing the approval of the executive board.

## TREASURER'S REPORT.

For the year ending December 1, 1880. Approved by the auditing committee, and a committee appointed by the society, and the vouchers deposited in the office of the secretary.

STATE AGRICULTURAL ROOMS.

MADISON, December 1, 1880.

*To the Executive Board of the Wisconsin State Agricultural Society:*

GENTLEMEN — I have the honor to hand you herewith a statement of the receipts and disbursements of your society for the year ending December 1, 1880.

Respectfully submitted,

C. MINER,
*Treasurer.*

### TREASURER'S REPORT.

*Receipts.*

| | |
|---|---|
| Balance from 1879 | $2,831 08 |
| Interest and premiums on bonds | 140 00 |
| Amount from state treasurer | 2,000 00 |
| Amount from sale of tickets | 8,538 55 |
| Amount from rent of ground | 1,597 68 |
| Amount from secretary, entry fees | 1,106 00 |
| Amount from Keanan and Hancock | |
| Union Stock Yards, Chicago, special premium | 25 00 |
| Amount from membership | 120 00 |
| Amount from sale of forage | 33 85 |
| Amount from advertising | 125 00 |
| Total | $16,517 16 |

# DETAILED STATEMENT OF DISBURSEMENTS,

*As compared with warrant account of secretary.*

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 1 | Boyce, A. A., expenses, board meeting | $5 00 |
| 2 | Miner, C., expenses, board meeting | 10 93 |
| 3 | Keyes, E. W., postage | 5 00 |
| 4 | Hees, F., repair stamp | 1 25 |
| 5 | Johnson, J., premium | 125 00 |
| 6 | Paul, John H., premium | 35 00 |
| 7 | Ball, J. C., work on building | 10 00 |
| 8 | Nichols, J. H., express | 12 25 |
| 9 | Bryant, H. A., labor | 10 00 |
| 10 | Keyes, E. W., postage | 3 00 |
| 11 | Newton, G., premium | 6 00 |
| 12 | Nichols, J. H., express | 1 85 |
| 13 | Keyes, E. W., postage | 4 00 |
| 14 | Slaughter, B. C., clerk | 6 60 |
| 15 | Boyce, A. A., expenses, board meeting | 9 00 |
| 16 | Miner, C., expenses, board meeting | 10 95 |
| 17 | Pilgrim, D. T., expenses, board meeting | 9 90 |
| 18 | Martin, C. L., expenses, board meeting | 10 95 |
| 19 | Babbitt, C., expenses, board meeting | 10 95 |
| 20 | Hazen, C., expenses, board meeting | 13 00 |
| 21 | Clark, Satterlee, expenses, board meeting | 12 50 |
| 22 | Dore, J. S., expenses, board meeting | 15 90 |
| 23 | Fratt, N. D., expenses, board meeting and convention | 39 00 |
| 24 | Field, W. W., expenses, board meeting | 7 50 |
| 25 | Herd book | 7 50 |
| 26 | Bryant, Geo. E., herd book | 10 00 |
| 27 | Dunlap, S., premium | 6 00 |
| 28 | Cowan, E. C., premium | 4 00 |
| 29 | Racine Silver Plate Co | 211 43 |
| 30 | Booth, W. A., express | 1 35 |
| 31 | Bryant, Geo. E, secretary's salary | 450 00 |
| 32 | Davidson, A. L., reporter | 135 00 |
| 33 | Keyes, E. W., postage | 3 00 |
| 34 | Nichols, J. H., express | 1 05 |
| 35 | Payment on mortgage | 2,829 37 |
| 36 | McKey, W. D., glass show case | 14 00 |
| 37 | Nichols, J. H., express | 1 15 |
| 38 | Booth, W. A., express | 2 10 |
| 39 | Bacon, W. D., extra expenses | 16 00 |
| 40 | Bryant, G. E., secretary's salary | 450 00 |
| 41 | Nichols, J. H., express | 1 65 |
| 42 | Cook, Geo. R., engraving medals | 4 10 |
| 43 | Slaughter, B. C., secretary's clerk | 30 00 |
| 44 | Memhard, Fred, freight | 5 73 |
| 45 | Daine, J., labor | 2 00 |
| 46 | Mallory, P. C., premium | 1 00 |
| 47 | Racine Silver Plate Co | 2 85 |
| 48 | Nichols, J. H., express | 8 85 |
| 49 | Slaughter, B. C., secretary's clerk | 30 00 |
| 50 | Allen, L. F., book | 8 00 |
| 51 | Nichols, J. H., express | 1 25 |
| 52 | Sanborn, S. P., clerk | 6 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 53 | Sanborn, S. P., clerk | $6 00 |
| 54 | Horton, C., premium | 2 00 |
| 55 | Nichols, J. H., express | 80 |
| 56 | Doyle, P., labor | 3 00 |
| 57 | Booth, W. A., express | 16 20 |
| 58 | Swanson, T., repairing flags | 2 00 |
| 59 | Baker, J. N., labor | 15 75 |
| 60 | Void | |
| 61 | Jobson, W. S. | 15 90 |
| 62 | Hawes, D., premiums | 60 00 |
| 63 | Wilson, B. H., posting bills | 2 00 |
| 64 | Void | |
| 65 | Philbrick, S. A., assistant superintendent poultry dept. | 28 00 |
| 66 | Bacon, W. D., superintendent poultry department | 20 00 |
| 67 | Doubleday, Geo., premiums | 60 00 |
| 68 | Williams, Wm., premiums | 50 00 |
| 69 | MacComber, S. D., premiums | 50 00 |
| 70 | MacComber, S. D., premiums | 50 00 |
| 71 | Williams, Wm., premiums | 30 00 |
| 72 | Morrison, G. B., premiums | 30 00 |
| 73 | McNutt, Eli, premiums | 165 00 |
| 74 | Wells, Wm., premiums | 90 00 |
| 75 | Wheeler, R., premiums | 85 00 |
| 76 | Bailey, V. K., premiums | 5 00 |
| 77 | Bemis, Wm., assistant superintendent forage | 14 00 |
| 78 | Boyce, A. A., superintendent forage | 28 00 |
| 79 | Stilson, Eli, superintendent gates | 20 00 |
| 80 | Stoddard, J., assistant superintendent swine | 28 00 |
| 81 | Coggswell, L. K., police | 6 00 |
| 82 | Hick, J. H., clerk | 12 00 |
| 83 | Waggstaff, S. M., assistant on gates | 17 50 |
| 84 | Pierce, A. J., assistant superintendent machinery | 52 50 |
| 85 | Jeffries, W., gate attendant | 17 50 |
| 86 | Brier, J. O., gate attendant | 17 50 |
| 87 | Putnam, J. S., gate attendant | 17 50 |
| 88 | Robertson, A. J., gate attendant | 17 50 |
| 89 | Bushnell, M. C., gate attendant | 17 50 |
| 90 | Zentnar, F., gate attendant | 17 50 |
| 91 | Whitby, J., clerk | 12 00 |
| 92 | Void | |
| 93 | Dunlap, Ed., police | 8 00 |
| 94 | Higgins, B., watchman | 12 00 |
| 95 | Williams, D., president's clerk | 17 50 |
| 96 | Koche, D. watchman | 10 00 |
| 97 | Farman, J. F., police | 6 00 |
| 98 | Warner, H., superintendent machinery | 30 00 |
| 98½ | Ludington, H., superintendent machinery | 10 00 |
| 99 | Ball, J., police | 8 00 |
| 100 | Clapp, Geo., police | 6 00 |
| 101 | Drew, J., police | 6 00 |
| 102 | Shumway, G., police | 8 00 |
| 103 | Garrison, G. V., watchman | 8 00 |
| 104 | Whittaker, O., police | 8 00 |
| 105 | Void | |
| 106 | Hart, C., police | 8 00 |
| 107 | Mann, J. E., police | 8 00 |
| 108 | Colley, W. C., police | 8 00 |
| 109 | Hayes, J. F., police | 10 00 |
| 110 | Baker, E., police and labor | 28 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 111 | Johnson, J., police | $8 00 |
| 112 | Hall, J., police | 10 00 |
| 113 | Leonard, Wm., police | 6 00 |
| 114 | Haven, F., police | 10 00 |
| 115 | Haven, Ole, police | 8 00 |
| 116 | Long, G., police | 10 00 |
| 117 | Hackford, C., police | 8 00 |
| 118 | Hall, T., whitewash | 75 |
| 119 | Howell, police | 12 00 |
| 120 | Crampton, W. A., police | 6 00 |
| 121 | Farman, J., police | 2 00 |
| 122 | Warner, W. K., assistant marshal | 17 50 |
| 123 | Clark, A., police | 6 00 |
| 124 | Clark, A. W., police | 10 00 |
| 125 | Bird Robert, police | 2 00 |
| 126 | Clark, A. W., police | 10 00 |
| 127 | Pilgrim, T., police | 10 00 |
| 128 | Randall, A., premium | 10 00 |
| 129 | Reed, Wm., premium | 28 50 |
| 130 | Wilcox, E., premium | 1 00 |
| 131 | Davis, F. D., premium | 7 00 |
| 132 | Davis, W. H., premium | 24 00 |
| 133 | Knowles, W. L., premium | 10 00 |
| 134 | Philips, A. J., premium | 12 00 |
| 135 | Jeffrey, Geo., premium | 26 00 |
| 136 | Sheridan, J. K, premium | 1 00 |
| 137 | Tudor, F. A., premium | 9 00 |
| 138 | Demar, H. W., assistant superintendent | 15 75 |
| 139 | Doubleday, Geo., premium | 240 00 |
| 140 | Doubleday, Geo., premium | 30 00 |
| 141 | Hazen, C., superintendent swine | 36 00 |
| 142 | Bell, A., premium | 9 50 |
| 143 | Sherman, F., premium | 4 00 |
| 144 | Palmer, W., premium | 5 00 |
| 145 | Jones, A. R., assistant superintendent fine arts | 28 00 |
| 146 | Field, W. W., superintendent fine arts | 52 00 |
| 147 | Palmer, E. W., premium | 3 00 |
| 148 | Arnold, A. A., superintendent cattle department | 28 00 |
| 149 | Joiner, S. H. and A. E, premium | 93 00 |
| 150 | Dore, J. L., superintendent education | 42 75 |
| 150½ | Austin, E. J., premium | 25 00 |
| 151 | Hazen, C., premium | 139 95 |
| 151½ | Malone, A. premium | 14 00 |
| 152 | Allds, C., premium | 30 00 |
| 153 | Martin, C. L, superintendent farm products | 32 00 |
| 154 | Dean, J., labor in main department | 12 00 |
| 155 | Clark, H. K., labor in main department | 12 00 |
| 156 | Clark, Sat., superintendent main department | 44 00 |
| 157 | Roper, L. labor in main department | 12 00 |
| 158 | Roper, S, labor in main department | 12 00 |
| 159 | Clark, J. J., assistant in main department | 21 00 |
| 160 | Harrington, S. W., premium | 25 00 |
| 161 | Babbitt, A., superintendent horse department | 44 00 |
| 162 | Babbitt, C., Sundries | 8 40 |
| 163 | Thornton, O. W., assistant superintendent forage | 14 00 |
| 164 | Doan, J., labor in main department | 12 00 |
| 165 | Bowles, T, premium | 10 00 |
| 166 | Hazen, C., premium | 25 00 |
| 167 | Puffer, S. P | 44 0 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 168 | Ringmore, G. W. | $34 00 |
| 169 | Alton, Geo. | 18 00 |
| 170 | Wells, W. L. | 20 00 |
| 171 | Hendrickson, E. | 20 00 |
| 172 | Baker, E., assistant superintendent | 21 00 |
| 173 | Wood, J. W., premium | 65 00 |
| 174 | Tool, Wm., premium | 7 00 |
| 175 | Foster, P. J., premium | 30 00 |
| 176 | Phillips, A. J, premium | 1 00 |
| 177 | Briggs, D., premium | 10 00 |
| 178 | Pilgrim, D. T., premiums | 42 00 |
| 179 | Pilgrim, superintendent horticultural department | 36 00 |
| 180 | Mosher, D., premium | 26 00 |
| 181 | Kiser, W. C., marshal | 24 00 |
| 182 | Pilgrim, D. T., plates | 28 88 |
| 183 | Kiser, W. C., premiums | 198 00 |
| 184 | Pratt, E. W., assistant in horticultural department | 28 00 |
| 185 | Babbitt, C., sundries | 9 90 |
| 186 | Jeffery, Geo., labor | 4 00 |
| 187 | Ludlow, A., premium | 50 00 |
| 188 | Rood, J. C., premium | 6 00 |
| 189 | Everson, Geo., premium | 35 00 |
| 190 | Buchanan, D., premium | 80 00 |
| 191 | Sheffield & Lyall, premium | 20 00 |
| 192 | Rawson, L., premium | 105 00 |
| 193 | Pilgrim, F., night watch | 6 00 |
| 194 | Pilgrim, J., assistant supt. horticultural department | 14 00 |
| 195 | Cunningham, A. D., premium | 5 00 |
| 196 | McBean, Frank, night watch | 10 00 |
| 197 | Kellogg, G. J., night watch | 39 00 |
| 198 | Lewis, G. D., premium | 24 00 |
| 199 | Bowen, J. M., premium | 20 00 |
| 200 | Fogg, J. S., clerk | 4 00 |
| 201 | Cramer, H., premium | 7 00 |
| 202 | Stewart, J. B., premium | 58 00 |
| 203 | Lucas, T., telephone | 5 00 |
| 204 | Williams, Mrs. J. E., premium | 22 50 |
| 205 | Goodrich, C. P., premium | 33 30 |
| 206 | Wilson, H. C., premium | 6 00 |
| 207 | Miner, C., treasurer expenditures and sundries | 41 02 |
| 208 | McDougal, S. W., assistant to president | 21 00 |
| 209 | Fox, J., assistant, horse department | 17 50 |
| 210 | Dorsey, Rat., premium | 13 00 |
| 211 | Miner, C., sundries | 7 00 |
| 212 | Darley, M., labor | 10 00 |
| 213 | Fratt, N. D., president | 79 55 |
| 214 | Plumb, J. C., premium | 12 00 |
| 215 | Plumb, L. J., premiums | 2 00 |
| 216 | Atwood, Chas., treasurer's clerk | 17 50 |
| 217 | Sylvester, H., treasurer's clerk | 14 00 |
| 218 | Smith, H. A., treasurer's clerk | 17 50 |
| 219 | Gordon, R. D., treasurer's clerk | 17 50 |
| 220 | Cottrell, T. M., treasurer's clerk | 17 50 |
| 221 | Heimstreet, E. B., treasurer's clerk | 17 50 |
| 222 | Morrison, W. H., treasurer's clerk | 17 50 |
| 223 | Brownell, I. C., treasurer's clerk | 17 50 |
| 224 | Chase, Miss Mary, premium | 33 30 |
| 225 | Main, A. H., assistant treasurer | 25 00 |
| 226 | Hollister, A. H., premium | 27 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 227 | Owens, J. E., premium | $62 00 |
| 228 | Rote, A. F., premium | 5 00 |
| 229 | Cody, W., police | 4 00 |
| 230 | Lewis, Mrs. H. A., premium | 2 00 |
| 231 | Cammack, Lizzie, secretary's clerk | 4 00 |
| 232 | Taylor, J., police | 5 00 |
| 233 | Baxter, Geo., clerk | 14 00 |
| 234 | Newton, J. S., premium | 38 00 |
| 235 | Newton, J. L., premium | 1 00 |
| 236 | Morse, J. W., premium | 65 00 |
| 237 | Bird, W. K., premium | 4 00 |
| 238 | Hayes, J., premium | 5 00 |
| 239 | Askew, L., premium | 3 00 |
| 240 | Wildhagen, Mrs. L., premium | 25 50 |
| 241 | Webster, J. L., labor | 5 25 |
| 242 | Wood, A., police | 6 00 |
| 243 | Rand, H. W., state attendant | 19 50 |
| 244 | Blanchard, Hattie, premium | 6 00 |
| 245 | B anchard, W., premium | 20 00 |
| 246 | Davenport, F., premium | 15 00 |
| 247 | Blanchard, W., premium | 5 00 |
| 248 | Reynolds, L., clerk | 1 00 |
| 249 | Reynolds, L., clerk | 5 00 |
| 250 | Field, J. W., clerk | 6 00 |
| 251 | Farr, H. L., clerk | 25 00 |
| 252 | Memhard, G., premium | 11 00 |
| 253 | Fuller, F. L., clerk | 6 00 |
| 254 | Sylvester, H., premium | 11 00 |
| 255 | Schluchler, J. G., premium | 2 00 |
| 256 | Main, A. H., premium | 6 00 |
| 257 | Baker, J. C., use of engine | 50 00 |
| 258 | Higgins, B., watchman | 2 00 |
| 259 | Dahl, A. L. premium | 22 00 |
| 260 | Main, A. H., dinner tickets | 92 00 |
| 261 | Void | ..... |
| 262 | Horton, G. W., premium | 4 00 |
| 263 | Palmer, W., premium | 2 00 |
| 264 | Gilbert, Wm., dinner tickets | 66 |
| 265 | Horton, G., clerk | 19 00 |
| 266 | Coleman, P., police | 6 00 |
| 267 | Smith, G. W., premium | 2 00 |
| 268 | Van Hyte, L., clerk | 19 00 |
| 269 | Woodbury, Milo, clerk | 19 00 |
| 270 | Randal, R., premium | 2 00 |
| 271 | Randal, police | 8 00 |
| 272 | Pickart C., premium | 3 00 |
| 273 | Lezier, Ed., post bills | 16 00 |
| 274 | Mathews, John, nightwatch | 22 00 |
| 275 | Clinton, J. E., printing | 7 00 |
| 276 | Wheeler, E. A., premium | 5 00 |
| 277 | Young, J. K., ass't education department | 4 00 |
| 278 | Toulsey, B., ass't poultry | 18 00 |
| 279 | Stevens, J., premium | 3 00 |
| 280 | Jacket, W., premium | 38 00 |
| 281 | Baker, J. W., labor in | 5 00 |
| 282 | Baker, J. W., ass't in forage department | 11 00 |
| 283 | Sanborn, Mrs. S. P., clerk | 11 00 |
| 284 | Hook Bros., premium | 17 00 |
| 285 | Hook, L., premium | 9 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 286 | Hook, W. L., premium | $5 00 |
| 287 | McBama, G., Janesville, straw | 21 25 |
| 288 | Schawb, Lizzie, premium | 3 00 |
| 289 | Davenport, T., feed | 39 91 |
| 290 | Packham, Mrs. R, premium | 2 00 |
| 291 | Perkins, Fred., premium | 2 00 |
| 292 | Taylor, Lizzie, premium | 12 00 |
| 293 | Brotentark, M., premium | 5 00 |
| 294 | Hosington, C. F., premium | 15 00 |
| 295 | Fitch, J. C., clerk | 5 00 |
| 296 | O'Keif, D., police | 3 00 |
| 297 | Keif, D. C., police | 15 00 |
| 298 | Cook, W. H., premium | 50 00 |
| 299 | Duncan, premium | 16 00 |
| 300 | Dunning & Sumner, goods | 90 |
| 301 | Rose, E, premium | 19 00 |
| 302 | Hover, E. C., premium | 9 00 |
| 303 | Collins, John, labor | 1 50 |
| 304 | Demming, A., premium | 5 00 |
| 305 | Grady, F., straw | 6 00 |
| 306 | Huntley, D. H., premium | 65 00 |
| 307 | Bear, David, police | 10 00 |
| 308 | Sherman, Jo., ice | 9 65 |
| 309 | Band | 145 00 |
| 310 | Howe, W. T., labor | 6 00 |
| 311 | Jones, J. N., goods | 12 00 |
| 312 | Jones, J. N., premium | 5 00 |
| 313 | Rutherford, John, premium | 20 00 |
| 314 | Memhard, Fred., cartage | 29 74 |
| 315 | Fidler, J., straw | 5 70 |
| 316 | Rolf, J., cambric | 2 20 |
| 317 | Vilas House, board guests | 9 00 |
| 318 | Calkins, D. M., carpenter | 40 50 |
| 319 | Babcock, J. B., carpenter | 42 50 |
| 320 | Hall, L. H., hardware | 6 00 |
| 321 | Hall, L. H., premium | 5 00 |
| 322 | Gillerty, B., labor | 28 50 |
| 323 | Wylie, Geo., premium | 23 00 |
| 324 | Kitzrow, Wm., premium | 44 00 |
| 325 | Bryant, Geo. E., salary | 450 00 |
| 326 | Hawley, B., labor | 9 75 |
| 327 | Leonard, M., premium | 38 00 |
| 328 | Wauldry, A., dinner tickets | 4 00 |
| 329 | Daggett, M. L., premium | 7 00 |
| 330 | Teuleman, H., premium | 13 00 |
| 331 | Dodge, A. C., premium | 20 00 |
| 332 | Mallory, L. T., premium | 16 00 |
| 333 | Spring, W., premium | 15 00 |
| 334 | Cooper, C., labor | 12 75 |
| 335 | Cain, John, labor | 18 75 |
| 336 | Cummings, J., labor | 36 25 |
| 337 | Haak & Haven, water pipe | 56 00 |
| 338 | Page, H. W., premium | 1 00 |
| 339 | Baker, E. W., premium | 4 50 |
| 340 | McLaughlin, ladies attendant | 10 00 |
| 341 | Doyle, Pat., labor | 5 25 |
| 342 | Sheridan, Ellen, premium | 5 50 |
| 343 | Fredrickson, L., lumber | 56 72 |
| 344 | Jones, N. P., premium | 10 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 345 | Mead, C. W., premium | $3 00 |
| 346 | Slightam, C. F., dinner tickets | 1 57 |
| 347 | Gill, Elir, premium | 4 00 |
| 348 | Gill, L., police | 6 00 |
| 349 | Richer, Wm., labor, forage department | 20 00 |
| 350 | Joy, Mrs. J., premium | 7 50 |
| 351 | Sherwood, H., clerk | 30 00 |
| 352 | Sheldon, S. L., goods to —— department | 18 81 |
| 353 | Warner, H. S., shafting | 59 65 |
| 354 | Storm, Wm., work | 10 00 |
| 355 | Storm, Wm., goods | 8 43 |
| 356 | Riley, Geo., livery | 32 50 |
| 357 | Devine, J., police | 8 00 |
| 358 | Jones, Wm., police | 4 00 |
| 359 | Dundas, J. C., premium | 20 00 |
| 360 | Moore, J., premium | 5 00 |
| 361 | Fitch, A. C., premium | 3 00 |
| 362 | Park Hotel, boarding guests | 4 50 |
| 363 | Stafford, C., dinner tickets | 1 00 |
| 364 | Anderson, M., premium | 13 00 |
| 365 | Wright, D. H., police | 8 00 |
| 366 | Stafford, C., assistant superintendent sheep | 18 00 |
| 367 | Philawlee, D. P., work on track | 4 50 |
| 368 | Ferguson, C., straw | 8 25 |
| 369 | Train, D., police | 6 00 |
| 370 | Blake, H., straw | 2 25 |
| 371 | Blake, H., straw | 5 25 |
| 372 | Comstock, G., straw | 3 00 |
| 373 | Comstock, Gil., straw | 3 00 |
| 374 | Chandler, J. C., premium | 2 00 |
| 375 | Chandler, J. C., assistant marshal | 17 50 |
| 376 | Paul, J. H., premium | 70 00 |
| 377 | Dorn & Co., livery | 81 00 |
| 378 | Clark, J. H., goods | 7 50 |
| 379 | Payne, John, police | 10 10 |
| 380 | Payne, J., police | 1 90 |
| 381 | Bradley, B., premium | 4 00 |
| 382 | Wilson, T., premium | 10 00 |
| 383 | Warren, W. W., premium | 1 00 |
| 384 | Frank, D. W., premium | 14 75 |
| 385 | Smith Bros., premium | 5 00 |
| 386 | Waltzinger, A. F., repairing flags | 90 |
| 387 | Galick, R. L., premium | 2 30 |
| 388 | McFarland, H., labor | 35 75 |
| 389 | Hestand, J. B., premium | 9 00 |
| 390 | State Journal, printing | 111 00 |
| 391 | Wootton, B., premium | 8 50 |
| 392 | Leitch, W. T., clerk | 10 00 |
| 393 | Nicholson, J., premium | 1 00 |
| 394 | Nicholson, J., premium | 60 00 |
| 395 | Harrison, M. H., hay | 312 50 |
| 396 | Ainsworth, H. C., painting | 4 63 |
| 397 | Harrison, J., straw | 4 50 |
| 398 | Wilson, F., straw | 6 00 |
| 399 | Bull, J., straw | 19 00 |
| 400 | Burington, C. D., premium | 8 00 |
| 401 | Wilson, F., labor | 7 50 |
| 402 | Forest, J. F., premium | 4 00 |
| 403 | Palmer, C. M., premium | 4 00 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 404 | Porter, W. H., premiums | $22 65 |
| 405 | Doolin, J., carpenter | 27 00 |
| 406 | Comstock, G., straw | 3 00 |
| 407 | Blake, H., straw | 3 00 |
| 408 | Arthur, Mrs. J. H., premium | 2 00 |
| 409 | Howe, J. premiums | 15 00 |
| 410 | Wheeler, Geo. W., premiums | 14 30 |
| 411 | Devine, M., labor | 23 25 |
| 412 | O'Mally, J., premiums | 30 00 |
| 413 | Shrugg, E. W., premium | 1 00 |
| 414 | Fox, A. C., premiums | 103 00 |
| 415 | Harding, Geo., premiums | 36 00 |
| 416 | Brabagen, J. B., premiums | 79 00 |
| 417 | Wait & Low, premiums | 38 50 |
| 418 | Roberts, H. G., premiums | 5 00 |
| 419 | Brayee, A., assistant superintendent cattle | 17 50 |
| 420 | Brayee, A., labor | 10 50 |
| 421 | Curtis, F. C., premiums | 20 00 |
| 422 | Saran, H., posting bills | 75 |
| 423 | Democrat Co., printing | 5 00 |
| 424 | Vilas, F. M., premiums | 7 00 |
| 425 | Galligher, B., premiums | 20 00 |
| 426 | Morgan, R., & Co., posters | 92 00 |
| 427 | Stout, L. B., premiums | 2 00 |
| 428 | Hoy, J., dinner tickets | 1 33 |
| 429 | Mayer, C. S., premiums | 9 00 |
| 430 | Young, R. L., premiums | 16 65 |
| 431 | Balcturn, J., premium | 1 00 |
| 432 | Anderson, L. C., premiums | 7 00 |
| 433 | Hamilton, C., premiums | 1 33 |
| 434 | Palmer, N. N., premiums | 167 30 |
| 435 | Peffer, K. T., premiums | 9 00 |
| 436 | Vial, A., straw | 10 00 |
| 437 | Thomas, W. B., premiums | 3 00 |
| 438 | Lewis, Mrs. H., premiums | 3 00 |
| 439 | Frank & Ramsay, goods | 20 00 |
| 440 | Baker & ——, lumber | 90 00 |
| 441 | Slaughter, B. C., clerk | 60 00 |
| 442 | Cooley, C. F., wood | 11 25 |
| 443 | Boyce, M. D., premiums | 34 00 |
| 444 | Cram, B. F., clerk | 6 00 |
| 445 | Fish, E. W., premiums | 10 00 |
| 446 | Stowe, Mrs. G. H., premiums | 63 00 |
| 447 | Fowler, B. F., premiums | 27 00 |
| 448 | Baker, George, premiums | 85 00 |
| 449 | Laramy, W. H., premiums | 40 00 |
| 450 | Egge, H. M., painting | 4 00 |
| 451 | Atwood, E. L., premiums | 5 00 |
| 452 | Wilson, E., premiums | 30 00 |
| 453 | Alcott, D. M. W., premiums | 3 00 |
| 454 | Peffer, R. F., premiums | 5 00 |
| 455 | Pyncheon, J., drayage | 50 |
| 456 | Phillips, H. A., premiums | 23 00 |
| 457 | Kiser, J. C., premiums | 265 00 |
| 458 | Minsch, T., premiums | 10 00 |
| 459 | Bosford, W. B, bills for fair | 100 00 |
| 460 | Taylor, H., premiums | 3 00 |
| 461 | Frank & Ramsay, premiums | 10 00 |
| 462 | Parks, H. C., post bills | 3 25 |

| No. of order. | To whom and for what. | Amount. |
|---|---|---|
| 463 | Brown, P. W., premium | $7 00 |
| 464 | Curtis, D., premium | 92 00 |
| 465 | Clarck, A. W., police | 2 00 |
| 466 | Telegraph, W. U | 11 00 |
| 467 | Hilson, J L, telegraph operator | 15 00 |
| 468 | Salisly, D. F., premium | 1 00 |
| 469 | Moore, Libbie, premium | 1 00 |
| 470 | Hall, H | 45 00 |
| 471 | Moore, L., premium | 4 00 |
| 472 | McFarland, H., labor | 50 |
| 473 | Ramsdel, Z., fish from lake | 10 00 |
| 474 | Lewis, P., wood | 3 00 |
| 475 | Bucklus, J. B., premium | 6 00 |
| 476 | Weeks, Thos., police | 2 00 |
| 477 | Goldenberst, B., barrel | 2 00 |
| 478 | Chipm n, A. J., premium | 5 00 |
| 479 | Cantwell, A. J., dinner tickets | 2 33 |
| 480 | Baker, D., premium | 10 00 |
| 481 | McPherson, J. P., premium | 16 65 |
| 482 | Leonard, M., labor | 3 00 |
| 483 | Wilman, Z. L., premium | 6 00 |
| 484 | Humbert, A. & P., premium | 67 00 |
| 485 | Bucklus, J. B., premium | 12 00 |
| 486 | Conklin & Gray, premium | 29 25 |
| 487 | Cantwell, W. J., printing | 70 00 |
| 488 | Cantwell, W. J., printing | 45 70 |
| 489 | Slaughter, B. C, clerk | 40 50 |
| 490 | Little, Thos., premium | 15 00 |
| 491 | McPherson, J. P., premium | 2 00 |
| 492 | Swanson, T., clerk | 27 70 |
| 493 | D nlap L., premium | 6 00 |
| 494 | Nichols, J. H., express | 1 75 |
| 495 | Hollister, A. H., goods | 1 00 |
| 496 | Booth, W. A., express | 2 05 |
| 497 | Sanford, G. W., premium | 2 00 |
| 498 | Ogilvie, Wm., premium | 115 00 |
| 499 | Park, Wm. J. & Co., goods | 5 20 |
| 500 | Bryant, Geo E., premium | 120 00 |
| 501 | Gray, Wm., premium | 20 00 |
| 502 | Andrew Bishop, sprinkling | 10 00 |
| 503 | Bennett, E. R., premium | 23 00 |
| 504 | J hnson, J. J., premium | 115 00 |
| 505 | Welch, Wm., labor | 50 00 |
| 506 | Dean, E. B., Jr | 61 00 |
| 507 | Bryant, Geo. E, secretary salary | 450 00 |
| 508 | Welch, Wm, labor | 8 00 |
| 509 | Anderson, C., labor | 8 00 |
| | Total amount of orders | $15,653 47 |
| | Paid orders, 1879 | 142 95 |
| | Paid dinner tickets | 62 33 |
| | Balance | 702 49 |
| | | $16,561 24 |
| | Unpaid orders, Nos. 259, 359, 422, 433 | 44 08 |
| | | $16.517 16 |

On motion, the chair appointed P. B. Parsons, Ed. Lazier and J. C. Chandler a committee to examine said report, and compare the same with the books of the secretary, and the vouchers therefor.

The committee, after a full examination of all vouchers, books, etc, reported as follows:

MADISON, December 1, 1880.

The committee appointed to examine the vouchers of the treasurer, and compare them with the books of the secretary, beg leave to report that we have discharged that duty, having compared the vouchers with the report, and with the orders drawn, and find them correct.

All of which is respectfully submitted.

P. B. PARSONS,
J. C. CHANDLER,
ED. LAZIER,
*Committee.*

On motion of Robert Ogilvie, the report was unanimously adopted.

On motion, adjourned.

# EXHIBITION OF 1880.

## OPENING ADDRESS.

By Hon. N. D. FRATT, President.

*Fellow Members of the State Agricultural Society; Ladies and Gentlemen:* It is my pleasant duty to say a few words of welcome to you on this occasion of our twenty-seventh annual gathering. I welcome you as a part of the great army of agricultural progress. I welcome you as the most enterprising, active and intelligent members of the oldest, and probably the most useful and necessary profession on the face of the earth. We are working men; men who work not alone with hands, but with brains also. Both are alike essential in upholding that most ancient and honorable profession, which existed long before the gentleman came into fashion —

> **"When Adam digged and Eve span,**
> **Pray where then was the gentleman?"**

Bear in mind, I speak of the conventional gentleman, who is like the lilies of the *Field* in this, "that he toils not, neither does he spin." He is above laboring, either with mind or hands, and he lives, the drone in the hive, upon the toil and enterprise of his fellows. For we know that labor is consistent with the truest gentility, and that in the development of the ideally perfect farmer, the noblest powers of manhood must have place and find their proper sphere of action. I congratulate you upon this grand exhibition. It is in most departments superior to all that have preceded it. The display in horses, cattle, sheep, swine and poultry is fully equal, while the agricultural, horticultural, manufacturers' and fine art departments are unusually good; and last of all, and perhaps greater than any, is the department of machinery, which can only be estimated by the number of acres covered, showing that the active brain of the inventor has not

been idle. This ought to be to us a joyful occasion. We should come, thankful that the greater part of our labors for the year are ended; the greater part of our gains are secured; and we should come, thankful to the giver of all good things that we have received at His hands such a measure of prosperity during the year. And as we look upon our friends anew, each man is to us a reminder of his specialty, and we should cheerfully greet each other, inquire after his well doing, and rejoice in his success.

It is not necessary at this time to say much concerning the benefits of these fairs. But it is hardly too much to say that, as the intelligent men I see around me are the cause of these annual fairs, so the fairs in their turn are the creators of that enterprising, wide-awake, discriminating spirit which is the ground and sure promise of success in agriculture. Here we see the best that can be shown from all parts of our magnificent state, of everything connected with agriculture. Here we have an opportunity of seeing all improvements in farming implements, of comparing one with another, of talking over their merits with those who have used them, and may attain the best understanding relative to their value. This subject, however, has been so thoroughly considered in addresses on former occasions, that it is only necessary to refer to it at this time, without wearying you with a repetition of that which is so obvious.

In reviewing the farming conditions of the current year, it may appear that in some respects we may not be so favorably situated as regards the crops as we were last year, yet we have abundant reason for congratulation in the general prosperity. Local storms have affected unfavorably our returns in some sections. But the reports are generally favorable, and the prospect is, that crops throughout the state will compare very well with the averages of former years. Scarcity will prevail nowhere, but as is usual in our favored land, we have an "abundance and to spare." Herein will be found the chief difference between our own and other lands. We cannot realize the vastness of our country; we cannot raise up our minds to such a plane that we can properly conceive its extent, its wonderful natural fertility, and the great variety of its products.

In Europe the failure of one interest brings distress upon all. Here, failure in one part of the country is scarcely felt in another, and it may be safely said that considering all parts of this immense country with its great variety of climate and productions, that there is always abundance; partial failure here or there is more than made up by the surplus in other parts, which the railroads bring to our very doors. Although in some sections winter wheat may have winter killed, it is in other parts well filled and a good crop. Spring wheat is probably about an average crop; the prospect for a large yield of corn is excellent; oats are generally below the average.

Dairy products have brought unusually good prices; cheese especially has brought better prices than last year. Looking at the crops, considering the prices of farm products as a whole, appreciating the revival of business in all departments of industry around us, surely the farmer has no reason for discouragement. Individual cases of failure and hardship there will always be; but we have only to look around and we must see that as a class, we are greatly favored by a steady and sure though gradual growth in material prosperity, and in all the comforts and refinements of life which naturally follow such prosperity.

As we consider agricultural conditions during the year, and naturally take pride in our success, and rejoice in our prospects, let us carefully observe and reflect concerning the improvement of these conditions, and learn how they may be modified to meet the changes which constantly occur in the ever shifting and varying demand of the world around us. Let us not be passively carried along in the stream of life, but be ever wide awake and active in meeting those demands, and in seizing every opportunity to supply the market just *what* it needs, and just *when* it is needed. Our experience should not, "like the stern lights of a ship illuminate only the track passed over," but cast its rays ahead and disclose the successes and profits of the future.

What are the conditions which are changing? I shall briefly consider in their order some of these:

The first changing condition I shall notice is the ever increasing facility and cheapness of transportation for our productions,

and consequent on this ease and cheapness of transportation, follows the increased money value of all our productions; by bringing close to us the great multitude of consumers in the eastern states, and in Europe,—and here permit me to acknowledge our obligations to the railroads. Time will not permit, and my ability would fail if I should attempt to set before you the advantages, direct and indirect which accrue to the farming community from the railroads. It is within the memory of many of us that the country might be filled with wealth, and the farmer who produced it, for the want of a market, might not be able to decently clothe his children, barefooted boys and poorly clad girls, and to give them an education was an ambition rarely realized. Who of us of middle age does not remember the time when in this favored country, the farmer hauled his pink-eyed wheat from forty to one hundred miles to the nearest market? Spending from four to ten days on the melancholy trip, receiving his thirty-five to fifty cents per bushel, and after paying his hotel bills and getting a few absolute necessaries, would hardly have enough money left to pay his way home,—this is not over stated. Who does not remember the long weary miles of mud, the loads of green lumber hauled home, the rains of fall and spring, and the biting blasts of winter? So much toil, so much exposure and so little gain. The most of these are things of the past, the markets of the world are now almost at our doors.

Let us rejoice in the changed condition of things. Let us be thankful for the energy and capital which have spread the roads, and built the trains, and created the power to take our produce to its destination, when without such aid it could hardly be taken at all; which have doubled the value of our produce and trebled the value of our lands, brought the luxuries of the world to our homes, and by annihilating the space and time which separated the nations of the world, showed us our mutual dependence, and made us realize, if not the fatherhood of God, at least the brotherhood of man. These roads are now being built in advance of the settlement of the country, and they are the only immediate means of opening the country to settlement. They are the pioneers of civilization. They bring the thousands of immigrants to their

homes, and make sure their success, transforming with that success dull and servile workers to active, intelligent and wealthy freemen. The network of steel is still spreading. In 1879, three thousand seven hundred and fifty miles were added to our total, and it is estimated that six thousand miles will be constructed in 1880, making the prospective mileage of January 1, 1881, ninety-one thousand five hundred and ninety-one miles of road. Now let us bear in mind that in all great achievements now progressing in human affairs, in the production or leading forth of the wealth of the mines, the forests and the soil, it is the railroads that have made all other inventions worth applying. That has caused abundance to rule where famine might have been; and that is now moulding the institutions of centuries to its imperative law. The next changed condition of farming interests consequent on railroad growth is, that the centers of wheat and corn production are constantly moving, and both are moving westward. This would at first seem to interfere with our prospects by subjecting us to unfavorable competition with those having the cheap lands of the west. This is more apparent than real.

For in this, as in other things, "there is a Providence which shapes our ends," and above and beyond our wisdom. A system of balances and compensations seems to attend upon all improvement and all progress, which "would not be dreamed of in our philosophy."

Precisely the same condition of things, which is slowly but surely being brought about here, has already been reached in New England, and from the same causes. At present, nearly all the available surplus of the corn crop is found in the river states of the west, viz.: Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas and Missouri; while our lake states, Wisconsin, Michigan and Minnesota, have barely enough for their own consumption. Of our wheat crop, the Atlantic states now produce only seventeen per cent., against thirty per cent. in 1860; the central belt of states has fallen during the same period from fifty-four per cent. to forty per cent., while the states west of the Mississippi have risen from fourteen per cent. to forty-two per cent. New England now produces only three-tenths of a bushel to each inhabitant,

and the middle states only three and one-third bushels, or a little more than half of what is necessary to a full supply; while the westward progress of corn production has been very slow, the center of *wheat* production is moving westward very actively, and will continue for many years, as wheat culture subdues the high plateaus and mountain valleys between the Missouri and the Pacific ocean. In Oregon and Washington territory, competent observers predict a yield of wheat, in the near future, three times as large as that of California; of Dakota the area especially adapted to wheat does not fall short of forty million acres. A considerable part of Wyoming and Idaho can be used in the same direction; and even Montana, though better suited to grazing purposes, is supposed, by Prof. Thomas, of the Hayden expedition, to contain nearly eight million acres of wheat lands. Altogether, we have west of us upwards of one hundred and sixty million acres of land in which wheat farming will always exist as a specialty. So, without stinting the requirements of our rapidly growing population, our wheat production cannot fail to supply the deficiency of the world for many generations. This the rapid transit and increasing cheapness of transportation by railroad and steamship makes available, and prevents competition except under the most favorable conditions. Though this might seem to be unfavorable to us in Wisconsin, it is far from being the case. It is true, it concerns us most closely, and it becomes us, as prudent and foresighted farmers, to adapt our operations to these changing conditions.

How will we be affected? As New England, and Old England, too, are now being affected. Before the great railroad systems were consolidated and worked at the low rates which now prevail, it was necessary for the people of New England to work arduously for bread alone, and white, or wheat bread, was a luxury. Now one day's wages of a common laborer, or half the daily wages of a carpenter or mason, will move that man's subsistence of grain and meat for one year a distance of one thousand miles. This effectually removes all thought of competitive production of meat and grain in New England, yet the aggregate value of farm products in the eastern states increases annually; and, as

in New England, so in the farm lands of central New York, and in the Mohawk and Genesee valleys, formerly the very center of the best wheat cultivation of the United States. These farms are now more valuable than ever before, and they are made so by the pursuit of a more mixed husbandry, and the adaptation of the crops to the newer conditions. Thus, although the field of production of the crop of cereals moves steadily to the west, their migration does not mean decay, but rather progress in the agriculture of the east. Grain and meats we shall still produce, but we shall cease to depend on them so exclusively. We shall pay more attention to dairy farming, make our lands richer and cultivate them better, and depend more and more upon the production of those perishable but more valuable crops, for which our market will be found in our rapidly growing cities and among the mechanics and laborers engaged in the manufacturing so wonderfully increasing in our midst. This means for us, as have resulted in many farming sections of New York, New Jersey, Pennsylvania and New England, greater prosperity and a higher standard of comfort and enjoyment.

I said we shall pay more attention to dairy farming. This has been and must continue to be peculiarly profitable to us in Wisconsin, and will probably be the most important element of stable or permanent profit in the new era which is coming upon us.

A very old Methodist minister, who for fifty years had preached in almost as many different towns, once said, "I never knew a man who for ten years kept ten good cows who did not become independent, if he did not become rich;" and certainly it is within our own observation that our most steadily successful farmers are those who make dairy farming a large part of their business. It is surely not advisable that the dairy business, or any other business, should be largely entered upon without knowledge or experience.

Some men may have a peculiar fitness for this business, and may profitably follow it alone. But with most it should be part of a wisely considered system of farming, gradually begun, and should be increased as knowledge and experience justify. Its peculiar merit is that so much of the elements of nutrition are

added to the soil, and so little taken away in proportion to the amount of profit realized. The well-managed dairy farm becomes constantly more fertile. It is within my knowledge, that in the course of twenty years some of the poorest farms in the country have become the very best, by husbanding the resources necessarily attendant on a fair proportion of dairy farming. This farming we must grow into more and more. During the past year it has been very profitable, and its importance and profit is but beginning to be realized. During the current year it promises to be much more profitable. The exportation of dairy products is steadily growing; this year it is much larger than it was last. Most of the cheese exported goes to Great Britain, which for the year ending June 30, 1879, took about 143,000,000 pounds, valued in round numbers at $12,600,000, and this year a much larger quantity. The foreign trade for American cheese is now almost exclusively for what is called factory cheese, and includes every grade and quality, from the poorest skim milk to the richest full cream. The bulk of the poor grades goes to England. With the laboring classes it takes the place of meat, and when low in price is eaten as we eat bread. There is very little difference in the best makes of English and American cheese, but the average quality of English cheese is better than ours. We are, however, fast gaining on them, and they are being compelled to introduce our factory system to protect themselves against our competition. As this competition is rendered possible to us only by cheap steam transit, so it will be constantly in our favor, as transportation becomes inevitably cheaper. The exports of American butter are increasing rapidly. For the year ending June 30, 1878, there was shipped from New York city 22,000,000 pounds, valued at about $4,000,000; and for the year ending June 30, 1879, 38,000,000 pounds, valued at $5,500,000. All kinds are sent, but mostly the cheaper grades, and there is now an increasing demand for the very best creamery butter.

Thus we see that the dairy must be an important factor in the farming of the future. Its market is sure, its profits are steady, and its importance as a means of keeping up that which is truly a capital, the elements of fertility in our soil, cannot be over

estimated. It is the farmers' savings bank. A further change which the experience of late years would seem fully to justify, is the growth of more winter and less spring wheat; the greater yield of winter wheat overbalances the evil of its liability to winter kill, and makes it now a more paying crop. Though there may be sections where this change may not be advisable, yet generally it will hold good. Notwithstanding the unfavorable winter of 1879–80, some fields of winter wheat are turning out thirty-five bushels per acre. For a few years past considerable attention has been given to the culture of tobacco. This new industry has been principally confined to the counties of Dane and Rock, and this year will reach nearly 13,000 acres, divided about equally between the two counties. A return of one hundred and fifty dollars per acre is often realized from the *villainous* weed. The crop of those two counties for the year 1880 is estimated at $1,500,000. Friends, do not be dazzled by this remarkable show. It may be immensely profitable for a time, but it is far more certain to impoverish the soil. Make haste slowly in taking this new departure. I now come to the last, and it may be the most important, change I would recommend in our farm management. Within the past two or three years more attention than ever before has been paid to the manufacture of sugar from sorghum and from the cane of the ordinary field corn. A few facts, obtained mostly from a pamphlet issued from the department of agriculture in Washington, directly bearing on this subject, cannot fail to be useful. This information seems especially desirable now, when our attention is awakened to the changing conditions attending our operations, and the importance of new sources of profit. Let us first estimate in some degree the cost of the sugar used by us and the immense saving it would be to us to retain that cost within our own borders. As an instance of the value of domestic growth of sugar to a nation situated climatically much as we are, the culture of beet sugar in France might properly be adduced. It is stated that without the immense saving and income arising from this source of wealth, it would have been impossible for France to have arisen from the great burden of financial depression and indebtedness consequent upon the war with Prussia. In our own

country "it is found that over and above the amount of all sugar produced in the United States, since 1849, we have consumed during the same period, not less than eighteen hundred and odd millions of dollars worth of foreign sugars and their allied products; an amount of sugar more than equal in value to all the precious metals mined in the country since the discovery of gold in California, and nearly equal to the public debt at the present time." For many reasons which lack of time will now prevent us considering, the growth of sorghum and manufacture of sugar therefrom has hitherto made small progress; but the introduction and the wide spread distribution by the department of agriculture, of the variety of sorghum called the Minnesota Early Amber, the juice of which is supposed to granulate more readily than that of many other varieties, has given a great impetus to the cultivation of the sorghum cane and the manufacture of sugar therefrom; it is earlier than any other known variety, ripening its seed in from ninety to one hundred days, and yielding bountifully an excellent quality of syrup, besides, in many cases, good sugar, though all the cases reported (except one) were carried on with open pan evaporation. We are informed by the commissioner of agriculture, Hon. W. G. Le Duc, that there are now being tested by the department, thirty-two varieties of sugar sorghums and millets, all of which are valuable to a greater or less degree, according to varying soil, climate, etc. But for the northern part of the United States, he recommends the Early Amber as in every way most suitable. In a convention of the Northwestern Cane Growers' Association, held in Minnesota last season, this subject was thoroughly discussed, and the convention decided that the Early Amber was the only kind to be grown in that high latitude. The commissioner is informed by Mr. Thoms, an experienced sugar boiler, employed last season at the Crystal Lake Sugar Works, Illinois, at which were made many thousand pounds of good sugar, that with trimmed stalks delivered at the door, he could make and deliver the sugar at the mill at a cost of one and one-fourth cents per pound, a statement corroborated by Mr. Russell, of Janesville, Wisconsin, late superintendent of the Crystal Lake factory during the season of 1879. In the pamphlet referred to,

an epitome is given of the reports received from those to whom the Early Amber seed was sent. Many of those reporting were entirely unaccustomed to the culture of this crop, and consequently were only partially successful. Others had the experience of some years to guide them, and from these the reports are uniformly favorable, and some remarkably favorable. A yield of at least two hundred gallons of dense syrup per acre, worth about fifty cents per gallon, it would be reasonable to expect with good season, good soil, good cultivation and good milling. What has been said in regard to dairying applies with perhaps equal pertinence to this subject. This business should not be rushed into largely and hastily. The culture of the cane, and the manufacture of the sugar, should grow with experience. But it is not too much to anticipate that a new era has arrived in the making of sugar, and that as an element of our agriculture it will steadily grow until every community in the northwest will cease to depend upon southern and foreign sugar, but will make its own, and retain its money-value at home.

For necessary information upon mode of growth, of manufacture, upon necessary machinery, the relative value of different kinds of sorghum and the common field corn, I would refer every progressive farmer to information easily attainable from the commissioner of agriculture at Washington, the Hon. W. G. Le Duc.

In conclusion, my friends, have we not reason to be thankful and very hopeful. With the revival of all kinds of business at home, our own business becomes exceptionally profitable; with cheap transit, we are brought near to the foreign consumer; with a more varied husbandry, new sources of wealth are opened to us; with the improvement in agricultural implements comes comparative freedom from the exhausting toil of our fathers and of our own younger days. Intelligence is spreading among us greater comfort, and a larger share of the refinements of life await us. Compare for a moment the privileges enjoyed by our children with the restrictions and exactions suffered by ourselves. Think of the opportunity and necessity for the exercise of mental power, and the most varied knowledge in agricultural operations from this time onward, and then we can realize that farming is to be

really, what it has always been theoretically, one of the noblest of human exertions. But let us not forget that necessary to all this is the truly educated, many sided, well developed *man*. Physically, none should surpass the farmer. Temperate, with healthful food, breathing the pure air of the open country, subject to all genial "skyey" influences, his body should be the fit home of a sound, reflective and observant mind. These conditions are favorable to virtue and all the blessings which flow from it, and thankful, thankful should we be that our lot is so cast: free from the enervating and corrupting influences of the city, free from the harassing cares which plow their furrows on the faces of the greater of those whose means are embarked in the hazardous speculations of commercial and manufacturing enterprises. That the varied happiness and success which legitimately belong to a well regulated farmer's life may attend us all, is the best wish I now can express.

Thanking you for your courteous attention, again I bid you welcome, hoping that the social, intellectual and useful information acquired by your attendance here will amply repay you for the time and money expended. I now declare this twenty-seventh annual fair open to the public.

# PREMIUMS AWARDED.

## DEPARTMENT A.—HORSES.

### CLASS 1.—*Roadsters.*

| | |
|---|---|
| Best stallion 4 years old and over, sixteen exhibits, George Everson, Lake Mills | $20 00 |
| Second best, Dexter Curtis, Madison | 10 00 |
| Best stallion 3 years old and under 4, three exhibits, John Alds, New Lisbon | 20 00 |
| Second best, John Alds, New Lisbon | 10 00 |
| Best stallion 2 years old and under 3, six exhibits, A. C. Dodge, Monroe | 20 00 |
| Second best, G. Maisch, Madison | 10 00 |
| Best stallion 1 year old and under 2, three exhibits, A. Ludlow, Monroe | 10 00 |
| Second best, F. C. Curtis, Rocky Run, Wis | 5 00 |
| Best sucking stallion foal, two exhibits, E. W. Fish, Reedsburg | 10 00 |
| Best brood mare 4 years and over with foal by her side, five exhibits, M. L. Boyce, Lodi, Wis | 15 00 |
| Second best, A. Ludlow, Monroe, Wis | 10 00 |
| Best filly 3 years old and under 4, eight exhibits, Geo. Everson, Lake Mills | 15 00 |
| Second best, C. Roys, Columbus, Wis | 10 00 |
| Best filly 2 years old and under 3, eight exhibits, H. L. Farr, Cottage Grove | 15 00 |
| Second best, John Howie, Waunakee, Wis | 10 00 |
| Best filly 1 year old and under 2, three exhibits, H. L. Farr, Cottage Grove | 10 00 |
| Second best, M. L. Boyce, Lodi | 5 00 |
| Best sucking filly foal, four exhibits, A. Ludlow, Monroe | 10 00 |
| Second best, Ed. Wheeler, Windsor | 5 00 |
| Best stallion and five of his colts at 4 years or under, four exhibits, S. D. Macomber, New Lisbon | Silver plate, 25 00 |

### CLASS 2.—*Horses for all Work.*

| | |
|---|---|
| Best stallion 4 years old and over, ten exhibits, C. F. Harrington, Madison | $15 00 |
| Second best, Thos. D. Davis, Spring Green | 7 00 |
| Best stallion 3 years old and under 4, six exhibits, N. B. Brown, Sun Prairie | 12 00 |
| Second best, Dexter Curtis, Madison | 6 00 |
| Best stallion 2 years old and under 3, four exhibits, C. D. Burrington, Sun Prairie | 8 00 |
| Second best, Bernard Ruddy, Waunakee | 4 00 |
| Best stallion 1 year old and under 2, two exhibits, John Moore, Mendota | 5 00 |
| Best sucking stallion foal, two exhibits, O. M. Palmer, Oregon | 4 00 |

Best brood mare 4 years old and over, with foal by her side, six exhibits, F. C. Curtis, Rocky Run ..... $15 00
Second best, M. L. Boyce, Lodi ..... 7 00
Best filly 3 years old and under 4, two exhibits, J. B. Dutchess, Kendall ..... 12 00
Second best, S. Dunlap, Token Creek ..... 6 00
Best filly 2 years old and under 3, four exhibits, Matt. Anderson, Cross Plains ..... 8 00
Second best, N. R. Bailey, Sun Prairie ..... 4 00
Best filly 1 year old and under 2, three exhibits, M. L. Boyce, Lodi .. 5 00
Best sucking filly foal, three exhibits, Eli Gill, Syene ..... 4 00

CLASS 3.—*American highly bred Trotting Stock, with Pedigrees.*

Best stallion of any age, one exhibit, S. D. Macomber, New Lisbon.. Dip.
Best span of stallions driven together and owned by one party, two exhibits, C. Roys, Columbus ..... Grand silver medal.
Second best, John Alds, New Lisbon ..... Dip.
Best stallion and five of his colts, two exhibits, S. D. Macomber ..... Grand silver medal.

CLASS 4.—*Draft Horses—Pure bred.*

Best stallion 4 years old and over, eight exhibits, Lyall & Sheffield, Madison ..... $20 00
Second best, Thos. Bowles, Janesville ..... 10 00
Best stallion 3 years old and under 4, three exhibits, Bryant & Gallagher, Cross Plains ..... 20 00
Second best, Joseph O'Malley, Waunakee ..... 10 00
Best stallion 2 years old and under 3, three exhibits, A. Ludlow, Monroe ..... 20 00

CLASS 5.—*Matched Horses and Mares.*

Best pair carriage horses or mares not less than 15½ hands, sixteen exhibits, Dr. J. B. Bowen ..... $20 00
Second best, David Briggs, Orfordsville ..... 10 00
Best pair of roadsters, ten exhibits, Dexter Curtis, Madison ..... 20 00
Second best, F. B. Grover, Rock Prairie ..... 10 00
Best pair of Normans, pure bred, one exhibit, C. Roys, Columbus .... 20 00
Best pair of farm horses, not pure bred, seven exhibits, J. C. Kiser, Oregon ..... 15 00
Second best, Hook Bros., Brooklyn ..... 7 00

CLASS 6.—*Geldings or Mares for Single Harness, and Thoroughbreds.*

Best gentlemen's roadster for single harness, 4 yea s old and over, twenty-seven exhibits, Dr. J. C. Dunds, Cambridge..Silver plate, $20 00
Second best, A. E. Thomas, Madison, Wis.....Silver plate, 10 00
Best thoroughbred stallion of any age, shown by bridle, five exhibits, W. L. Wells, Lodi, Wis ..... 20 00
Second best, C. Roys, Hampden, Wis ..... 10 00
Best thoroughbred mare, any age, shown by bridle, seven exhibits, C. Roys, Columbus, Wis ..... 15 00
Second best, C. Roys, Columbus ..... 10 00

The Committee recommend the following special premiums on draft horses, viz.:

Thos. Bowles, Janesville, stallion 4 years and over ..... $15 00
J. N. Gaffney, Paoli, stallion 4 years and over ..... 7 00
John Currin, Lodi, stallion 3 years and over ..... 12 00
E F. Riley, Madison, stallion 4 years and over ..... 10 00
Robert Wilson, Mendota, stallion 2 years and over ..... 8 00

## DEPARTMENT B.— CATTLE.

### CLASS 8.— *Short-Horns.*

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|---|---|
| Best bull 4 years old and over, five exhibits, J. C. Kiser, Oregon | $25 00 |
| Second best, D. Buchanan, Rio | 15 00 |
| Best bull 3 years old and under 4, one exhibit, J. E. Owens, Brooklyn, | 25 00 |
| Best bull 2 years old and under 3, two exhibits, W. C. Kiser, Syene | 25 00 |
| Second best, Thomas Little, Janesville | 15 00 |
| Best bull 1 year old and under 2, five exhibits, J. C. Kiser, Oregon | 25 00 |
| Second best, D. Buchanan, Rio | 15 00 |
| Best bull calf over 6 and under 12 months old, five exhibits, W. C. Kiser | 10 00 |
| Second best, W. C. Kiser | 5 00 |
| Best bull calf under 6 months old, four exhibits, J. C. Kiser, Oregon | 10 00 |
| Second best, W. C. Kiser, Syene | 5 00 |
| Best cow 4 years old and over, five exhibits, J. C. Kiser | 20 00 |
| Second best, W. C. Kiser | 10 00 |
| Best cow 3 years old and under 4, seven exhibits, J. C. Kiser | 20 00 |
| Second best, W. C. Kiser | 10 00 |
| Best heifer 2 years old and under 3, eight exhibits, J. C. Kiser | 20 00 |
| Second best, W. C. Kiser | 10 00 |
| Best heifer 1 year old and under 2, twelve exhibits, W. C. Kiser | 20 00 |
| Second best, J. C. Kiser | 10 00 |
| Best heifer calf over 6 and under 12 months old, three exhibits, D. Buchanan | 10 00 |
| Second best, D. Buchanan | 5 00 |
| Best heifer calf under 6 months old, four exhibits, Geo. E. Bryant, Madison | 10 00 |
| Second best, D. Buchanan, Rio | 5 00 |

325

### CLASS 9.— *Jerseys.*

| | |
|---|---|
| Best bull 3 years old and over, one exhibit, Chester Hazen, Ladoga | $20 00 |
| Best bull 2 years old and under 3, two exhibits, H. A. Phillips, Sun Prairie | 20 00 |
| Second best, N. N. Palmer, Brodhead | 10 00 |
| Best bull 1 year old and under 2 two exhibits, Wm. Gay, Madison | 20 00 |
| Best bull calf over 6 and under 12 months, one exhibit, Geo. E. Bryant, | 10 00 |
| Best bull calf under 6 months old, five exhibits, N. N. Palmer, Brodhead | 10 00 |
| Second best, N. N. Palmer, Brodhead | 5 00 |
| Best cow 3 years old and over, six exhibits, Geo. E. Bryant, Madison | 15 00 |
| Second best, N. N. Palmer, Brodhead | 10 00 |
| Best heifer 2 years old and under 3, three exhibits, Geo. E. Bryant | 15 00 |
| Second best, N. N. Palmer | 10 00 |
| Best heifer 1 year old and under 2, four exhibits, Geo. E. Bryant | 15 00 |
| Second best, N. N. Palmer | 10 00 |
| Best heifer calf over 6 and under 12 months, three exhibits, Geo. E. Bryant | 10 00 |
| Second best, N. N. Palmer | 5 00 |
| Best heifer calf under 6 months old, three exhibits, N. N. Palmer | 10 00 |
| Second best, Geo. E. Bryant, Madison | 5 0 |

200

### CLASS 10.— *Ayrshires.*

| | |
|---|---|
| Best bull 3 years old and over, one exhibit, Chester Hazen, Ladoga | $20 00 |
| Best bull 2 years old and under 3, two exhibits, J. J. Johnson, Hartland | 20 00 |
| Second best, D. Huntley, Appleton | 10 00 |

Best bull 1 year old and under 2, three exhibits, Willard Blanchar, Windsor ..... $20 00
Second best, D. Huntley, Appleton ..... 10 00
Best bull calf over 6 and under 12 months old, six exhibits, D. Huntley ..... 10 00
Second best, J. J. Johnson, Hartland ..... 5 00
Best bull calf under 6 months old, five exhibits, Chester Hazen ..... 10 00
Second best, J J. Johnson ..... 5 00
Best cow 3 years old and over, ten exhibits, Chester Hazen ..... 15 00
Second best, J. J. Johnson ..... 10 00
Best heifer 2 years old and under 3, six exhibits, D. Huntley ..... 15 00
Second best, Chester Hazen, Ladoga ..... 10 00
Best heifer 1 year old and under 2, eight exhibits, D. Huntley ..... 15 00
Second best, Chester Hazen ..... 10 00
Best heifer calf over 6 and under 12 months, two exhibits, J. J. Johnson ..... 10 00
Second best, J. J. Johnson ..... 5 00
Best heifer calf under 6 months old, six exhibits, J. J. Johnson ..... 10 00
Second best, D. Huntley ..... 5 00

## CLASS 11.— *Devons.*

Best bull, 3 years old and over, five exhibits, John W. Morse, Verona $20 00
Second best, George Baker, Hustisford ..... 10 00
Best bull 1 year old and under 2, four exhibits, George Baker ..... 20 00
Second best, I. S. Newton, Verona ..... 10 00
Best bull calf over 6 and under 12 months old, two exhibits, L. Rawson, Oak Creek, Wis ..... 10 00
Second best, L. Rawson ..... 5 00
Best bull calf under 6 months old, eight exhibits, John W. Morse, Verona ..... 10 00
Second best, George Baker ..... 5 00
Best cow 3 years old and over, eleven exhibits, L. Rawson, Oak Creek 15 00
Second best, I. S. Newton, Verona ..... 10 00
Best heifer 2 years old and under 3, four exhibits, John W. Morse, Verona ..... 15 00
Second best, L. Rawson, Oak Creek ..... 10 00
Best heifer 1 year old and under 2, five exhibits, John W. Morse ..... 15 00
Second best, George Baker, Hustisford ..... 10 00
Best heifer calf over 6 and under 12 months old, four exhibits, Geo. Baker ..... 10 00
Best heifer calf under 6 months old, eight exhibits, I. S. Newton ..... 10 00
Second best, John W. Morse, Verona ..... 5 00

## CLASS 14.— *Holsteins.*

Best exhibition, not less than five head, F. W. Larmy, Beloit ..... $25 00
Second best, F. W. Larmy, Beloit ..... 15 00

## CLASS 16.— *Herds.*

### SHORT-HORNS.

Best bull and four cows or heifers over 2 years old, J. C. Kiser ..... $60 00
Second best, W. C. Kiser ..... 40 00
Third best, D. Buchanan ..... 30 00

### JERSEYS.

Best bull and four cows or heifers over 2 years old, N. N. Palmer .... $50 00

AYRSHIRES.

Best bull and four cows or heifers over 2 years old, three exhibits, J. J. Johnson ..... $50 00
Second best, Chester Hazen, Ladoga. ..... 30 00

DEVONS.

Best bull and four cows or heifers over 2 years old, three exhibits, L. Rawson ..... $50 00
Second best, George Baker, Hustisford..... 30 00

SWEEPSTAKES.

Best bull and four heifers under 2 years old, five exhibits, J. C. Kiser ..... $60 00
Second best, George E Bryant, Madison..... 40 00
Best bull calf and four heifer calves, bred and owned by exhibitor, five exhibits, J. J. Johnson, Hartland..... 30 00
Second best, George Baker, Hustisford..... 20 00

## DEPARTMENT C.— SHEEP.

### CLASS 17.— *American Merinos.*

Best buck 2 years old and over, six exhibits, John H. Paul, Genesee. $15 00
Second best, John H. Paul, Genesee..... 10 00
Best buck 1 year old and under 2, five exhibits, A. Humbert, Coldwell's Prairie..... 15 00
Second best, John H. Paul ..... 10 00
Best pen three buck lambs, three exhibits, A. Humbert..... 10 00
Second best, John H. Paul..... 5 00
Best pen three ewes 2 years old and over, five exhibits, A. Humbert.. 15 00
Second best, John H. Paul ..... 10 00
Best pen three ewes 1 year and under 2, four exhibits, John H. Paul. 15 00
Second best, A. Humbert..... 10 00
Best pen of three ewe lambs, four exhibits, A. Humbert..... 10 00
Second best, John H. Paul ..... 5 00
Best buck and five ewes (winners of above excluded), two exhibits, A. Humbert, ..... ...Silver plate, 20 00
Second best, John H. Paul, ..... ...Silver plate, 15 00

### CLASS 18.— *Long Wool.*

Best buck 2 years old and over, five exhibits, Jos. O'Malley, Waunakee, $15 00
Second best, Wm. Ogilvie, Verona..... 10 00
Best buck 1 year old and under 2, nine exhibits, Wm. Ogilvie..... 15 00
Second best, Wm. Ogilvie..... 10 00
Best pen of three buck lambs, six exhibits, Wm. Ogilvie ..... 10 00
Second best, George Harding, Waukesha..... 5 00
Best pen of three ewes 2 years old and over, four exhibits, William Ogilvie. ..... 15 00
Second best, George Harding..... 10 00
Best pen of three ewes 1 year old and under 2, six exhibits, William Ogilvie..... 15 00
Second best, George Harding..... 10 00
Best pen of three ewe lambs, five exhibits, George Harding... ..... 10 00
Second best, Joseph O'Malley ..... 5 00
Best buck and five ewes (winners of above excluded), three exhibits, George Harding..... Silver plate, 20 00
Second best, William Ogilvie ..... Silver plate, 15 00

CLASS 19.— *Downs.*

| | |
|---|---|
| Best buck 2 years old and over, eight exhibits, A. O. Fox, Oregon | $15 00 |
| Second best, Lewis Baker, Waunakee | 10 00 |
| Best buck 1 year old and under 2, eight exhibits, Wm. Ogilvie | 15 00 |
| Second best, A. O. Fox, Oregon | 10 00 |
| Best pen of three buck lambs, six exhibits, Wm. Ogilvie | 10 00 |
| Second best, A. O. Fox | 5 00 |
| Best pen of three ewes 2 years and over, six exhibits, A. O. Fox | 15 00 |
| Second best, L. Rawson, Oak Creek | 10 00 |
| Best pen of three ewes 1 year old and under 2, eight exhibits, A. O. Fox | 15 00 |
| Second best, A. O. Fox | 10 00 |
| Best pen of three ewe lambs, eight exhibits, A. O. Fox | 10 00 |
| Second best, A. O. Fox | 5 00 |
| Best buck and five ewes (winners of above excluded), four exhibits, A. O. Fox | Silver plate, 20 00 |
| Second best, George H. Daubner, Brookfield Center | Silver plate, 10 00 |

SWEEPSTAKES.

| | |
|---|---|
| Best three fat wethers 2 years old and over, three exhibits, A. O. Fox | Silver plate, $10 00 |

## DEPARTMENT D.— SWINE.

CLASS 20.— *Large Breeds, including Poland China, Chester White and others.*

| | |
|---|---|
| Best boar 2 years old and over, nine exhibits, B. T. Fowler, Hart Prairie | $15 00 |
| Second best, E. I. Austin, Beloit | 10 00 |
| Best boar 1 year old and under 2, eleven exhibits, E. Wait & Sons, La Grange | 10 00 |
| Second best, B. T. Fowler, Hart Prairie | 5 00 |
| Best breeding sow 2 years old and over, twelve exhibits, E. I. Austin, | 15 00 |
| Second best, Hook Bros., Brooklyn | 10 00 |
| Best breeding sow 1 year old and under 2, thirteen exhibits, D. Mosher, Beloit | 10 00 |
| Second best, S. Hook & Sons, Brooklyn | 5 00 |
| Best breeding sow with litter of sucking pigs, not less than four, two exhibits, George Wylie, Leeds | 15 00 |
| Best boar pig over 6 and under 12 months, four exhibits, D. Mosher | 8 00 |
| Second best, E. Wait & Son, La Grange | 4 00 |
| Best sow pig over 6 and under 12 months old, three exhibits, D. Mosher | 8 00 |
| Second best, B. T. Fowler, Hart Prairie | 4 00 |
| Best boar pig under six months old, forty-four exhibits, E. Wait & Son | 8 00 |
| Second best, S. Hook & Sons, Brooklyn | 4 00 |
| Best sow pig under 6 months old, thirty-two exhibits, Geo. Wylie | 8 00 |
| Second best, E. Wait & Son | 4 00 |

CLASS 21.— *Middle Breeds, including Berkshires.*

| | |
|---|---|
| Best boar 2 years old and over, two exhibits, Thos. Davenport, Madison | $15 00 |
| Second best, J. E. Owens, Brooklyn | 10 00 |
| Best boar 1 year old and under 2, four exhibits, W. C. Kiser | 10 00 |
| Second best, A. O. Fox, Oregon | 5 00 |

| | |
|---|---|
| Best breeding sow 2 years old and over, seven exhibits, W. C. Kiser, | $15 00 |
| Second best, J. E. Owens | 10 00 |
| Best breeding sow with litter of sucking pigs, not less than four, five exhibits, W. C. Kiser, Syene | 15 00 |
| Second best, E. R. Bement, Oregon | 10 00 |
| Best breeding sow 1 year old and under 2, four exhibits, A. Malone, Beloit | 10 00 |
| Second best, J. E. Owens | 5 00 |
| Best boar pig over 6 months old and under 1 year, three exhibits, A. O. Fox | 8 00 |
| Second best, J. E. Owens | 4 00 |
| Best sow pig over 6 months old and under 1 year, four exhibits, E. R. Bement | 8 00 |
| Second best, A. Randall, Hustisford | 4 00 |
| Best boar pig under 6 months old, sixteen exhibits, W. C. Kiser | 8 00 |
| Second best, A. Malone, Beloit | 4 00 |
| Best sow pig under 6 months old, eleven exhibits, J. E. Owens | 8 00 |
| Second best, A. Randall, Hustisford | 4 00 |

CLASS 22.—*Small Breeds, including Essex, Suffolk and others.*

| | |
|---|---|
| Best boar 2 years old and over, two exhibits, S. H. and A. E. Joiner, Janesville | $15 00 |
| Second best, S. H. and A. E. Joiner, Janesville | 10 00 |
| Best boar 1 year old and under 2, two exhibits, S. H. and A. E. Joiner, Janesville | 10 00 |
| Second best, J. J. Tschudy & Son, Monroe | 5 00 |
| Best breeding sow 2 years old and over, four exhibits, S. H. and A. E. Joiner | 15 00 |
| Second best, J. J. Tschudy & Son | 10 00 |
| Best breeding sow 1 year old and under 2, five exhibits, J. J. Tschudy & Son | 10 00 |
| Second best, S. H. and A. E. Joiner | 5 00 |
| Best breeding sow with litter of sucking pigs, not less than four, two exhibits, J. J. Tschudy & Son, Monroe | 15 00 |
| Second best, S. H. and A. E. Joiner | 10 00 |
| Best boar pig over 6 and under 12 months old, four exhibits, S. H. and A. E. Joiner | 8 00 |
| Second best, J. J. Tschudy & Son | 4 00 |
| Best sow pig over 6 and under 12 months old, three exhibits, S. H. and A. E. Joiner | 8 00 |
| Second best, S. H. and A. E. Joiner | 4 00 |
| Best boar pig under 6 months old, six exhibits, S. H. and A. E. Joiner | 8 00 |
| Second best, J. J. Tschudy & Son | 4 00 |
| Best sow pig under 6 months old, seven exhibits, J. J. Tschudy & Son | 8 00 |
| Second best, J. J. Tschudy & Son | 4 00 |

Special premium of $25 offered by Messrs. Keenan and Hancock of Union Stock Yards, Chicago, Illinois (Commission Merchants).

| | |
|---|---|
| Best display of Berkshire swine, four exhibits, W. C. Kiser | $25 00 |

## DEPARTMENT E.—POULTRY.

### CLASS 23.—*Asiatic.*

| | |
|---|---|
| Best trio light Brahma fowls, three exhibits, G. W. Baker, Madison | $2 50 |
| Second best, E. Wilson, Lake Mills | 1 50 |
| Best trio light Brahma chicks, four exhibits, G. W. Baker | 2 00 |
| Second best, Robert Wootton, Madison | 1 00 |
| Best trio dark Brahma fowls, one exhibit, J. R. Brabazan, Delavan | 2 50 |

| | |
|---|---|
| Best trio dark Brahma chicks, one exhibit, E. Wait & Son, La Grange | $2 00 |
| Best trio Buff Cochin fowls, four exhibits, E. Wilson, Lake Mills | 2 50 |
| Second best, J. R. Brabazan | 1 50 |
| Best trio Buff Cochin chicks, one exhibit, J. R. Brabazan | 2 00 |
| Best trio Partridge Cochin fowls, one exhibit, J. R. Brabazan | 2 50 |
| Best trio Partridge Cochin chicks, one exhibit, J. R. Brabazan | 2 00 |
| Best trio White Cochin fowls, E. Wilson, Lake Mills | 1 50 |
| Best trio White Cochin chicks, E. Wilson, Lake Mills | 2 00 |
| Second best, E. Wilson, Lake Mills | 1 00 |

DORKING.

| | |
|---|---|
| Best trio Silver Gray Dorking chicks, one exhibit, R. Wootton | $2 00 |
| Best trio American Dominique fowls, two exhibits, J. R. Brabazan | 2 50 |
| Second best, J. R. Brabazan | 1 50 |
| Best trio Dominique chicks, three exhibits, J. R. Brabazan | 2 00 |
| Best trio Plymouth Rock fowls, four exhibits, J. R. Brabazan | 2 50 |
| Second best, E. Wait & Son | 1 50 |
| Best trio Plymouth Rock chicks, four exhibits, A. Randall | 2 00 |
| Second best, J. R. Brabazan | 1 00 |

SPANISH.

| | |
|---|---|
| Best trio Black Spanish (white face) fowls, one exhibit, J. R. Brabazan, | $2 50 |
| Best trio White Leghorn fowls, two exhibits, E. Wait & Son | 2 50 |
| Second best, J. R. Brabazan | 1 50 |
| Best trio White Leghorn chicks, three exhibits, E. Wait & Son | 2 00 |
| Second best, J. R. Brabazan | 1 00 |
| Best trio Brown Leghorn fowls, one exhibit, J. R. Brabazan | 2 50 |
| Best trio Brown Leghorn chicks, one exhibit, J. R. Brabazan | 2 00 |
| Best trio Silver Spangled or Penciled Hamburg fowls, four exhibits, E. Wait & Son, on Spangled | 2 50 |
| Second best, E. Wait & Son | 1 50 |
| Best trio Silver Penciled Hamburg chicks, four exhibits, E. Wait & Son, La Grange | 2 00 |
| Second best, E. Wilson | 1 00 |

FRENCH.

| | |
|---|---|
| Best trio Houdan fowls, three exhibits, R. Wootton | $2 50 |
| Second best, J. R. Brabazan | 1 50 |
| Best trio Houdan chicks, three exhibits, Robt. Wootton | 2 00 |
| Second best, Robt. Wootton | 1 00 |

POLISH.

| | |
|---|---|
| Best trio Black Polish (white crest) fowls, J. R. Brabazan | $2 50 |
| Best trio Black Polish chicks, three exhibits, J. R. Brabazan | 2 00 |
| Second best, J. R. Brabazan | 1 00 |
| Best trio White Polish fowls, one exhibit, E. Wilson | 2 50 |
| Best trio Silver Polish fowls, one exhibit, E. Wilson | 2 50 |
| Best trio Silver Polish chicks, one exhibit, J. F. Forrest, Poynette | 2 00 |
| Best trio Golden Polish fowls, one exhibit, J. R. Brabazan | 2 50 |

BANTAMS.

| | |
|---|---|
| Best trio Golden Seabright fowls, one exhibit, J. R. Brabazan | $2 50 |
| Best trio Golden Seabright chicks, one exhibit, J. R. Brabazan | 2 00 |
| Best trio of any other variety fowls, four exhibits, J. R. Brabazan | 2 50 |
| Second best, E. Wilson | 1 50 |
| Best trio of any other variety, chicks, three exhibits, J. R. Brabazan, | 2 00 |
| Second best, Geo. Harding, Waukesha | 1 00 |

GAME.

| | |
|---|---|
| Best pair Brown Red, one exhibit, John Hayes | $2 50 |
| Best pair Blackbreasted Red Game, fowls, four exhibits, John Hayes, | 2 50 |
| Best pair game, any other variety, one exhibit, fowls, E. Wilson | 2 50 |
| Best pair game, any other variety, chicks, three exhibits, E. Wilson | 2 00 |
| Second best, E. Wilson | 1 00 |

TURKEYS.

| | |
|---|---|
| Best pair Bronze turkeys, fowls, three exhibits, J. R. Brabazan | $2 50 |
| Second best, E. Wilson | 1 50 |
| Best pair Bronze turkeys, chicks, one exhibit, J. F. Forrest | 2 00 |
| Best pair common turkeys, fowls, two exhibits, J. R. Brabazan | 2 00 |

WATER FOWLS.

| | |
|---|---|
| Best pair of geese, one exhibit, J. R. Brabazan | $2 00 |
| Best pair Aylesbury ducks, one exhibit, J. R Brabazan | 2 00 |
| Best pair Rouen ducks, two exhibits, J. R. Brabazan | 2 00 |
| Second best, J. R. Brabazan | 1 00 |
| Best pair Muscovy ducks, two exhibits, J R. Brabazan | 2 00 |
| Best pair Cayuga ducks, two exhibits, J. R. Brabazan | 2 00 |
| Second best, J. R. Brabazan | 1 00 |
| Best and greatest variety of poultry shown by one person, one exhibit, J. R. Brabazan, Delavan | 5 00 |

PIGEONS.

| | |
|---|---|
| Best exhibition of fancy pigeons, one exhibit, M. Breitenbach, Madison | $5 00 |

RABBITS.

| | |
|---|---|
| Best show of rabbits, one exhibit, Chas. Pickarts, Madison | $3 00 |

The committee highly recommended the Pekin ducks, White Call ducks and White Crested white ducks, exhibited by J. R. Brabazan, of Delavan.

## DEPARTMENT F. — AGRICULTURE.

### CLASS 24. — *Field Products.*

| | |
|---|---|
| Best sample spring wheat (Club), three exhibits, W. H. Davis, Oshkosh | $5 00 |
| Second best, D. T. Pilgrim, West Granville | 3 00 |
| Best sample spring wheat (Rio Grande or China Tea), six exhibits, W. H. Davis | 5 00 |
| Second best, W. H. Porter, Marshall, Wis | 3 00 |
| Best sample spring wheat (Fife), six exhibits, D. T. Pilgrim | 5 00 |
| Second best, W. H. Davis | 3 00 |
| Best any other spring variety, nine exhibits, D. T. Pilgrim | 5 00 |
| Second best, M. E. Spring, Baraboo | 3 00 |
| Best white winter wheat, eight exhibits, J. B. Duncan, Baraboo | 5 00 |
| Second best, J. W. Wood, Baraboo | 3 00 |
| Best red winter wheat, eight exhibits, M. E. Spring | 5 00 |
| Second best, J. W. Wood | 3 00 |
| Best rye, six exhibits, D. T. Pilgrim | 5 00 |
| Second best, W. H. Davis | 3 00 |
| Best white oats, twelve exhibits, Warren Jacket, Clontarf | 5 00 |
| Second best, D. T. Pilgrim | 3 00 |
| Best black oats, four exhibits, Warren Jacket | 5 00 |
| Second best, D. T. Pilgrim | 3 00 |

| | |
|---|---|
| Best barley, five exhibits, W. H. Davis, Oshkosh | $5 00 |
| Second best, D. T. Pilgrim | 3 00 |
| Best buckwheat, seven exhibits, John Rutherford, Verona | 4 00 |
| Second best, D. T. Pilgrim | 2 00 |
| Best flax seed, three exhibits, D. T. Pilgrim | 5 00 |
| Second best, Warren Jacket | 3 00 |
| Best sack of hops, one exhibit, M. E. Spring | 5 00 |
| Best timothy seed, ten exhibits, J. W. Wood | 5 00 |
| Second best, Jesse Stevens, Stoner's Prairie | 3 00 |
| Best clover seed (Alsike), nine exhibits, Matt. Anderson, Cross Plains | 5 00 |
| Second best (Red), Wash. Woodard, Token Creek | 3 00 |
| Best clover seed (Red), nine exhibits, D. T. Pilgrim | 5 00 |
| Second best (Alsike), Wash. Woodard | 3 00 |
| Best peas, nine exhibits, John Rutherford, Clontarf | 5 00 |
| Second best, W. H. Davis | 3 00 |
| Best beans, ten exhibits, J. W. Wood | 5 00 |
| Second best, W. H. Porter, Marshall | 3 00 |
| Best Dent corn, white, fifteen exhibits, E. R. Bement, Oregon | 5 00 |
| Second best, B. T. Fowler, Hart Prairie | 3 00 |
| Best Dent corn, yellow, thirty-one exhibits, N. S. Hook, Brooklyn | 5 00 |
| Second best, Smith & Bro., Brooklyn | 3 00 |
| Best Flint corn, white, seven exhibits, Warren Jacket, Clontarf | 5 00 |
| Second best, Warren Jacket | 3 00 |
| Best Flint corn, yellow, twelve exhibits, Warren Jacket | 5 00 |
| Second best, W. R. Thomas, Watertown | 3 00 |
| Best ten pounds tobacco, four exhibits, J. R. Hiestand, Madison | 5 00 |
| Second best, Preston W. Brown, Madison | 3 00 |
| Best six pumpkins, eight exhibits, M. E. Spring, Baraboo | 3 00 |
| Second best, Mrs. W. R. Bird, Verona | 2 00 |
| Best exhibition of field products grown in the state, including not less than five varieties of cereal grain, not less than twelve varieties in all, D. T. Pilgrim, West Granville ..... Silver plate, | 25 00 |
| Second best, Warren Jacket ..... Silver plate, | 15 00 |

## CLASS 25.— *Garden and Vegetable Produce.*

| | |
|---|---|
| Best Early Ruby potatoes, six exhibits, J. W. Wood, Baraboo | $3 00 |
| Second best, G. W. Sanford, East Middleton | 2 00 |
| Best Early Rose potatoes, sixteen exhibits, J. W. Wood | 3 00 |
| Second best, Warren Jacket, Clontarf | 2 00 |
| Best any other variety early potatoes, thirty-nine exhibits, I. S. Newton, Verona | 3 00 |
| Second best, J. W. Wood, Baraboo | 2 00 |
| Best Peachblow potatoes, eight exhibits, Warren Jacket | 3 00 |
| Second best, J. P. McPherson, Springdale | 2 00 |
| Best any other variety of late potatoes, thirty-nine exhibits, Mrs. C. W. Mead, Sun Prairie | 3 00 |
| Second best, A. Humbert | 2 00 |
| Best yellow Nansemond sweet potatoes, four exhibits, M. L. Daggett, Madison | 3 00 |
| Second best, Warren Jacket | 2 00 |
| Best red Bermuda sweet potatoes, two exhibits, J. W. Wood | 3 00 |
| Best Lima beans, eleven exhibits, H. A. Phillips, Sun Prairie | 3 00 |
| Second best, Warren Jacket | 2 00 |
| Best blood turnip beets, nineteen exhibits, J. W. Wood | 3 00 |
| Second best, I. S. Newton | 2 00 |
| Best long blood beets, seven exhibits, J. W. Wood | 3 00 |
| Second best, Warren Jacket | 2 00 |
| Best mangel wurzel, ten exhibits, John Rutherford, Verona | 3 00 |
| Second best, J. W. Wood | 2 00 |
| Best red Wethersfield onions, twelve exhibits, J. W. Wood | 3 00 |
| Second best, E. C. Holt | 2 00 |

| | |
|---|---|
| Best yellow Danvers onions, twelve exhibits, A. Humbert | $3 00 |
| Second best, A. Humbert | 2 00 |
| Best any other variety of onions, nine exhibits, J. W. Wood | 3 00 |
| Second best, Wm. Palmer, Oregon | 2 00 |
| Best Drumhead cabbage, eight exhibits, Mrs. L. Wildhagen, Madison, | 3 00 |
| Second best, J. W. Wood | 2 00 |
| Best Winningstadt cabbage, nine exhibits, D. T. Pilgrim | 3 00 |
| Second best, George Jeffrey | 2 00 |
| Best long Orange carrots, nine exhibits, J. W. Wood | 3 00 |
| Second best, John Rutherford, Verona | 2 00 |
| Best Horn carrots, eleven exhibits, J. W. Wood | 3 00 |
| Second best, John Rutherford | 2 00 |
| Best head of cauliflower, four exhibits, Mrs. L. Wildhagen | 3 00 |
| Second best, J. W. Wood | 2 00 |
| Best ten heads of celery, nine exhibits, Henry Schuster, Middleton | 3 00 |
| Second best, Mrs. L. Wildhagen | 2 00 |
| Best twelve ears of early sweet corn, seventeen exhibits, J. W. Wood, | 3 00 |
| Second best, Smith & Bro, Brooklyn | 2 00 |
| Best twelve ears of late sweet corn, twenty-one exhibits, I. S. Newton, | 3 00 |
| Second best, M. L. Daggett, Madison | 2 00 |
| Best sample of egg plant, eight exhibits, J. W. Wood, Baraboo | 2 00 |
| Second best, H. M. Page, Madison | 1 00 |
| Best six watermelons, six exhibits, E. W. Palmer, Rutland | 3 00 |
| Second best, J. De Jean | 2 00 |
| Best six nutmeg melons, four exhibits, Mrs. L. Wildhagen | 3 00 |
| Second best, Fred Perkins, Rutland | 2 00 |
| Best parsnips, nine exhibits, Wm. Toole, North Freedom | 3 00 |
| Second best, John Rutherford | 2 00 |
| Best twelve large red peppers, twelve exhibits, J. W. Wood | 2 00 |
| Second best, J. R. Hiestand, Madison | 1 00 |
| Best peck of vegetable oysters, nine exhibits, J. W. Wood | 2 00 |
| Second best, Warren Jacket | 1 00 |
| Best six Hubbard squashes, thirteen exhibits, Wm. Toole | 3 00 |
| Second best, M. L. Daggett | 2 00 |
| Largest squash of any variety, six exhibits, J. W. Wood | 3 00 |
| Second largest, George W. Horton, Madison | 2 00 |
| Best twelve tomatoes, twenty-nine exhibits, S. H. Hall, Madison | 3 00 |
| Second best, E. M. Smith, Madison | 2 00 |
| Best flat turnips, eight exhibits, E. C. Holt, Madison | 3 00 |
| Second best, J. W. Wood | 2 00 |
| Best Rutabagas, eleven exhibits, E. C. Holt | 3 00 |
| Second best, John Rutherford | 2 00 |
| Best exhibition by professionals, grown in the state, by exhibitors, including not less than five varieties of vegetables, nor less than twelve varieties in all, both quality and number of varieties considered, J. W. Wood, Baraboo ..... Silver plate, | 10 00 |
| Second best, John Rutherford, Verona ..... Silver plate, | 5 00 |
| Best exhibition by non-professionals, grown in the state by exhibitor, including not less than five varieties of vegetables, nor less than twelve varieties in all, both quality and number of varieties considered, Warren Jacket, Clontarf ..... Silver plate, | 10 00 |
| Second best, W. H. Porter, Marshall ..... Silver plate, | 5 00 |

## CLASS 26.— *Products of the Flouring Mill, Dairy and Apiary.*

| | |
|---|---|
| Best barrel of winter wheat flour, two exhibits, W. H. Porter, Sil. plate, | $15 00 |
| Second best, John Rutherford ..... Sil. plate, | 10 00 |
| Best barrel of spring wheat flour, two exhibits, W. H. Porter, Sil. plate, | 15 00 |
| Second best, John Rutherford ..... Sil. plate, | 10 00 |

CREAMERY BUTTER.

For each exhibit not less than 100 pounds, made at any time, and awarded forty points or over in a scale of fifty, or perfection, shall be designated "Gilt Edged," and draw a pro rata share of $100; four exhibits. The following named persons were awarded as follows:

| | |
|---|---|
| George C. Chaffee, Whitewater | $33 30 |
| N. N. Palmer, Brodhead | 33 30 |
| C. P. Goodrich, Oakland | 33 30 |

DAIRY BUTTER.

Best roll, print or package, not less than twenty pounds, four exhibits,

| | |
|---|---|
| J. B. Duncan, Baraboo | $10 00 |
| Second best, A. Chipman, Sun Prairie | 5 00 |

FACTORY CHEESE.

For each exhibit of three cheese, or not less than 150 pounds, made at any time, and awarded forty points and over in a scale of fifty points, or perfection, shall be designated "Grade No. 1," and draw a pro rata share of $100, eight exhibits. The following named persons were awarded as follows:

| | |
|---|---|
| W. H. Porter, Marshall | $16 65 |
| T. S. Young, Prairie du Sac | 16 65 |
| Chester Hazen, Ladoga factory | 16 65 |
| Chester Hazen, Brandon factory | 16 65 |
| Chester Hazen, factory | 16 65 |
| Pierce Brothers Sheboygan Falls | 16 65 |

FARM DAIRY CHEESE.

Best exhibit, not less than 100 pounds, made at any time, two exhibits,

| | |
|---|---|
| George W. Weeden, Sheboygan | $10 00 |
| Second best, E. L. Atwood, Trempealeau | 5 00 |

HONEY, SUGAR AND SYRUP.

| | | |
|---|---|---|
| Best sample ten pounds of honey in best marketable shape, four exhibits, D. Barr, Hubbleton | Silver plate, | $5 00 |
| Second best, Daniel D. Daniher, Madison | Silver plate, | 3 00 |
| Best practical bee-hive, five exhibits, Daniel D. Daniher, | Silver plate, | 5 00 |
| Second best, Fritz Elver, Middleton | Silver plate, | 2 00 |
| Best honey extractor, three exhibits, Fritz Elver | Silver plate, | 2 00 |
| Second best, Daniel D. Daniher | Silver plate, | 1 00 |
| Best extracted honey, three exhibits, Fritz Elver | Silver plate, | 3 00 |
| Second best, G. W. Sanford, East Middleton | Silver plate, | ..... |
| Best method of handling bees, to be demonstrated on the grounds, three exhibits, Daniel D. Daniher | Silver plate, | 10 00 |
| Best Italian bees, four exhibits, G. W. Sanford | Silver plate, | 5 00 |
| Second best, Fritz Elver | Silver plate, | 3 00 |
| Best wax extractor, three exhibits, Daniel D. Daniher | Silver plate, | 2 00 |
| Best and largest display of aparian supplies and fixtures, four exhibits Fritz Elver | Silver plate, | 5 00 |
| Second best, Daniel D. Daniher | Silver plate, | 3 00 |
| Best ten pounds maple sugar, two exhibits, J. B. Duncan, | Silver plate, | 5 00 |
| Best gallon maple syrup, four exhibits, H. C. Wilson, Madison | Silver plate, | 5 00 |

## CLASS 27.— *Household Products, Bread and Cake.*

| | | |
|---|---|---|
| Best loaf graham bread, four exhibits, Mrs. R. J. Atwood, Madison | Silver plate, | $3 00 |
| Best loaf white bread (hop yeast), four exhibits, Mrs. W. D. Stillman, Madison | Silver plate, | 3 00 |

| | | |
|---|---|---|
| Best loaf Indian bread, two exhibits, L. F. Biglow, Brooklyn | Silver plate, | $3 00 |
| Best sponge cake, five exhibits, J. R. Hiestand, Madison, | Silver plate, | 2 00 |
| Best pound cake, two exhibits, J. R. Hiestand | Silver plate, | 2 00 |
| Best jelly cake, five exhibits, J. R. Hiestand | Silver plate, | 2 00 |
| Best chocolate cake, five exhibits, J. R. Hiestand | Silver plate, | 2 00 |
| Best cocoanut cake, five exhibits, J. R. Hiestand | Silver plate | 2 00 |
| Best fruit cake, four exhibits, L. F. Biglow | Silver plate, | 2 00 |
| Best and largest exhibition of articles of above sorts, two exhibits, J. R. Hiestand, Madison | Silver medal, | ..... |

*Sealed and Preserved Fruits and Pickles in Glass Jars. Domestic Manufacture.*

| | | |
|---|---|---|
| Best canned peaches, eight exhibits, Mrs. I. S. Newton, Verona. | Silver plate, | $2 00 |
| Best canned plums, nine exhibits, Mrs. W. D. Stillman, Madison | Silver plate, | 2 00 |
| Best canned currants, eight exhibits, J. W. Wood, Baraboo | Silver plate, | 2 00 |
| Best canned tomatoes, six exhibits, D. Barr | Silver plate, | 2 00 |
| Best canned gooseberries, seven exhibits, Miss Annie W. Cooper | Silver plate, | 2 00 |
| Best canned raspberries, twelve exhibits, J. W. Wood | Silver plate, | 2 00 |
| Best canned strawberries, five exhibits, Miss Annie W. Cooper | Silver plate, | 2 00 |
| Best canned grapes, ten exhibits, Mrs. R. J. Atwood, | Silver plate. | 2 00 |
| Best canned blackberries, seven exhibits, J. W. Wood | Silver plate, | 2 00 |
| Best canned pears, six exhibits, Mrs. C. W. Mead, Sun Prairie | Silver plate, | 2 00 |
| Best canned Hyslop or Transcendent crabs, ten exhibits, J. M. Patterson | Silver plate, | 2 00 |
| Best plum jelly, eleven exhibits, Mrs. W. D. Stillman | Silver plate, | 2 00 |
| Best currant jelly, eleven exhibits, Mrs. W. D. Stillman, | Silver plate, | 2 00 |
| Best red raspberry jelly, six exhibits, Miss Annie W. Cooper | Silver plate, | 2 00 |
| Best crab apple jelly, twelve exhibits, P. Humbert | Silver plate, | 2 00 |
| Best marmalade, six exhibits, Mrs. I. S. Newton | Silver plate, | 2 00 |

SOUR PICKLES.

| | | |
|---|---|---|
| Best cucumbers, four exhibits, J. W. Wood | Silver plate, | $2 00 |
| Best mangoes, four exhibits, Mrs. J. H. B. Matts, Verona | Silver plate, | 2 00 |
| Best peaches, two exhibits, D. Barr, Hubbleton | Silver plate, | 2 00 |
| Best onions, three exhibits, J. W. Wood | Silver plate, | 2 00 |
| Best mixed, four exhibits, J. W. Wood | Silver plate, | 2 00 |

SWEET PICKLES.

| | | |
|---|---|---|
| Best peaches, five exhibits, Mrs. W. D. Stillman | Silver plate, | $2 00 |
| Best apples, seven exhibits, Miss Annie W. Cooper | Silver plate, | 2 00 |
| Best apple butter, three exhibits, J. R. Brabazan, Delavan | Silver plate, | 2 00 |
| Best raspberry jam, seven exhibits, Miss Annie W. Cooper | Silver plate, | 2 00 |
| Best blackberry jam, five exhibits, Miss Emma W. Sharp, Madison | Silver plate, | 2 00 |
| Best tomato catsup, eight exhibits, Mrs. W. D. Stillman. | Silver plate, | 2 00 |
| Best and largest exhibition canned fruits, jellies, jams and pickles in glass jars, six exhibits, Mrs. I. S. Newton, Verona | Silver plate, | 5 00 |

The Wisconsin State Hospital for the Insane made the following splendid exhibit, but declined to receive premiums:

Three kinds of potatoes, half bushel of each kind.
Two kinds of onions.
Parsnips in variety.
Two kinds of beets.
Carrots.
Six squashes.
Lima beans.
Two kinds of cabbage.
Cauliflower.
Tomatoes, two entries.
Twelve red peppers.
Tickling cucumbers.
Five kinds of watermelons.
Three kinds of muskmelons.
Flower-pot red pepper plants.
Flower-pot egg plants.
Flower okra plants.

Mr. E. G. Hayden, superintendent of Wisconsin University farm, placed upon exhibition samples of the products of that farm, which attracted much attention, both because of the very fine exhibit and of the general interest taken by farmers in the experiments there being tried, as follows, viz.:

Winter Wheat — Fultz, Clawson, Prussian, Golden Straw and Silver Chaff.
Spring Wheat — Red Mammoth, Lost Nation, White Michigan, Defiance, Champlain.
White Oats — Schonen, Waterloo, Deutsch, Somerset, Canada.
Barley — Mansury, Scotch, Probstier.
Rye — White Winter.
Corn — Yellow Dent, Cherokee, White Australian.
Sweet Corn — Dolly Dutton, Early Virginia, Stowell's Evergreen, 12-Rowed, Washington Market.
Potatoes — Ohio Beauty, Jordan's Prolific, Dunmore, Dunmore Seedling, Name Lost.
Onions — Yellow Danvers, Red Wethersfield, New Queen.
Cabbage — Drumhead, Winningstadt, Red.
Carrots — Long Orange and White Belgian.

## DEPARTMENT G.—FRUITS AND FLOWERS.

### CLASS 28.— *Fruits by Professional Cultivators.*

APPLES.

| | | |
|---|---|---|
| Best and greatest display of varieties, not to exceed twenty-three or more specimens each, nine exhibits, Geo. J. Kellogg, Janesville, | | $10 00 |
| Second best, Wm. Reid, North Prairie | | 7 50 |
| Third best, A. J. Philips, West Salem | Silver plate. | 5 00 |
| Best ten varieties adapted to northwest, three specimens each, nine exhibits, G. P. Peffer, Pewaukee | | 7 00 |
| Second best, Chas. Hirschinger, Baraboo | | 5 00 |
| Third best, E. Wilcox & Sons, La Crosse | Silver plate, | 3 00 |
| Best five varieties adapted to northwest, three specimens each, nine exhibits, John Howie, Waunakee, Wis | | 3 00 |
| Second best, J. C. Plumb & Son, Milton | | 2 00 |
| Third best, N. N. Palmer, Brodhead | Silver plate, | 1 00 |
| Best and largest variety of winter, not to exceed ten, three specimens each, nine exhibits, G. P. Peffer | | 5 00 |
| Second best, Geo. J. Kellogg | | 3 00 |
| Third best, A. J. Philips | Silver plate, | 2 00 |

| | |
|---|---|
| Best five varieties winter, three specimens each, nine exhibits, G. P. Peffer | $3 00 |
| Second best, J. C. Plumb & Son | 2 00 |
| Third best, Wm. Reid ..... Silver plate, | 1 00 |
| Best show of ten varieties large and showy apples, three or more specimens each, nine exhibits, J. C. Plumb & Son | 5 00 |
| Second best, A. J. Philips | 3 00 |
| Third best, Chas. Hirschinger ..... Silver plate, | 2 00 |
| Largest apple, eight exhibits, Chas. Hirschinger | 1 00 |
| Heaviest apple, seven exhibits, Wm. Reid | 1 00 |
| Best plate of Plumb's Cider, eight exhibits, J. C. Plumb & Son | 1 00 |
| Best plate of Haas, ten exhibits, A. J. Philips | 1 00 |
| Best plate of Fameuse, ten exhibits, G. P. Peffer | 1 00 |
| Best plate of Walbridge, six exhibits, A. J. Philips | 1 00 |
| Best plate of Utter, eight exhibits, J. C. Plumb & Son | 1 00 |
| Best plate of Westfield Seek-no-further, eight exhibits, John Howie | 1 00 |
| Best plate of Tallman Sweet, nine exhibits, A. J. Philips | 1 00 |
| Best plate of St. Lawrence, nine exhibits, John Howie | 1 00 |
| Best plate of Duchess of Oldenburg, ten exhibits, A. J. Philips | 1 00 |
| Best plate of Willow Twig, eight exhibits, J. C. Plumb & Son | 1 00 |
| Best plate of Wealthy, five exhibits, A. J. Philips | 1 00 |
| Best plate of Pewaukee, seven exhibits, A. J. Philips | 1 00 |

PEARS.

| | |
|---|---|
| Best and greatest display of varieties, one exhibit, G. P. Peffer | $5 00 |
| Best three varieties, one exhibit, G. P. Peffer | 2 00 |
| Best Flemish Beauty, three exhibits, G. P. Peffer | 2 00 |

PLUMS.

| | |
|---|---|
| Best and greatest variety, two exhibits, G. P. Peffer | $3 00 |
| Best three varieties, three exhibits, G. P. Peffer | 2 00 |
| Second best, Wm. Reid | 1 00 |
| Best collection of native, three exhibits, G. P. Peffer | 2 00 |
| Best plate of native, four exhibits, Wm. Reid | 1 00 |

## CLASS 29.— *Grapes and Crabs by Professional Cultivators.*

GRAPES.

| | |
|---|---|
| Best and greatest display of varieties, five specimens, four exhibits, Wm. Reid | $10 00 |
| Second best, Geo J. Kellogg | 7 00 |
| Third best, G. P. Peffer ..... Silver plate, | 5 00 |
| Best ten varieties, three specimens, five exhibits, Henry Schuster | 5 00 |
| Second best, Geo. J. Kellogg | 3 00 |
| Third best, Wm Reid ..... Silver plate | 2 00 |
| Best five varieties, three specimens, five exhibits, Henry Schuster | 3 00 |
| Second best, N. N. Palmer | 2 00 |
| Third best, G. P. Peffer ..... Silver plate, | 1 00 |
| Best single variety, three specimens, five exhibits, Wm. Reid | 2 00 |
| Second best, Geo. J. Kellogg | 1 00 |
| Best three bunches of Concord on one cane, five exhibits, Wm. Reid | 2 00 |
| Second best, Geo. J. Kellogg | 1 00 |
| Best three bunches of Delaware on one cane, five exhibits, Wm. Reid | 2 00 |
| Second best, Chas. Hirschinger | 1 00 |
| Best three bunches of Worden on one cane, three exhibits, Geo. J. Kellogg | 2 00 |
| Second best, G. P. Peffer | 1 00 |
| Best three bunches of Wilder on one cane, four exhibits, Wm. Reid | 2 00 |
| Second best, G. P. Peffer | 1 00 |
| Best single variety, quality to rule, six exhibits, Geo. J. Kellogg | 3 00 |
| Second best, N. N. Palmer | 2 00 |

CRABS.

| | |
|---|---|
| Best and greatest variety named, six exhibits, G. P. Peffer | $3 00 |
| Second best, A. J. Philips | 2 00 |
| Third best, J. C. Plumb & Son | Silver plate, 1 00 |
| Best plate of Hyslop, eight exhibits, A. J. Philips | 1 00 |
| Best plate of Transcendent, eight exhibits, E. Wilcox & Sons | 1 00 |
| Best Whitney No. 20, five exhibits, A. J. Philips | 1 00 |
| Best seedling crab, eleven exhibits, Chas. Hirschinger | 2 00 |

SWEEPSTAKES ON FRUITS OF ALL KINDS.

| | |
|---|---|
| Best collection of fruit of all kinds, seven exhibits, G. P. Peffer | $7 00 |
| Second best, Geo J. Kellogg | 5 00 |
| Third best, Wm. Reid | Silver plate, 3 00 |

## CLASS 30.— *Fruits by Non-Professional Cultivators.*

APPLES.

| | |
|---|---|
| Best and greatest display of varieties, not to exceed twenty, three or more specimens of each, thirteen exhibits, T. J. Foster, Ableman, Wis | $10 00 |
| Second best, Almon Bell, Rutland, Wis | 7 50 |
| Third best, Geo. Jeffrey | Silver plate, 5 00 |
| Best ten varieties adapted to Northwest, three specimens each, nine exhibits, E. D. Lewis, Lake Mills, Wis | 7 00 |
| Second best, P. J. Foster | 5 00 |
| Third best, D. Huntley, Appleton | Silver plate, 3 00 |
| Best show of ten varieties, large showy apples, three or more specimens each, ten exhibits, P. J Foster, Ableman | 5 00 |
| Second best, J. R. Brabazan, Delavan | 3 00 |
| Third best, F. C. Curtis, Rocky Run | Silver plate, 2 00 |
| Best five varieties adapted to Northwest, three specimens each, sixteen exhibits, George Jeffrey | 3 00 |
| Second best, Almon Bell | 2 00 |
| Third best, E. D. Lewis | Silver plate, 1 00 |
| Best and largest variety of winter, not to exceed ten, three specimens each, eight exhibits, P. J. Foster | 5 00 |
| Second best, Henry Taylor, East Middleton | 3 00 |
| Third best, D. & W. Alcott, Brodhead | Silver plate, 2 00 |
| Best five varieties of winter, three specimens each, thirteen exhibits, P. J. Foster | 3 00 |
| Second best, Geo. W. Ringrose, Wauwatosa | 2 00 |
| Third best, George Jeffrey, Milwaukee | Silver plate, 1 00 |
| Largest apple, six exhibits, E. D. Lewis | 1 00 |
| Heaviest apple, six exhibits, Geo. Jeffrey | 1 00 |
| Best plate Plumb's Cider, ten exhibits, E. C. Holt | 1 00 |
| Best plate Haas, nine exhibits, E. D. Lewis | 1 00 |
| Best plate Walbridge, eight exhibits, P. J. Foster | 1 00 |
| Best plate Utter, ten exhibits, Geo. Jeffrey | 1 00 |
| Best Plate Westerfield Seek-no-further, thirteen exhibits, E. W. Palmer, Rutland | 1 00 |
| Best plate Tallman Sweet, seventeen exhibits, P. J. Foster | 1 00 |
| Best plate St. Lawrence, sixteen exhibits, E. W. Palmer | 1 00 |
| Best plate Duchess of Oldenburg, thirteen exhibits, D. & W. Alcott | 1 00 |
| Best plate Willow Twig, twelve exhibits, E. D. Lewis | 1 00 |
| Best plate Wealthy, six exhibits, Geo. Jeffrey | 1 00 |
| Best plate Pewaukee, seven exhibits, D. & W. Alcott | 1 00 |
| Best plate Fameuse, nineteen exhibits, D. & W. Alcott | 1 00 |

PEARS.

| | |
|---|---|
| Best and greatest display of varieties, five exhibits, Geo. Jeffrey | $3 00 |
| Second best, Geo. W. Ringrose | 2 00 |
| Best three varieties, four exhibits, Geo. Jeffrey | 2 00 |
| Best Flemish Beauty, ten exhibits, S. H. Hall, Madison | 2 00 |
| Second best, Julius Baldwin, Brooklyn, Wis | 1 00 |
| Best plate of Clapp's Favorite, two exhibits, Geo. Jeffrey | 1 00 |

PLUMS.

| | |
|---|---|
| Best and greatest variety, four exhibits, Geo. Jeffrey | $3 00 |
| Second best, Geo. W. Ringrose | 2 00 |
| Best plate of native, five exhibits, J. R. Hiestand, Madison | 1 00 |

## CLASS 31.— *Grapes and Crabs by Non-Professional Cultivators.*

GRAPES.

| | |
|---|---|
| Best and greatest display of varieties, five specimens, four exhibits, H. Tiedemann, Middleton Station | $10 00 |
| Second best, Geo W. Ringrose | 7 00 |
| Third best, E. D. Lewis .....Silver plate, | 5 00 |
| Best ten varieties, three specimens, two exhibits, E. D. Lewis | 5 00 |
| Best five varieties, three specimens, four exhibits, H. C. Wilson | 3 00 |
| Second best, E. D. Lewis | 2 00 |
| Best single variety, three specimens, three exhibits, E. D. Lewis | 2 00 |
| Second best, Geo. W. Ringrose | 1 00 |
| Best three bunches of Concord on one cane, six exhibits, Geo. W. Ringrose | 2 00 |
| Second best, H Tiedemann, Middleton Station | 1 00 |
| Best three bunches of Delaware on one cane, six exhibits, H. Tiedeman | 2 00 |
| Second best, H. C. Wilson | 1 00 |
| Best three bunches of Worden on one cane, two exhibits, E. D. Lewis | 2 00 |
| Best single variety, quality to rule, four exhibits, E. D. Lewis | 3 00 |
| Second best, H. C. Wilson | 2 00 |

CRABS.

| | |
|---|---|
| Best and greatest variety named, six exhibits, Geo. W. Ringrose | $3 00 |
| Second best, Geo. Jeffrey | 2 00 |
| Third best, E. D. Lewis .....Silver plate, | 1 00 |
| Best plate of Hyslop, fourteen exhibits, J. R. O'Sheridan, Madison | 1 00 |
| Best plate of Transcendent, fourteen exhibits, D. & W. Alcott | 1 00 |
| Best plate of Whitney No. 20, Geo. W. Ringrose | 1 00 |

## *Sweepstakes on Fruits of all Kinds.*

| | |
|---|---|
| Best collection fruit of all kinds, five exhibits, Geo. Jeffrey | $7 00 |
| Second best, Geo. W. Ringrose | 5 00 |
| Third best, E. D. Lewis.....Silver plate, | 2 00 |

## CLASS 34.—*Flowers by Professional Cultivators.*

| | |
|---|---|
| Best and most artistically arranged floral design, four exhibits, Wm. Kitzerow, Milwaukee | $5 00 |
| Second best, Geo. W. Ringrose, Wauwatosa | 3 00 |
| Third best, Mrs J. E. Williams.....Silver plate, | 2 00 |
| Best and most tastefully arranged basket of flowers, three exhibits, Geo. W. Ringrose | 2 00 |

| | |
|---|---|
| Best and most tastefully arranged collection of cut flowers, five exhibits, Geo. W. Ringrose | $4 00 |
| Second best, Wm. Kitzerow | 3 00 |
| Third best, Mrs. J. E. Williams | 2 00 |
| Best pyramidal bouquet, five exhibits, Mrs. J. E Williams | 3 00 |
| Second best, Wm. Kitzerow | 2 00 |
| Best pair flat table bouquets, four exhibits, Wm. Kitzerow | 2 00 |
| Second best, Mrs. J. E. Williams | 1 00 |
| Best pair flat hand bouquets, four exhibits, Mrs. J. E. Williams | 2 00 |
| Second best, Wm. Kitzerow | 1 00 |
| Best bouquet of everlasting flowers, three exhibits, Wm. Kitzerow | 3 00 |
| Second best, H. G. Roberts, Janesville | 2 00 |
| Best ten named dahlias, four exhibits, Wm. Kitzerow | 2 00 |
| Second best, J. C. Plumb & Son | 1 00 |
| Best display of roses, five exhibits, Wm. Kitzerow | 3 00 |
| Second best, Geo. J. Kellogg | 2 00 |
| Best five named varieties of roses, five exhibits, Wm. Kitzerow | 3 00 |
| Second best, Geo J. Kellogg | 2 00 |
| Best display of verbenas, four exhibits. No award. | |
| Second best, Z L Welman, Stoughton | 1 00 |
| Best show of pansies, four exhibits, Z. L. Welman | 1 00 |
| Best show of double petunias, two exhibits, Z L Welman | 1 00 |
| Best show of gladiolus, six exhibits, H. G. Roberts, Janesville | 2 00 |
| Second best, Wm. Kitzerow | 1 00 |
| Best show of tube roses, four exhibits, H. G. Roberts | 1 00 |
| Best show of green house plants, not less than fifty nor more than one hundred varieties, four exhibits, Mrs. J. E. Williams, Madison | 7 50 |
| Second best, Wm. Kitzerow | 5 00 |
| Third best, Geo. W. Ringrose Silver plate, | 3 00 |
| Best twenty varieties of green house plants in bloom, four exhibits, Mrs. J. E. Williams Madison | 3 00 |
| Second best, Wm. Kitzerow | 2 00 |
| Best ten geraniums, five exhibits, Z. L. Welman | 3 00 |
| Second best, Wm. Kitzerow | 2 00 |
| Best six fuchsias, four exhibits, Wm. Kitzerow | 2 00 |
| Second best, Mrs. J. E. Williams | 1 00 |
| Best display of flowers of all kinds, grown by exhibitor, five exhibits, William Kitzerow, Milwaukee | 5 00 |
| Second best, Mrs. J. E. Williams, Madison | 3 00 |
| Best display of ornamental foliage plants, not more than fifteen varieties, five exhibits, Wm Kitzerow | 3 00 |
| Second best, Mrs. J. E. Williams | 2 00 |

CLASS 35.—*Flowers by Non-professional Cultivators.*

| | |
|---|---|
| Best and most artistically arranged floral design, five exhibits, Miss K. F. Peffer Pewaukee, Wis | $5 00 |
| Second best, Mrs. Geo. F. Brown, Madison | 3 00 |
| Third best, Geo. Alton, Wauwatosa Silver plate, | 2 00 |
| Best and most tastefully arranged collection of cut flowers, seven exhibits, Mrs. Geo. Membard, Madison | 4 00 |
| Second best, Mrs A. A. Boyce, Lodi | 3 00 |
| Third best, Miss K. F. Peffer Silver plate, | 2 00 |
| Best and most tastefully arranged basket of flowers, eight exhibits, Mrs. A. H. Main, Madison | 3 00 |
| Second best, Miss K. F. Peffer | 2 00 |
| Best pyramidal bouquet, five exhibits, Miss E. A. Mayers, Madison | 2 00 |
| Second best, Geo. Alton | 1 00 |
| Best pair round bouquets, seven exhibits, Miss E. A. Mayers | 2 00 |
| Second best, Geo. Alton | 1 00 |

Best pair flat table bouquets, six exhibits, Geo. Alton ..... $2 00
Second best, Miss K. F. Peffer ..... 1 00
Best pair flat hand boquets, nine exhibits, Geo. Alton ..... 2 00
Second best J. R. Hiestand ..... 1 00
Best bouquet of everlasting flowers, two exhibits, Mrs. L. F. Mallory, Waukesha ..... 2 00
Second best, Mrs. L. Wildhagen, Madison ..... 1 00
Best display of Dahlias, not more than twenty varieties, three exhibits, J. R. Brabazan, Delavan ..... 2 00
Second best, Mrs. A. A. Boyce ..... 1 00
Best ten named Dahlias, four exhibits, Miss K. F. Peffer ..... 2 00
Second best, J. R. Brabazan ..... 1 00
Best display of Roses, three exhibits, Geo. Alton ..... 3 00
Second best, Mrs. L. Wildhagen ..... 2 00
Best five named varieties of Roses, three exhibits, Mrs. E. Wildhagen, 3 00
Second best, Geo. Alton ..... 2 00
Best display of Verbenas, five exhibits, Mrs. L. F. Mallory ..... 2 00
Second best, Mrs Geo. Memhard ..... 1 00
Best ten named Verbenas, one exhibit, Mrs. L. Wildhagen ..... 2 00
Best show of Astors in quality and variety, five exhibits, Mrs. L. F. Mallory ..... 2 00
Second best, J. R. Hiestand ..... 1 00
Best show perennial Phlox, four exhibits, Mrs. Geo. Memhard ..... 1 00
Second best, Mrs. John Joy ..... 50
Best show of Pansies, three exhibits, Wm. Toole, North Freedom ..... 1 00
Second best, Mrs. L. F. Mallory ..... 50
Best show of Double Petunias, two exhibits, Mrs. L. F. Mallory ..... 1 00
Best show of Dianthuses (pink), four exhibits, Mrs. L. F. Mallory ..... 1 00
Second best, Mrs. L. Wildhagen ..... 50
Best show of Gladiolus, six exhibits, Miss K. F. Peffer ..... 1 00
Second best, Mrs. A. A. Boyce ..... 50
Best show of Phlox Drummondi, six exhibits, D. F. Salisbury, Fitchburg ..... 1 00
Second best, Mrs. John Joy ..... 50
Best show of Tube Roses, four exhibits, Mrs. L. Wildhagen ..... 1 00
Second best, Mrs. A. A. Boyce ..... 50
Best show of Lilies, four exhibits, Mrs. Geo. F. Brown ..... 1 00
Second best, E. O'Sheridan, Madison ..... 50
Best show of stocks, two exhibits, Mrs. A. A. Boyce ..... 1 00
Second best, Mrs. John Joy ..... 50
Best show of Balsams, four exhibits, Mrs. John Joy ..... 1 00
Second best, Mrs. L. F. Mallory ..... 50
Best show of green house plants, not less than twenty-five nor more than fifty varieties, five exhibits, Mrs. Geo. Memhard ..... 5 00
Second best, Mrs. L. F. Mallory ..... 3 00
Best ten varieties of green house plants in bloom, four exhibits, Mrs. John Joy ..... 3 00
Second best, Geo. Alton ..... 2 00
Best ten Geraniums, four exhibits, Mrs. L. Wildhagen ..... 3 00
Second best, Mrs. L. F. Mallory ..... 2 00
Best six Fuchsias, six exhibits, Mrs. L. F. Mallory ..... 2 00
Second best, Mrs L. Wildhagen ..... 1 00
Best six Carnations, six exhibits Geo. Alton ..... 2 00
Second best, Mrs. L. Wildhagen ..... 1 00
Best display of flowers raised by exhibitor, six exhibits, Mrs. Abel Dunning, Madison ..... 5 00
Second best, Miss K. F. Peffer ..... 3 00
Best show of ornamental foliage plants, not more than ten varieties, five exhibits, Geo. Alton ..... 3 00
Second best, Mrs. John Joy ..... 2 00

## DEPARTMENT I. — MANUFACTURES.

### CLASS 37.— *Stone Cutter's Work and other Building Material, House Building Material, etc.*

Best four window blinds, one exhibit, A. D. Cunningham, Baraboo . $5 00

### CLASS 39.— *Stoves, Furnaces, Hollow Ware and Articles of Hardware.*

Best cooking stove for wood, two exhibits, Jno. N. Jones, Madison .. $5 00
Best cooking range for families, one exhibit, Frank & Ramsay, Madison ..... 5 00
Best ornamental parlor stove, six exhibits, Frank and Ramsay, Madison ..... 5 00
Best display of stoves, two exhibits, Jno. N. Jones.....Grand Silver Medal
Best horse shoes in variety, two exhibits, Zack Ramsdale, Madison .. $2 00
Best exhibition of guns, one exhibit, A. McGovern, Madison ..... Dip.

### CLASS 40.— *Silver, Britannia and Crockery Ware.*

Best and largest display of gold and silver electro plating, two exhibits, Geo. B. Kelly, Racine, Wis..... Silver Medal

### CLASS 41.— *Surgical, Dental, Mathematical and Philosophical Instruments and Apparatus.*

Best skill in dental work, one exhibit, Robinson & Kollock, Madison, ..... .... Silver Medal

### CLASS 42.— *Chemical Manufacture.*

Best sample of carbonate of lead, two exhibits, A. H. Hollister, Madison ..... $3 00
Best oxide of zinc, two exhibits, A. H. Hollister Madison ..... 3 00
Best mineral paint, two exhibits, A. H. Hollister, Madison ..... 2 00
Best dyes, two exhibits, A. H. Hollister, Madison..... 2 00
Best blacking, one exhibit, A. H. Hollister, Madison..... 2 00
Best yeast cakes, two exhibits, A. H. Hollister, Madison ..... 2 00
Best bar soap, two exhibits, A. H. Hollister, Madison ..... 2 00
Best fancy soap, one exhibit, A. H. Hollister, Madison..... 2 00
Best potash, two exhibits, A. H. Hollister, Madison ..... 2 00
Best bi-carbonate potash, two exhibits, A. H. Hollister, Madison..... 2 00
Best candles, one exhibit, A. H. Hollister, Madison ..... 2 00
Best caddy of Lucifer matches, one exhibit, A. H. Hollister, Madison 3 00
Best show of perfumery, one exhibit, A. H. Hollister, Madison..... Dip.
Best show of fancy soap and perfumery for the toilet, by manufacturer, one exhibit, A. H. Hollister..... Silver Medal

### CLASS 43.— *Carriages, Wagon Work, etc.*

Best double carriage, three exhibits, H. S. Benjamin, Milwaukee, ..... Silver plate, $15 00
Best single top buggy, nine exhibits, Farrell, Milsep & Co., Madison, ..... Silver plate, 10 00
Best single open buggy, eight exhibits, C. T. Wilcox, manufactured by the Single Center Spring Company, Janesville, Wis. Silver plate, 10 00
Best trotting wagon, one exhibit, William Servis, Sheboygan Falls, ..... Silver plate, 10 00

Best pleasure wagon, four exhibits, H. S. Benjamin..... Silver plate, $5 00
Best single sleigh, five exhibits, Wm. Servis ..... Silver plate, 5 00
Best common farm wagon, fifteen exhibits, H. S. Benjamin, ..... Silver plate, 5 00
Best fancy lumber wagon, one exhibit, Stratman & Co., Dodgeville, ..... Silver plate, 5 00
Best display of hubs, spokes, felloes and other wagon work, three exhibits, C. Hanson, Madison..... Silver plate, 5 00

## CLASS 44.— *Cabinet Ware, Cooperage, Willow Ware, etc.*

Best spring bed bottom, one exhibit, C. A. Libby & Co., Evansville, ..... Silver plate, $5 00

## CLASS 45.— *Leather and Leather Manufactures.*

### LEATHER.

Best six sides of harness leather, two exhibits, Chas. Hoebel, Madison.. ..... Diploma.

### HARNESS, ETC.

Best carriage harness, one exhibit, Chas. Hoebel..... Silver plate, $10 00
Best wagon harness, three exhibits, M. Boehmer, Madison, ..... Silver plate, 5 00
Best single harness, two exhibits, M. W. Lynch, Madison, ..... Silver plate, 5 00
Best gent's saddle, one exhibit, M. Boehmer..... Silver plate, 5 00
Best lady's saddle, one exhibit, M. Boehmer. ..... Silver plate, 5 00
Best three trunks, two exhibits, M. Boehmer..... Silver plate, 5 00
Best four horse collars, three exhibits, M. W. Lynch .... Silver plate, 3 00

### BOOTS AND SHOES.

Best and largest exhibition of pegged boots and shoes, twelve pairs of each style, manufactured in the state, one exhibit, Kirch & Bollenbeck, Madison..... Silver plate, $10 00
Best and largest exhibition of sewed boots and shoes, one pair each style, manufactured in the state, two exhibits, V. Malec & Bro., Madison ... ..... Silver plate, 10 00

## CLASS 46.— *Paper, Printing and Bookbinding.*

Best exhibition of plain and fancy binding, one exhibit, W. J. Park, Madison..... Dip.

## CLASS 47.— *Textile Fabrics, Clothing, etc.*

Best fleece of long wool, two exhibits, A. O. Fox, Oregon..... $5 00

### CLOTHING, HATS, FURS, ETC.

Best exhibition of gent's hats and caps, one exhibit, O. E. Fitch & Co., Madison..... $5 00
Best six buckskin gloves, one exhibit, O. E Fitch & Co., Madison... 3 00
Badger state butter color, E E. Sheldon, Ft. Atkinson..... Dip.
Non-explosive water gas, S. B. Farrar, Madison..... Dip.
Patent granite iron ware, St. Louis Stamping Co..... Dip.
Adjustible whiffletree clip, Howard Harvey, Pt. Washington... .... Dip.
Cooking stove for coal, John N. Jones, Madison..... Dip.
No. 1 lever butter worker, D. W. Curtis, Ft. Atkinson..... Dip.
No. 6 boss churn, Chas. P. Willard & Co., Chicago, Ill..... Dip.

1 dog power, Chas. P. Willard & Co., Chicago, Ill ..... Dip.
Universal mop wringer, H. A. Libby & Co., Evansville ..... Dip.
Improved furniture polish, H. A. Libby & Co., Evansville ..... Dip.
Sickle grinder, Chas. Askew, Madison ..... Dip.
Self-raising flour, Geo. V. Hecker & Co., Chicago, Ill ..... Sil. Medal
Business wagon, Farrell & Milsep, Madison ..... Dip.
Cooley creamer, Jas. A. Boyd, Chicago ..... Dip.
Creamery and refrigerator, J. F. Ferguson, Burlington, Vt ..... Dip.
Concussion churn, J. F. Ferguson, Burlington, Vt ..... Dip.
Washing machine, J. T. Greenwood, Beloit ..... Dip.
Single seat 2-spring phæton, H. S. Benjamin, Milwaukee ..... Dip.
Two-seated platform wagon, H. S. Benjamin, Milwaukee ..... Dip.
Churn, G. L. Farmer, Rockford, Ill ..... Dip.
Door screen and blind, S. H. Severson, Stoughton ..... Dip.
Combination mop and brush holder, H. A. Libby & Co., Evansville ..... Dip.
Common sense broom, H. A. Libby & Co., Evansville ..... Dip

## DEPARTMENT J.—FINE ARTS.

### CLASS 48.—*Music and Musical Instruments, and Sewing Machines. Five exhibits.*

White Sewing Machine, Joel Boley, Madison ..... Dip.
Cornet, J. M. Foote, Chicago, Ill ..... Dip

### CLASS 49.—*Works of Art.*

| | |
|---|---|
| Best portrait in oil, seven exhibits, James R. Stuart, Madison | $10 00 |
| Best original landscape in oil, work of exhibitor, nine exhibits, Mrs. G. H. Stowe, Janesville | 10 00 |
| Best historical landscape in oil, four exhibits, Jas. R. Stuart | 10 00 |
| Best animal painting in oil, one exhibit, Jas. R. Stewart | 5 00 |
| Best specimen bird painting in water colors, four exhibits, E. Rose, Madison | 4 00 |
| Best crayon from photograph, eight exhibits, E. Rose | 5 00 |
| Best marine painting in oil, five exhibits, N. P. Jones, Madison | 10 00 |
| Best painting, still life, in oil, five exhibits, Mrs. G. H. Stowe | 5 00 |
| Best painting game life, in oil, four exhibits, Jas. R. Stuart | 5 00 |
| Best portrait in water colors, seven exhibits, W. L. Knowles, Madison, | 5 00 |
| Best specimen of game, water colors, two exhibits, Mrs. G. H. Stowe, | 5 00 |
| Best still life in water colors, one exhibit, E. Rose | 5 00 |
| Best collection of china painting, two exhibits, R. L. Garlick, Madison | 5 00 |
| Best single piece china painting, two exhibits, Mrs. G. H. Stowe | 3 00 |
| Best water color painting on silk, one exhibit, Mrs. A. H. Main, Madison | 3 00 |
| Best oil painting on silk or satin, two exhibits, Mrs. H. M. Lewis, Madison | 3 00 |
| Best panel painting in oil, fifteen exhibits, Jas. R. Stuart | 3 00 |
| Best panel painting in water colors, three exhibits, Mrs. G. H. Stowe, | 3 00 |
| Best pencil drawing, six exhibits, Miss Lucy C. Andrews, Milwaukee | 2 00 |
| Best collection of paintings, water colors, four exhibits, Mrs. G. H. Stowe | 15 00 |
| Best collection of oil paintings, not less than fifteen pictures, two exhibits, James R. Stuart | 25 00 |
| Best India ink photograph, five exhibits, W. L. Knowles | 5 00 |
| Best water color (stipple) photograph, five exhibits, Mrs. G. H. Stowe | 5 00 |
| Best oil photograph, three exhibits, Mrs. G. H. Stowe | 5 00 |
| Best specimen steel engraving, two exhibits, Miss Lizzie Taylor, Madison | 3 00 |

Best specimen of wood engraving, one exhibit, L. J. Plumb, Milton.. $2 00
Best set of architectural plans, original, one exhibit, E. Rose, Madison 5 00
Best collection of photographs and other sun pictures, made by exhibitor, one exhibit, H. H. Dahl, Madison.. ..... 10 00
Best collection of photographic copies of oil paintings, one exhibit, Mrs. F. M. Vilas, Madison, Wis..... 5 00
Best landscape photograph, one exhibit, A. L. Dahl..... 2 00
Best collection of stereoscopic views, Wisconsin natural scenery, one exhibit, A. L. Dahl, Madison..... 10 00
Best collection in lithography, one exhibit, J. G. Schluchter, Madison 2 00

## CLASS 50.— *Needle, Shell and Wax-work.*

Best sample plain sewing, embracing the different stitches used in household sewing and repairing, four exhibits, Miss Hester Craven, Madison, Wis..... $2 00
Best fancy knitting work, ten exhibits, Mrs. W. R. Bird, Verona ..... 2 00
Best cotton tidy, twenty-five exhibits, Miss Lucy C. Andrews, Milwaukee ..... 1 00
Best worsted tidy, seventeen exhibits, Mrs. I. S Newton, Verona . .. 1 00
Best specimen of embroidered slippers, two exhibits, Miss Emma W. Sharp, Madison. ..... 1 00
Best specimen of worsted embroidery, ten exhibits, H. A. Lewis, Madison ..... 2 00
Best raised worsted embroidery, two exhibits, Miss Lizzie Taylor.... 2 00
Best needle work or floss embroidery, nine exhibits, Geo. W. Horton, Madison ..... 2 00
Best silk embroidery, ten exhibits, Mrs. L. R. Stewart, Brodhead.... 2 00
Best embroidered chair cover, four exhibits, Miss Hattie Blanchar, Windsor..... 2 00
Best ottoman cover, two exhibits, Miss Hattie Blanchar ..... 2 00
Best sofa cushion, five exhibits, Mrs. R. Packham, Waunakee..... 2 00
Best specimen machine braid work, one exhibit, Miss Hester Craven. 1 00
Best specimen hand braid work, three exhibits, N. B. Brown, Sun Prairie ..... 1 00
Best gent's dressing gown, one exhibit, Mrs. S. J. Askew, Madison... 3 00
Best sample of work in wax, one exhibit, Mrs. J. Nicholson, Monroe, 1 00
Best sample shell work, two exhibits, J. M. Patterson, McFarland ... 1 00
Best sample leather work, one exhibit, N. R. Baily, Sun Prairie..... 1 00
Best specimen of bead work, five exhibits, Mrs. J. H. B. Matts, Verona..... 2 00
Best specimen fancy netting, five exhibits, Miss Lizzie Taylor..... 2 00
Best exhibition of hair work, three exhibits, Mrs. G. H. Stowe ..... 2 00
Best lamp mat, six exhibits, Mrs. W. D. Stillman, Madison..... 1 00
Best toilet set, six exhibits, Miss Hattie Blanchar, Windsor..... 2 00
Best afghan, three exhibits, Miss Sarah Chandler, Madison..... ... 2 00
Best exhibition of Honiton lace, work of exhibitor, eight exhibits, Miss Lizzie Schwab, Madison..... 3 00
Best exhibition of any other kind of lace, fifteen exhibits, E. Wilson, Lake Mills ..... 3 00
Best exhibition of applique embroidery, one exhibit, Mrs. F. M. Vilas, Madison... ..... 2 00
Best exhibition of Cretonne embroidery, two exhibits, Miss Lucy H. Andrews ..... 2 00
Best set of embroidered underclothes, one exhibit, Miss Hester Craven ..... 2 00
Best infant's wardrobe, one exhibit, Miss Hester Craven..... 2 00
Best picture embroidery, two exhibits, Miss Lizzie Taylor ..... 2 00
Best exhibition in this entire class, three exhibits, Mrs. G. H. Stowe, 10 00

*For Boys and Girls under fifteen years of age.*

Best work on perforated board, four exhibits, Miss Libbie Morse, Verona ..... $1 00
Best specimen of plain sewing, one exhibit, J. B Duncan ..... 1 00
Best collection of bracket work, one exhibit, Fred. Sherman, Janesville ..... 3 00
Best single piece bracket work, one exhibit, Fred. Sherman, Janesville ..... 1 00

CLASS 51.— *Domestic Manufactures.*

Best kersey blanket, two exhibits, Wm. Rapp, Dane Station, ..... Silver plate, $4 00
Second best, Mrs. Newton Briggs, Madison ..... Silver plate, 2 00
Best ten yards of home-made flannel, one exhibit, Wm. Rapp, ..... 4 00
Best rug of any material, seven exhibits, Mrs. C. H. Billings, Madison ..... Silver plate, 4 00
Second best, Mrs. Newton Briggs ..... 2 00
Best fifteen yards rag carpet, five exhibits, Mrs. H. M. Ayer, Lodi .... 4 00
Second best, Mrs. R. J. Atwood, Madison ..... 2 00
Best woolen stockings, three exhibits, Mrs. I. S. Newton .. Silver plate, 2 00
Best woolen socks, six exhibits, Mrs. I. S. Newton ..... Silver plate, 2 00
Best two pounds of woolen yarn, one exhibit, J. De Jean, Rutland ..... Silver plate, 2 00
Best woolen mittens, eight exhibits, J. M. Patterson, McFarland ..... Silver plate, 2 00
Best fringed woolen mittens, two exhibits, J. M. Patterson, McFarland ..... Silver plate, 2 00
Best white quilt, six exhibits, D. F. Salisbury, Fitchburg, Silver plate, 4 00
Second best, J. M. Patterson ..... Silver plate, 2 00
Best silk quilt, three exhibits, Mrs. Abel Dunning, Madison ..... Silver plate, 4 00
Second best, Mrs. C. S. Karn, Madison ..... Silver plate, 2 00
Best log cabin quilt, six exhibits, Mrs. C. S. Karn ..... Silver plate, 4 00
Second best, Miss Lizzie Taylor ..... Silver plate, 2 00
Best patch work quilt, seventeen exhibits, Mrs. L. R. Stuart, Brodhead ..... Silver plate, 4 00
Second best, Mrs. C. W. Mead, Sun Prairie ..... Silver plate, 2 00
Best knit counterpane, six exhibits, Miss Lizzie Taylor .. Silver plate, 4 00
Second best, Mrs. E. L. Atwood, Trempealeau ..... Silver plate, 2 00
Best wrought counterpane, two exhibits, Mrs. C. W. Mead, Silver plate, 4 00
Best worsted scarf, five exhibits, Mrs. O. E. Matts, Paoli, Silver plate, 3 00
Best wrought shawl, four exhibits, Mrs. L. R. Stuart ..... Silver plate, 4 00
Best exhibition of taste and skill in cutting and making ladies' dresses by other than professional manufacturer, four exhibits, Miss K. F. Peffer, Pewaukee ..... Silver plate, 10 00
Best specimen of gents' shirt, one exhibit, Mrs. I. S. Newton ..... Silver plate, 2 00
Best specimen of darning, five exhibits, N. R. Bailey, Sun Prairie ..... Silver plate, 2 00
Best ladies' sack, domestic manufacture, three exhibits, Miss Hester Craven ..... Silver plate, 4 00
Best display in this entire class by one exhibitor, one exhibit, Miss Hester Craven ..... Silver plate, 10 00
Sandwich Island Ferns, Miss Lucy C. Andrews, Milwaukee ..... Dip.
Single piece in water colors, Mrs. G. H. Stowe, Janesville ..... Dip.
Collection of decorative art, Mrs. N. M. Page, Baraboo ..... Dip.

# DEPARTMENT K. — EDUCATION AND NATURAL HISTORY.

## CLASS 55.—*Rural District School.*

Specimen of drawing with pen, J. B. Silsbee, Janesville ..... Dip.

## CLASS 57.

Best essay by any pupil under 16 years of age, Freddie Cranefield, Syene, Wis.....Silver plate, $5 00

## CLASS 59.— *Natural History.*

Best collection illustrating the botany of Wisconsin, A. F. Rote, Monroe, Wis..... $5 00
Best collection illustrating the birds of Wisconsin, Charles G. Mayers, Madison, Wis..... 5 00
Best collection illustrating the insects of Wisconsin ..... 5 00
Best specimen of penmanship, J. C. Proctor, Madison ..... ... Dip.

# REPORTS OF SUPERINTENDENTS.

## DEPARTMENT C.— SHEEP.

By CHESTER HAZEN, Superintendent.

This department was well represented at the exhibition of 1880, showing the deep interest Wisconsin farmers are taking in this very important branch of agriculture. The specimens exhibited in all the classes, showing the superiority of the skill and experience applied to the breeding of sheep in our state, which, in connection with the favorable climate and rich and productive soils, and pure water, has been the main cause of the superior quality of Wisconsin wool, and fine specimens of strong, healthy sheep, such as Wisconsin or any other state may justly feel proud of.

Wisconsin is fast becoming a stock growing state. Wheat-growing has for several years been almost a failure with a majority of Wisconsin farmers; and wool growing, with all the natural advantages our state affords, is and must continue to be one of the leading agricultural pursuits of Wisconsin.

The American Merinos were fairly represented in numbers, and showed some superior stock. But the exhibition in this class was not as large as I should like to have seen it. Many breeders of fine wool sheep were deterred from attending the fair with their stock on account of the unusual pressing time in harvesting the tobacco crop, for which Dane and Rock counties have become noted.

Long wools were well represented as to numbers and excellence.

Downs were better represented than for several years past. A greater number of animals and a larger variety. In fact there was on exhibition three separate breeds of Downs — South Downs, Shropshire Downs, and Lincolnshire Downs. Those different breeds should not be compelled to compete in one class, and I am of the opinion that another class for Downs ought to be created.

## DEPARTMENT D.—SWINE.

BY CHESTER HAZEN, SUPERINTENDENT.

Class 20. Large breeds, principally Poland Chinas, was a very extensive exhibit, fully up to any former season, both in numbers and points of excellence.

Class 21. Middle breeds. This class was represented by Berkshires, almost entirely. The exhibit was very fine in quality and much larger in numbers than at previous fairs.

Class 22. Small breeds were well represented, and its former reputation well sustained. Some additions, such as Yorkshires, were added to this class this season; they appear to have some good qualities.

Swine, although they may be considered the most filthy and the lowest in the scale of any of our domestic animals, take a high rank as regards the revenue of the average farmer. In fact the pork produced may be considered one of the leading industries of Wisconsin farmers; and the improvement that has been made in the different breeds of swine the past decade indicates that careful thought and study has been exercised by the breeders of pure blooded hogs in our state, and that their efforts have been rewarded by general success.

The pork product of our country takes a high position in the commerce and exports of our nation, and of all the uses this product has been put to, the late invention of manufacturing lard into Butterine, to be sold on the markets of the world for and in the place of butter, caps the climax. Should this bogus butter meet with success and become a staple article of commerce, it might seriously affect the dairy interests of our country. On the other hand, it would create a new market for lard.

## DEPARTMENT F.— AGRICULTURE.

BY C. L. MARTIN, SUPERINTENDENT.

### CEREALS.

I repeat what I said last year. We have a right to be proud of the high rank that this part of our exhibition has attained — a grand show, an immense show, a show worth going one hundred miles to see. No lack of interest. Our old exhibitors, Wood, Pilgrim, Smith, Putnam and many others striving to excel, and in doing so made the finest exhibition of cereals and seeds ever seen in any state in the Union. The fine display satisfies me that those men are taking great pains in making judicious selections of the purest and best seeds, otherwise they never could have attained this degree of excellency.

### VEGETABLES.

Here we have good evidence of the energy and intelligence of our farmers and gardeners. We should be proud of them. Such potatoes, cabbages, cauliflower, egg plant, and all sorts of vegetables; the largest and best collection ever seen here in one building before. Mr. Wood, of Baraboo, had a large exhibit from the most delicate vegetable to large squash. I have forgotten the measurement and weight. It was a little less in size than the dome of the capitol and nearly as solid. Here stood Mrs. Wood all day, and every day during the fair, answering questions about the plants, which she seemed well qualified to do, as it should be.

### BUTTER AND CHEESE.

Butter and cheese was not so large in quantity as last year, still there was a good show, and the judges who were buyers, after a very practical examination, declared both butter and cheese, taken altogether to be of most excellent quality.

### BREAD, CAKE AND JELLIES.

The exhibit was both good and numerous, and the secretary having purchased some glass cases to keep the dust and fingers from the cake gave great satisfaction, and will encourage the exhibitors in this department in the future.

MISCELLANEOUS.

The exhibition made in this department by the Chicago & Northwestern Railroad was the largest and finest I have ever seen. It was made by the direction of Mr. Simmons, commissioner of the land department of that prosperous railway company, and consisted of the following exhibits brought from and raised in Minnesota, along the line of the division known as the Winona and St. Peter Railroad. If the young and hardy youth of our state *will go west*, we can imagine no better clime in which to settle than that which can produce such splendid exhibits. The taste and skill shown in placing this very large collection on exhibition merits much praise.

One hundred and ninety-seven samples of grain, consisting of wheat, oats, barley and peas; forty-nine samples of vegetables; eighteen varieties of potatoes; ninety-nine varieties of apples; four varieties of grapes; seven varieties of wild grasses; nine varieties of corn; three varieties of sugar cane; two varieties of Egyptian corn; three varieties of tame grasses; samples of seventy-two kinds of wood, native of Minnesota and seventeen samples of game birds of that state.

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## DEPARTMENT G.—HORTICULTURE.

BY D. T. PILGRIM, SUPERINTENDENT.

The number of entries, and the large space occupied by the exhibitors in the Fruit and Floral Department at the annual exhibition in 1880 evidenced to the regular fair-visitor, that there was no lack of interest in this field of labor throughout the state. Old contributors, the "regulars," of the horticultural army were present with the fruits of their labor, while many volunteer recruits came with joy and gladness upon their faces, and placed at Pomona's feet their first fruit offerings. This was gratifying, and gave general cheer to all.

The whole amount of plates exhibited was about five thousand.

I note some of the principal exhibitors; if any are omitted it is unintentional. Among the professional exhibitors, I found in his usual place, G. P. Peffer, of Pewaukee, with ninety-six

varieties of apples, forty-seven of crabs, twenty-seven of pears, twenty-two of grapes, seven of plums, four of peaches, also two large bunches of mammoth grapes, which measured one and one-half inches in diameter. This was a very fine show. A. J. Philips, of West Salem, had on exhibition thirty varieties of apples, eighteen of crabs, some very fine specimens of Wealthy apples and crabs; about one hundred and twenty-five plates in all.

Mr. Wilcox, of La Crosse, had a fine display of apples and crabs; also some young trees showing very large growth.

J. C. Plumb, of Milton, exhibited eighty varieties of apples, sixteen of crabs; two hundred plates in all. Also a very fine display of evergreens and fruit trees.

Wm. Reed, of North Prairie, twenty varieties of apples, twenty-four of grapes, three of plums and nine of crabs. Exhibition very fine.

G. J. Kellogg, of Janesville, had forty varieties of apples, twelve of crabs, fifteen of grapes; had a very fine show of Roger nineteen and Roger fifteen grapes. Whole number of plates two hundred and fifty.

Mr. Palmer, of Brodhead, Mr. Hersinger, of Baraboo, and others, each made a fine display.

Among the non-professional cultivators who were out in very good force were George Jeffery, of Smithville, who had sixty-six varieties of apples, eighteen of crabs, eighteen of pears and two of plums. Some two hundred in all.

E. D. Lewis, of Lake Mills, exhibited nineteen varieties of apples, four of crabs, eleven of grapes and one of pears.

George Ringrose, of Wauwatosa, had thirty-five varieties of apples, twenty-two of crabs, nine of pears, six of grapes, three of plums. Whole number of plates two hundred.

E. C. Holt, of Madison, H. Shouster, of Middleton, D. Alcot, of Spring Valley, H. Tudiman, of Middleton, T. D. Plumb, of Madison, and others, each had a fine display of fruit and drew a fair share of premiums.

The professional florists were out in very good force. Among them were Mr. Kitsroe, of Milwaukee, who had the greatest display of plants and flowers.

Mrs. J. E. Williams, of Madison, made a very fine display of green-house plants of all kinds, being the greatest display of plants west of Milwaukee.

G. W. Ringrose, of Wauwatosa, had a very fine display of plants, also some very fine floral designs. E. Welman made a good display of plants and flowers.

H. G. Roberts, of Janesville, fine show of gladioli.

Among the non-professional florists were Mrs. L. T. Malory, Mrs. Wildhagen, Mrs. Memhard, Mrs. G. L. Brown, Mrs. Joy, Miss Kate Peffer and others; each made a very fine display and carried off a fair share of premiums.

The exhibition as a whole can be called a success. There might be mentioned some decided marks of progress; enough to know that it is not on the downward track. I am under great obligations to one and all of my horticultural friends. I extend a hearty and cordial good will for their efforts in making the exhibition a success of which all may be proud. It has not been my purpose to extol one exhibitor over another — all did well. Far less grumbling was heard over award of premiums, than ever before, either creditable to the good judgment of the committees or the common sense of the exhibitors.

To fulfill the request of the secretary of this society, I have compared the amounts paid by different states on fruit and flowers, which is as follows:

| | | |
|---|---|---|
| Illinois | paid in 1880 | $600 00 |
| Indiana | paid in 1880 | 550 00 |
| Michigan | paid in 1880 | 800 00 |
| Minnesota | paid in 1880 | 800 00 |
| Wisconsin | paid in 1880 | 578 00 |

## DEPARTMENT H.— MACHINERY.

BY J. H. WARREN, SUPERINTENDENT.

Art — the "Handmaid of Agriculture," gave most abundant evidence of her devotion to her mistress, in the large and varied articles exhibited at our State Fair, calculated to lighten the burden and facilitate the accomplishment of all the varied labors of

the farm, as will be seen by the following list of exhibits and exhibitors:

E. P. Wheeler, Beloit, Wis.— Eclipse windmill.

Knowlton Manufacturing Co., Rockford, Ill.—Combined reaper, single reaper, mower, grain drill, cultivator, cultivator, hay rake.

E. J. Smalley, Manitowoc, Wis— Pioneer horse power, power feed cutter, Pioneer farm feed mill, Clipper hand feed mill.

Warder, Mitchell & Co., Chicago, Ill.— Self raking reaper, single reaper, light mower, new mower.

P. K. Dedirick & Co., Albany, N. Y.— Horse hay press.

E. D. Bishop, Whitewater, Wis. —Minneapolis harvester and twine binder.

Jacob Degenhardt, Campbellsport, Wis.— Carriage gate, farm gate, garden gate.

O. C. Vaughn, Jefferson, Wis.— Buchanan sulky corn cultivator.

F. M. Spear, Oconomowoc, Wis.— Farm gate.

Russell & Co., Milwaukee, Wis.— Steam traction engine and separator.

J. S. Rowell, Sons & Co., Beaver Dam, Wis.—Broadcast seeder and cultivator combined, grain drill.

Madison Plow Company, Madison, Wis.— 12-inch sod plow; gauge wheel and fixtures; Caslor coulter and clasp; steel beam clasp; 18 inch prairie breaker, complete; 16-inch heavy grub breaker, complete; 14-inch light prairie caster cutter gauge; 14-inch clipper, extra high, landside; 14-inch turf and stubble plow; 14-inch stubble plow; 14-inch stubble plow; corn and hop plow; 18-inch 3-horse plow; 14-inch steel-beam plow; 13-inch steel beam plow; 12-inch steel-beam plow; 14-inch steel-beam plow; jointer and clasp; sulky plow; sulky attachment; 12-inch chilled plow.

J. F. Gavon, Brodhead (for Winship Bro's, Racine, Wis.)— Triumph wind mill.

I. P. Phillips, Milwaukee, Wis.— Hollingsworth sulky rake; Rundur sulky rake; Surprise sulky rake; Taylor No. 1. sulky rake; Red Bird sulky rake; corn shellers; Senior cider mill.

Fuller & Johnson (Walter A. Wood), Madison, Wis.— Twine

self-binding harvester; chain rake reaper; sweep rake reaper, senior; sweep rake reaper, junior; moving attachment complete.

Fuller & Johnson.— Enclosed gear mower; Barlow corn planter; Burson corn planter with drill attachment; Harworth check rower; Stark dropping attachment for planter; McCherry seed drill; McCherry broad cast seeder; La Belle lumber wagon; Monitor sulky cultivator; Gesley sulky cultivator; Gesley sulky plow; Thompson & Son sulky plow; Thompson & Son steel beam plow; Thompson & Son wood beam plow; Gilpin sulky plow; Gilpin breaker attachment; Furst & Bradley combined cultivator; Furst and Bradley walking cultivator; Furst & Bradley combined cultivator; Furst & Bradley walking cultivator; Furst & Bradley sulky plow, friction attachment; Furst & Bradley sulky plow, breaker attachment; Furst & Bradley Garden City steel plow; Garden City chilled plow; self-dump hay rake; hand dump hay rake; Freedman harrow; Scotch harrow; adjustable harrow; prairie breaker; M. Graves & Co., victor self-dump hay rake; Star hand-dump hay rake; Coates lock lever hand-dump rake; Scobie harrow; Johnson & Smith, iron harrow; revolving road scraper; American cider and wine mill; Waupun fanning mill; Young America cider and wine mill; Stone City Fence Co., four point steel barbed wire; Nichols, Shepard & Co., retractor separator; Nichols, Shepard & Co., ten horse mounted power; Chicago Pitts separator; Chicago Pitts ten horse mounted power; Young America feed mill; American feed mill; Big Giant feed mill; American feed mill.

Ben. C. Torson, Madison, Wis.— Randall harrows; sulky corn cultivator.

Bovee Brothers, Richland Center, Wis.— Hay and grain raker and loader.

Geo. Rundle, Palmyra, Wis.—Model of horse hay pitching apparatus; hay elevator and carrier.

G. A. Williams, Lake Mills, Wis.— Broadcast seed and cultivator combined.

C. W. Matt, Milwaukee, Wis.— Spring-tooth harrow; spring-tooth cultivator.

J. L. Davison, Madison, Wis.— Chapman's hay-pitching apparatus.

F. M. Spear, Oconomowoc, Wis.—Farm gate.

Baker Manufacturing Company, Evansville, Wis.—Nameless Monitor windmill; Nameless Monitor windwill; feed grinder; corn sheller.

C. Aullman & Co., Canton, Ohio.— Separator; self-binder.

W. Butterfield, Madison, Wis.— Self-binder; self-binder; Rosby mower and cultivator combined; No. 1 Osborn mower; No. 5 Rosby mower.

W. B. Hook, Oregon, Wis.— Farm gate.

Russell & Co., Massilon, Ohio.— Traction engine; threshing machine.

Madison Manufacturing Co., Madison, Wis.—Cane mills; farm boiler; evaporator; horse power.

A. B. Campbell, Albion, Wis.— harrow; harrow.

N. F. Frederickson, Madison, Wis.— Fanning mill.

B. F. Luce, Janesville, Wis. — Automatic self-adjusting gate.

B. Goldenburg, Madison, Wis.— Cider mill.

M. V. Matterson & Perry, Milwaukee, Wis.— Royce reapers; Graham mower; Eastern steam mower; Lion rake; Columbia chilled plows.

Wm. Deering, Chicago, Ill.—Marsh harvester and twine binder; Warrior mower; Marsh harvester and twine binder.

Peerless Reaper Company, Canton, Ohio.— No. 5 mower; No. 4 combined reaper; No. 6 single reaper.

Harris Manufacturing Co., Janesville, Wis.— Leader mower; Leader reaper; Prairie City seeder; Leader drill; spring-tooth harrow.

Geo. Esterly and Son, Whitewater, Wis.— Twine binder.

D. S. Morgan & Co., Rockporte, N. Y.— Seymour mower No. 2 Triumph reaper; No. 3 Triumph reaper.

M. C. Goucher, Milwaukee, Wis.— Superior seeder; Thomas, H. D., hay rake; Thomas, S. D., hay rake.

I. N. Stoddard, Dayton, Ohio.— Tiger rake; Tiger drill; Tiger seeder.

Eureka Manufacturing Co., Rock Falls, Wis.— Champion seeder.

J. I. Case, Racine, Wis.— Traction engine; Agitator separator.

Briggs & Enoch, Rockford, Ill.— Browne sulky plow; sulky cultivator.

Briggs & Enoch, Rockford, Ill.— Sulky plow; Boss corn planter; walking cultivator; Excelsior plow.

B. D. Buford & Co., Rockford, Ill.— Browne sulky plow; sulky cultivator; harrow; large breaking plow; plows.

N. C. Thompson, Rockford, Ill.— Gorham cultivator; Thompson's riding cultivator; Thompson's walking cultivator; Thompson's sulky plow; Thompson's hay rake; Thompson's stalk cutter; display of plows.

Emerson, Salcott & Co., Rockford, Ill.— Standard reaper; Standard mower; Standard riding cultivator; Standard seeder; Standard planter; Standard rotary planter.

A. N. Pomeroy, Sun Prairie, Wis.— Mill lane driver.

Keystone Manufacturing Co., Sterling, Ill.— Corn sheller; Pet sheller; Pony sheller; L. C. rake; senior planter; junior planter; rotary planter; disk harrow; dump rake; Keystone hay tedder; Keystone feed cutter; Keystone senior cider mill; Keystone medium mill.

Monroe Manufacturing Co., Monroe, Wis.— Acme sulky cultivator; Acme walking cultivator; double shird plow.

S. L. Sheldon, Madison, Wisconsin — Fonet hay loader; Gregg hay rake; Buckeye drill; combined fertilizer grain drill; seeder; cider mills; Watertown steam engine; Dayton traction engine, with attachment; Pitts separator; Birdsell clover huller; Norwegian steel beam plow; Taylor horse power; Meadow King mower; Meadow King mower and tiller; Watertown platform wagons; Cortland platform wagons; Pontiac platform wagons; display Cook buggies; Columbia phaeton; Stoughton farm wagons.

Monroe Manufacturing Company, Monroe, Wisconsin — Monroe farm wagon.

A. A. Newell, Kalamozoo, Michigan — Seating tubular well valve; Seating brass cylinder; adjustable stroke pump head.

W. S. Morgan, Evansville, Wisconsin — Broad cast seeder and roller.

Aullman, Taylor & Co., Waupun, Wisconsin — Twelve foot wind mill; Nameless, twelve foot pumping mill.

Budle & Kelley, Troy, Ohio — Two horse planter; combination planter and drill, (two horse).

J. I. Case, Racine, Wisconsin — Centre draft sulky plows; steel beam plows, sulky breaker attachment; 14-inch breaking plows; 16-inch brush breaker; 12-inch breaking plow; steel plow, wood beam; chilled plows; harrows; riding corn cultivators; walking cultivator.

E. M. Goff, Tiffany Creek, Wisconsin — Farm gate.

D. Golden, Rutigo, Langlade county, Wisconsin — Corn planter.

S. Sheppard, Seymour, Wisconsin — Boss separator; Workman seeder; steel tooth harrow (72); Forty steel tooth harrow.

S. L. Sheldon, Madison, Wisconsin — Gilpin sulky plow; John Deere walking plow; John Deere breaker; John Deere cultivator; Deere corn planter; American cider mill; Taylor harrow; Osage feed mill; King of the Lawn lawn mower; Young American lawn mower.

A. P. Watson, Indianopolis, Indiana — Willoughby fertilizing drill; Norris Star drill (one horse).

J. E. Miles, Janesville, Wisconsin — Hay carrier.

McCormic Harvesting Machine Company — Self binding harvester; reaper; mower.

Appleton Manufacturing Company, Appleton, Wisconsin — Badger seeder.

E. O. Darling, Rockton, Illinois — Fanning mill.

Van Brunt & Davis, Horicon, Illinois — Grain drill; broad cast seeder.

Briggs & Enoch, Rockford, Illinois —Two horse prairie breaker, turf and stubble plow.

Zimmerman, (C.) Beaver Dam — Powell broad cast seeder; Rowell drill.

To make special mention of any particular exhibit, in a department where all present completeness to perfection, is not only a

difficult, but delicate matter. Yet I feel no complaint can be made by other exhibitors, if I make special mention of the very fine exhibit and the elegant manner of display made by J. I. Case & Co. of Racine; especially was this display a very attractive and interesting feature of the fair.

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## DEPARTMENT I.—MANUFACTURES.

BY SATTERLEE CLARK, SUPERINTENDENT.

While there was a fine show in the manufactures at the fair of 1880, it still seems as if it should have been much better.

There are scattered all over the state factories for the manufacture of almost everything made in the country, and comparatively few of them exhibit at our fairs.

One reason for this is that they are able to sell their wares as fast as they can manufacture them without such an advertisement; another is, if one man carried off all the premiums in his line, it would not pay the expense of sending a man to the fair to exhibit his goods.

There are some notable exceptions, which I think entitled to be mentioned in this report. In the line of hardware, John N. Jones and Frank & Ramsay (both of Madison) made first class exhibitions, particularly in the line of stoves of every variety.

The Racine Plating Co. entered, by Geo. B. Kelly, an elegant display of their goods, and it is not improper for me to say right here, for style, finish and durability they cannot be excelled by any other company.

A. H. Hollister exhibited a splendid show in his line, consisting of carbonates, paints, dyes, toilet soaps, fancy soap, candles, matches, perfumery, etc., upon nearly all of which he obtained first premiums.

There was such a fine display of carriages and wagons that the judges found great difficulty in deciding who was entitled to first premium.

There was a creditable exhibition of harnesses, both double and single, as also of saddles.

There was also a good display of boots and shoes.

O. E. Fitch & Co., of Madison, made a fine display of hats, caps, gloves and mittens.

Under the heading of Miscellaneous Articles not on list, there were quite a number of articles worthy of notice.

Among the said articles was Geo. V. Hecker's self-raising flour, which I think attracted more attention than any other article on the grounds.

The Racine Boat Co. exhibited three boats which attracted a great deal of attention, and were well entitled to notice.

There were many more articles, too numerous to mention, upon which I recommended a diploma.

At the annual meeting of the Board, I will suggest a very few changes in the premium list in this department.

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## DEPARTMENT B.—CATTLE.

HON. A. A. ARNOLD, SUPERINTENDENT.

The undersigned, superintendent of cattle department at Wisconsin State Fair for the year 1880, respectfully reports as follows: The whole number of cattle shown was two hundred and twelve, of which seventy-nine were Short-horns, forty-nine Ayrshires, forty Devons, twenty-five Jerseys and nineteen Holstein.

The following are the names of exhibitors and kinds of cattle exhibited.

Wm. Kiser, twelve head of Short-horns.

J. Kiser, fifteen head of Short-horns.

Col. Reynolds, one Short-horn.

J. E. Owens, eight head of Short-horns.

Mr. Buchanan, nineteen head of Short-horns.

E. Gill, fourteen head of Short-horns.

State University, ten head of Short-horns and four head of Holstein.

G. E. Bryant, nine head of Short-horns.

D. Huntley, twelve head of Ayrshires.

C. E. Hazen, seventeen head of Ayrshires.

J. Johnson, fourteen head of Ayrshires.
W. Blanchard, one Ayrshire.
J. W. Morse, five head of Devons.
L. Ransom, fifteen head of Devons.
Mr. Baker, sixteen head of Devons.
J. Strong, four head of Devons.
Mr. Larson, fifteen head of Holstein.
N. N. Palmer, fourteen head of Jerseys.

The exhibition, though not as large as in the year 1879, still was equal to it except in the Short-horns, and in this nearly equal, except as to number. On the whole, the exhibition was very creditable to the breeders of cattle in our state. With the liberal premiums offered, it would seem that breeders in the adjoining states might be induced to show their cattle at our fairs, if ours was not held at a time to interfere with other state fairs in Illinois, Iowa aud Minnesota. Unless some new feature can be introduced at our state fair to make it more attractive, I would not recommend an increase in the list of premiums offered, but would suggest that the secretary make the coming year an especial effort to obtain offers of special premiums from the leading business men of our state, who by so doing, would not only vastly assist our fair, but they may, if desirable, offer the special premium coupled with an advertisement, thus killing two birds with one stone.

To the several committees in my department, I take this occasion to tender my sincere thanks for the very efficient manner in which they adjudged in their several classes. As proof of which there was not a single appeal, and as far as I learned, no grumbling, as is often the case. When they misjudged (if at all), it was where honest and competent men would often differ in judgment.

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## FORAGE DEPARTMENT.

The supplies of hay, straw, feed and water furnished by the Society to the horses, cattle, sheep and swine, on exhibition at the last state fair, were good in quality, and in sufficient quantity for

the wants of the stock on exhibition in those departments. The hay was particularly fine, and was furnished by Mr. M. H. Harriman, from the farm of General Bryant.

On the care and proper distribution of those supplies depend the comfort of the stock, and the convenience and good temper of the exhibitors. The expenses of this department for the fair of 1880 were $557.11; the amount paid for the fair of 1879 was $577.13.

A. A. BOYCE, *Superintendent.*

# RECEPTION OF GEN. U. S. GRANT.

The first citizen of the United States was in attendance during the exhibition of 1880, which was held in Madison on the fair grounds of the society, the historic "Old Camp Randall," at 1:30 P. M. of September 7th. Gen. U. S. Grant was escorted from the residence of his host, Col. Wm. F. Vilas, on Gilman street, to the state fair grounds, the procession moving in the following order:

Madison Band — Lake City Guards, Capt. Chapman — Governor's Guard, Capt. Heinkel — Squad of Veterans' Club — Carriage containing Gen. Grant, Gov. Smith and Col. Vilas — Squad of Veterans' Club — Carriage containing Col. Fred. Grant, Gen. Rowley, Capt. Kasson and Capt. King — Squad of Veterans' Club, forming hollow square.

Upon arriving at the grounds, the prominent personages of the procession, with representatives of the press, officers of the fair and municipal authorities, took position in the judges' stand. The races were viewed by the party for nearly two hours. A number of prominent persons were presented to Gen. Grant, the distinguished guest being unusually talkative, discussing war reminiscences, horse racing, etc., with evident gusto.

At four o'clock, the visitors resumed their carriages, and being driven out upon the race-track, in front of the grand stand, the militia companies formed a hollow square with the notables within. In introducing Gen. Grant to the assembled throng, Gen. George E. Bryant, secretary of the society, addressed the hero of Vicksburg as follows:

"GENERAL GRANT: — By the courtesy of the officers of the State Agricultural Society, whose guest you are, I have been commissioned by the veteran soldiers of Wisconsin, who with you wore the blue, to speak a word of welcome. Many of us

wear the scars of battles fought and won — all wear in their hearts the love of that country you have honored in war and in peace! Fifteen years 'after the battles are over and war drums have ceased to beat,' we meet you, our best-loved commander, here upon old Camp Randall, the gathering place, — where a hundred thousand of the youth and manhood of loyal Wisconsin fitted for the fray! Here the wife gave up her husband, the mother her son; the maiden her lover; that the stars in our flag should not be lessened — that the nation might live! Here from 1861 to 1864 was gathered an army larger in numbers than was the proud army that marched with Sherman from Atlanta to the sea. From this spot, Wisconsin soldiers bore aloft the eagle of the free. 'Old Abe,' the War Eagle of Wisconsin belongs to our club. He draws no pension though he is battle scarred, but the state he served will give him rations so long as cattle feed on our prairies, fish swim in our waters and birds fly in the air. Was it not a happy deed that the Wisconsin State Agricultural Society should purchase these beautiful grounds, so oft remembered as the place where we donned the blue, upon which to hold our annual fairs.

Here where naught was thought but of grim-visaged war,
When peace, white-winged, had spread her pinions o'er;
Are gathered pictures, penciled by the hand of skill,
Works of art — lessons of our schools.
Acres of machinery — whose busy hum
Reminds us old soldiers of the morning drum —
Flowers and fruits one building fill;
In another, turkeys gobble, chickens cackle and won't be still;
They know there's no real soldiers here.
Fish swim in waters clear,
And dream of bugs and flies, and have no fear
Of seine or spear.

"Agriculture feeds us as is attested by a hundred, by forty feet of solid food. The manufacturer and the artisan have brought to this show, things handy to have and pretty to look at, made from the woods that grow and the iron imbedded in our northern frontier. Up where the white tents rose and the young soldier slept and dreamed of glory, the noble horse eats his oats

and longs for the blue ribbon or the race to-morrow. Along where the non-commissioned officers used to go to practice 'eyes right' and study Hardee's tactics, five hundred head of cattle and sheep chew their cuds as they repeat, 'agriculture feeds and clothes us,' while down where the sentinel first learned to walk and grumble on his lone watch, King Porker who pays our taxes grunts his satisfaction of the doings of the day.

"General, to these grounds, crowded with the samples of Wisconsin's wealth, we welcome you, and from the heart of every veteran soldier, aye, from the heart of every loyal man and woman of Wisconsin, swells up the wish that your days may be long and happy."

In reply the Hero of Appomattox said:

"GENERAL BRYANT, OLD COMRADES AND LADIES AND GENTLEMEN — In 1850, I visited Wisconsin, and have not been within your beautiful state since. And when I was here before, I did not come to Madison, so that this is my first visit to your Capital which is so far-famed for its beauty and many attractions; and I assure you that it meets all my expectations; I only wish I could stay longer and see more of this fair city. The people of Wisconsin are to be sincerely congratulated upon their wealth and prosperity, as evidenced in this magnificent display of industrial and agricultural products. As General Bryant has remarked, it is indeed a most fitting thing that the beautiful grounds now occupied by this assemblage should have been transformed from a soldiers' camp to the uses of an agricultural association — it is a symbol of beating the spears of war into the plowshares of peace. I hope that these grounds may never again be the scene of war-like preparations, never again be used for military purposes; and may the young men and boys before me, and these fine-appearing militia-men, never be called upon to witness the scenes of strife which these old veterans have gone through.

"Mr. Secretary, I again thank you for this cordial reception, and shall be happy to grasp my brother veterans and you all by the hand."

The Veteran Club then formed, and filing past the general, shook hands with their old commander, who occasionally ex-

changed words with some old-time friends. The veterans then formed a hollow square outside of the Wisconsin National Guard, who in turn shook hands with the general. After this, the people generally passed by and grasped his sturdy right hand.

The reception being over, the visitors were driven through the live-stock department, and then driven back to the city.

In the evening a dinner was tendered to General Grant and son at the Vilas residence, a number of distinguished citizens being present by invitation of Col. and Mrs. Vilas. After the tables were cleared, an informal general conversation ensued. The hero of Vicksburg and Appomattox being in his best mood made all happy, by his kindly words and interesting speeches.

On the morning of the 8th, a special car containing General and Colonel Grant, Col. Vilas, Mayor Spooner, representatives of the city press and others left the Chicago and Northwestern depot, at 8:15 o'clock, for Devil's Lake, where a few hours were agreeably spent in viewing the delightful scenery of that region. The excursion returned at noon, and General Grant being taken to the fair grounds, partook of a farmers' dinner, after which the distinguished party made the grand rounds of the various departments, the General enlivening the time by his apt comparisons of the exhibits with the like (though unlike) exhibits seen in his recent visit around the world.

# STATE AGRICULTURAL AND HORTICULTURAL CONVENTION,

*Held at Madison, January 1st to February 4th, 1881, under the auspices of the State Agricultural and State Horticultural Societies.*

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TUESDAY, 7:30 P. M.

The convention met in the agricultural rooms in the capitol, and was called to order by Hon. N. D. Fratt, president of the Wisconsin State Agricultural Society, who addressed the convention as follows:

*Gentlemen, and Fellow Members of the State Agricultural, and Horticultural Societies:* — It gives me very great pleasure to extend to you, one and all, the annual greeting of these associations, and to assure you of a most cordial welcome to our council board, with the new lights, afforded by another year of experience and experiment, and the new ideas developed at home and abroad. I think that we may safely count upon many valuable plans and suggestions to mark our deliberations; and here permit me to remark, once for all, that in these meetings, and during these discussions, it is quite essential to full freedom of thought and debate, that all propositions made, all plans proposed, all ideas started and all suggestions presented, should only be regarded as tentative, thrown out for our discussion and investigation, for our consideration and approval or rejection, as the good judgment of this assembly may finally dictate, and that no man shall be held responsible for the full scope and ultimate effect of such ideas and suggestions. Naturally, the mind turns to the most perplex-

ing questions, which daily present themselves, in the practical management of the farm and the farmer's household, and among the foremost of these, is the problem of good farm help and its care and subsistence, and a supply of efficient household help, or its equivalent, in relieving the pressure of labors and duties on the farmer's household.

These questions have assumed their present importance largely from the decadence of our rural population, and the remedy has not yet been effectively provided. Intimately connected with this subject, in the relation of cause and effect, arises the question of extended landed estates, as contrasted with ordinary and legitimate farms, or rich and powerful landed proprietors, who only manage their estates as a business enterprise, and smaller land owners, actual farmers; of the speculator in farming, who makes his gains from the muscle of his steam plow, and the sweat of his hired man's brow, and of him who plows and sows, who reaps and mows, and wipes the sweat from his own brow. Of course, this is no time or place to enter into an extended discussion of these great questions, but only to throw out such hints, where they incidentally affect the subject-matters of this paper, as may lead the minds of our thinking and working men to study the subject further. The standpoint should ever be to us the highest and best interests of the real practical laboring farmer and his family; for clearly, to my mind, there are centered the highest interests of humanity and the best good of the nation. All over the land we find, to a greater or less degree, a tendency to extend the larger farms, and to swallow up the smaller ones. To make farming proper, no longer the life occupation and profession of the proprietor of the soil, but to place it on the footing of extended business enterprises, with the owner of the soil or his agent as general manager, and farm machinery and cheap unskilled labor for the motive power, men stretch out the limits of already large farms, by shrewd management and sharp bargains, until they count their broad acres by the thousands; and the smaller snug homesteads that once dotted the prairie on almost every quarter section or crowned the hills or filled the valleys, with the happy homes of a numerous and prosperous rural population, almost disappear

from the land, and in their stead, at longer intervals, the larger and more pretentious homes and the more ample and commodious barns and farm buildings of the more wealthy landed proprietor appear, practically isolated from each other, and quite unsocial in their sparseness.

The latest improved and most effective farm machinery stands ready to issue forth at the nod of the proprietor, to break the soil, to hoe the ground, to harvest the crop and to perform all the thousand and one duties and labors that were once performed by the strong and willing hands of thinking, intelligent, industious men. Good citizens of this republic, each one of whom represented a family circle of young men and young women, at once the pride and future hope of a great agricultural people, individual members of a rural population which in days of prosperity and peace ever formed the real productive wealth and hope of the nation, and from whose ranks, when the storm-clouds of war, foreign or domestic, spread over the land, stalwart and fearless defenders of home and country and soil, are ever ready to rally by thousands to support that country which truly to them represents home, fire-side, fortune and family, and all they are and all they hope to be, and in many cases the traditions and ties of immediate ancestry. The country school house, at once the source of light and hope to an intelligent people, frozen out by the sparseness of population, crawls away out of sight, dilapidated, ill-kept, unused, obsolete and perhaps at last disappears in many precincts; and the country church often follows it into retirement. The proprietor's family seeks spiritual and intellectual pabulum in the neighboring towns and villages, and the less fortunate are left to shift for themselves as best they may. Or oftentimes the moneyed man, the shrewd managing business man, seeks the far off frontier, to which some new avenue of approach has just been opened by railway or otherwise, and carefully selecting the choicest valleys, the richest plains, the noblest and best wooded forests, the purest streams, the clearest lakes, the sweetest pasturage and the deepest soil, and there, with his money in hand, he stakes out his wide domain, absorbing at the merely nominal government price, thousands upon tens of thousands of the

choicest acres of a country, unrivaled in all the great and glorious qualities that furnish forth the very best samples of a farming country. Acres that should of right form the birthright of toiling thousands of the sons of the soil, and furnish forth prosperous homes to numerous happy and industrious families of the best citizens of a prosperous community. No small land owner or actual working farmer can settle near such an estate and enjoy the privileges incident to a properly settled farming country; as social privileges, schools and churches, have no place in such an enterprise.

The omnipresent newspaper man will tell the world of the great enterprise; will make known the number and size of the barns and other buildings on the lordly estate, not one of which forms a home for an intelligent citizen; how many steam-plows break the virgin soil of his vast fields, not one of which represents anything but the dollars and cents invested; how many reapers and mowers cut and save his immense crops, around not one of which clusters a single human aspiration; how many cattle, sheep and hogs swarm over his vast and fertile possessions, not one of which forms an appendage to a modest home and a happy fire side, where the men and women of a future generation are being reared in honest industry, to maintain the intelligence, the morality, the integrity, the patriotism, the true wealth and the real pride of the country. Here we find another obstacle to the formation of a numerous and prosperous rural population. For the first of these conditions, namely, the absorbing of small farms by the large and overgrown domains adjacent to them, and the founding of vast estates in farming lands by retired capitalists, perhaps, undesirable as it may be in this democratic, republican land of human equality, there may be no adequate remedy. In the older settlements, indeed, it often happens that the smaller land-owner, blessed with a growing family, may desire to improve his own prospects by going where lands are cheaper, and more acres may be obtained for himself and family. But surely for the last evil there should be an adequate remedy provided, and actual settlers of working farmers should never be called upon to compete with vast tracts of land on which no settlers find a home.

No people ever before possessed so broad, rich and noble a patrimony as was placed in the hands of our American people. Millions on millions of acres of the most productive virgin soil — watered by the longest and deepest rivers, inclosing in their broad plains the purest and largest lakes, abounding in the grandest ranges of hills and mountains, crowned with the most valuable forests, the most abundant supply of coal and iron in almost every part of the land. Whilst from wells sunk deep down in the bosom of Mother Earth, lavish supplies of illuminating oil bubble forth by untold millions of gallons, enough to supply the light of the world. Gold, silver and precious stones lie upon the hillsides and in the valleys, on the plains or deep in the soil, only waiting the toil of the intelligent miner, to come forth with competence for the labor and wealth of the country. What people, ever, in all the history of the world, had such a patrimony? What people, ever, in all the history of the world, so wasted its magnificent birthright, the just inheritance of coming generations, as this people has?

Is it not time, high time, that these subsidies should cease — this wastefulness should end — and that the real farmers, cultivators of the soil, should speak out in unmistakable terms to save to the country its rural population, by saving the grand material patrimony which is theirs by right of citizenship, and to squelch out the ten thousand numerous projects that yearly flood our legislative halls, by which our national domain is being rapidly frittered away, and by which homes for the toiling millions that are swarming into our lands are being lost to those whose of right they should be? Nor is the disappearance of the smaller farmers and their families the only results that arise, in some measure at least, from those causes. The tenement-houses that once stood upon almost every well-appointed farm, and with its supply of strong and willing hands, largely supplemented the effective force upon the farm and in the farm-house, has, to a greater or less extent, disappeared from the face of the land. Improved farm machinery, propelled by steam, horse, mule or ox power, has so far taken the place of human strength and skill that the tenant no longer finds a steady, remunerative market for his labor. Nearly

all our most important crops find their way to market almost as soon as they leave the fields, and then the machine is housed and all superfluous help, by force of necessity, goes to seek other markets, or failing therein, continues to tramp in fruitless search of the lost home. The farmer himself goes forth to his daily labors seated on his sulky plow or cultivator, or riding on his mower or harvester, performing with ease and much better, the labor of nearly a score of men, furnished with the ancient implements of farming. And his crop is planted, raised, harvested and marketed with the aid of such machinery and of unskilled labor, and the burden does not fall with crushing force upon the farmer himself, and his side of the great problem of help is to some fair degree solved, though there is much even there that needs thought and study. But it is still more true, that the household branch of the farm labor question still remains unanswered, and imperiously demands our thoughtful attention. From day to day, year after year, the household drudgery goes on, grinding the life, slowly but surely, out of any woman who undertakes, single-handed and alone, to cope with the mighty task.

The tenant house, that once furnished a store of fresh young help for the farmers' kitchen, and a home for the hired man or men, and with it much of comfort and hope to the farmers' household, is very seldom found on the farm. The farm house has thus become a boarding house for farm help, and has added largely to the household labors and cares. Nor is this the only burden that has been doubled up on the good housewife's hands. in these later days, as the country grows older, the style of living changes in almost every respect, from the almost Spartan simplicity of our pioneer homes. Dwelling houses partake of the general improvement in all the appointments of the farm, and become more ample and pretentious in space, furniture and fixtures, and every additional room, however convenient and much needed, adds many cares to the housewife's duties. Books, papers and periodicals are sent all over the land, in such an abundant flood of cheap, elegant, useful and entertaining reading matter, that they find their way into every household of any standing, and are read and enjoyed at every well appointed fireside. The mis-

tress' mind in the family should never lack such intellectual food as those messengers of light and pleasure bring to every mind. For this some leisure from daily duties must be found. But says Old "Grad-grind," what is the use of all this? My dear sir, the pitcher that goeth often to the well will be broken. The bow that is always bent will lose its strength. The musical string that is ever strained to its utmost tension will lose its harmony, no human mind or body can live out half its days, in real, wholesome human life, that is compelled to endure this continuous and severe strain. Again, the social calls upon the household must be met to a still greater degree. No family ought ever to shut itself up in its own little domicile, surrrounded only by its own selfish sympathies, and feeling only its own narrow aspirations. The human heart must reach out to its fellows or shrivel up and die. It must ever look to its superiors for example and instruction; to its equals for mutual consultation, self development and improvement. And must never fail to bestow upon the less fortunate members of its community, those pleasant, cheering and useful influences and assistances, that come so welcome to the poor, the sick and the downcast, when bestowed in a generous and kindly manner from the hands and hearts of the more fortunate.

Nor should we ever forget the fact, or ridicule it, or grumble about it, that everything is tending to the creation of the beautiful; we see it all about us. In the equipage that turns out for the Sunday or holiday drive, in the tasteful finish of farm machinery, in the pictures that ornament our houses, in the tasteful papers that cover our walls, in the beautiful wares that deck the festive dinner or supper tables, in the bright carpets that cover our best room floors, and last, but not least, and by no means least worthy of our notice and approval, in the improved personal adornments of dress, and ornaments,—only from a sense of duty, and with great reluctance, do I approach this difficult subject of personal adornment, old as the hills but ever new. Respect and affection are the life of every true woman, and without that affectionate respect to which the home mother is entitled, family confidence and unity are shattered, if not utterly lost. Fudge! Humbug! growls old utilitarian, from behind his county

political paper, as he sits before his fire and feeds his intellect on the slang-whanging of his party organ, and chuckles over the probable triumph of his party at the next election, and the success of his party candidate for congress, coroner, or constable. Look at me, what do I care for fine clothes, gew-gaws? Don't I know just as much? Can't I labor just as effectively, raise just as large crops and get just as good bargains in buying and selling, as I could if I were decked out with all the finery of the tailor and jeweler? My dear sir, go back with me to a certain old homestead, of which you know full well, and take a careful look at a certain young man that you knew quite well some years ago, full of health and hope; with care he lays out the treasures of his wardrobe, shaves clean his downy chin, dons his best suit, carefully places his watch in his pocket and as carefully leaves his chain or guard in plain sight, puts the handkerchief into the breast pocket, leaving the corner to peep out and roguishly coquette with the girl of his heart, and as he feels himself ready to start, carefully surveys the landscape o'er from the top of his best plug hat to the sole of his well-blacked boots, and then, self satisfied, in happy satisfaction with himself and personal appearance, hies himself to the bowers of his beloved, confident of success.

Why did you put on all those "store clothes" and gew-gaws? Why did you not sally out in your present guise? Stand up here, sir, and let us take an account of your attractions. Stoga boots, well worn, not over clean and well perfumed, shoddy pants, picturesque and ornamented with much needle work, elegantly crammed into the tops of his boots, or hang airily on the boot straps; blue blouse and hickory shirt to match; a slouch hat that looks as though it was ready to sing "When this old hat was new," and all else in strict conformity. Now remove that venerable clay pipe from your mouth, stained and perfumed with many an ancient smoke, and tell us, had you gone in your present plight, do you think that pride and self respect would have gone with you, or confidence and love would have welcomed you? Not much! But you went in your best — and personal adornment was not "fudge" then — and at the door she met you, and

her neat and well clad figure ushered you into the best room, where neatness and beauty ruled; and to you every ornament had the air of her taste and skill, and the room fairly floated in the harmonious atmosphere of her beauty; and as you sat and "sparked" away into the "wee sma' hours," and talked of things past, present and future — especially future — was there one adornment on her fair form that you did not note or one that you would be willing to spare? Not one. The influence of those personal adornments, those polite and courteous attentions would be as much appreciated to-day, as when they were all called in play in those pleasant earlier days, and if practiced uniformly, would shed a brighter light of mature love and confidence over this dark work-day world than they then did. But some degree of leisure must be had for them; some degree of freedom from the unceasing strain of toil and care that marks the lives of half the farmers' wives in the land. It becomes us, as self-styled "lords of creation," to look carefully about us and find out some remedy for these ills, that, whilst they fall with the most crushing weight upon the companions of our lives, the mothers of our children, the light and comfort of our homes, still bear heavily upon the hearts of all true men. The question has been spoken upon and written about, but still remains practically unsettled. Relief for the over worked farmer's wife. She who, instead of being the happy mistress of her own home and family, is oftentimes but its weariest slave. The remedy consists in diminishing the great burden of ever recurring duties that mark the housewife's daily life from early Monday morning to late Saturday night.

The never-failing three substantial meals each day, the cooking, preparing, dish-washing and general cleaning, with little or no appliances to relieve the monotonous detail. The Monday's washing, the Tuesday's ironing, the bi-weekly bakings and general cookings, the tri-weekly churnings and butter-working, the daily sweeping and dusting, the hourly tidiness and setting in order, the regular weekly mendings and repairings, the oft recurring "stitch in time" for every member of the family, the knitting and netting, the making up, ripping out, remodeling and

making over, the care of the daily clothes, as well as the daily food of the household, the making of various new and necessary garments, with the care and planning of it all, so as to do the most with the least possible outlay, and to the best advantage. All these and *many*, very *many* other duties fill each moment of the housewife's busy life, scarcely saving the sacred hours of Sunday from the dreary round. Is it strange that our insane asylums are so often recruited from the ranks of farmers' wives? Is it at all wonderful that the silent grave so often receives the weary form, and that its eternal rest so often relieves the life-long strain? But what is proposed as a remedy? Gentlemen, I can only offer some crude suggestions for your consideration, relying upon your wisdom and thoughtfulness in arriving at a just conclusion:

1st. Let the comfortable and unpretending tenant house, wherever it is practicable, find a place on the farm, and let the farm help find a home and home-care in its shelter. It will encourage the farm help to permanency, reliability and to having a home of his own.

2d. Let the master of the farm see well to it that his own home is in good order, and well furnished with all conveniences for doing the house work. When he is buying his improved sulky-plow, cultivator, harvester or horse-rake, let him remember to investigate the improved churns, washing-machines, wringers and other labor-saving machines for the household. Water in abundance for both laundry and culinary purposes, ready within the walls of the kitchen and laundry, and only to be sought by the easy-working pump. A good system of drainage from kitchen and sinks, that shall safely and surely carry off all refuse water. A good cooking stove or range in its place, and a good wood-house, well stored with a year's supply of seasoned wood, prepared and stored up each winter for the coming year's use. Ample supply in larder and store-room for family use.

3d. The cheese factory has already relieved the house work of one continuous and heavy source of care and labor, and why should not the neighborhood creamery take the fresh new milk each day from the farmers around, and at trifling expense return gilt edged butter ready for market, thus taking away much of the terror of dairy farming?

4th. During the long, hot and busy summer months, the family baking and heavy cooking form a serious item of the daily burden of house keeping. Is it not worthy of thought and experiment whether a farm bakery, co-operative or otherwise, might not be organized to do this work, at a great saving of fuel and strength, and a slight individual expense, to quite a large circle of farmers?

5th. Let the best family sewing machine, well kept and always in order, ever stand ready to do its stitching duties, and co-operate with the family seamstress, who should find a place and labor quite often in almost every family, and never permit the family clock to point to the weary hours of 10, 11 or 12 at night, whilst the weary mistress sits at the work table making or mending the family wardrobe, and the lord of the household snores away his weariness in bed. And never fail, upon all extra occasions, to furnish in the house, as on the farm, extra help to perform the labor.

6th. The precept and example of the master of the house should impress upon the minds of all the family, that it is the duty of all permanent members of the household to assist in every possible way in performing all heavy and rough jobs, and discharging all those little duties about the house; of being helpful, of waiting upon themselves, of putting everything into its well-ordered and appointed place and putting in order at once all the little breakages in the establishment. No one who has never fairly tried it can conceive of how much comfort and aid comes to the housewife, by such little helps as those indicated above.

7th, and last, but by no means least, let the husband never fail of affording to his partner in life and joy and sorrows, those manifold and numerous little opportunities of getting away for a short time, if only for a day or for an hour, from the presence of the mountain of daily toil. He himself goes to the market and to the mill, to the postoffice and to the blacksmith shop, to the agricultural meeting, and to the political caucus and convention, to the auction or to the horse trot, and to a thousand and one other places, where he meets his fellows and talks over all the masculine gossip, which he of course calls news, and thus relieves himself from any monotonous tedium that may have gathered

around his home life, which is ever broader and more varied, as every out door life is, than the life of the house wife. Then let him see to it that she has as fair a chance, and let him not grumble and cry gossip if she desires to see the faces of her associates, and hear their voices, and talk over the feminine items of news.

Gentlemen, I am fully conscious that I have not been able to handle this subject as it deserves; that some of my suggestions may be impracticable, and some crude and ill-digested, but I only ask for them your candid consideration, and if there is anything here worth saving, take care of it, perfect it and put it into practice, supply my deficiencies by your own efforts. Study, think, act, offer your own ideas, try your own experiments, and finally report to us your results, your conclusions and your recommendations.

Whatever you may do, rest well assured that it is your own interest, as well as your own duty that calls upon you to act like true men, to grapple at once and boldly with this question, and to furnish for it some good practicable remedy.

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## TRANSPORTATION FROM THE NORTHWEST TO THE SEA-COAST.

BY HON. A. A. ARNOLD, GALESVILLE.

In all civilized countries, government is best maintained by the people thereof submitting quietly and peaceably to the author ized laws.

When, however, a state of things exists, showing that the laws are inefficient or that others are necessary to correct errors, it is the right and duty of the people to amend them or institute new laws based on such constitutional principles as shall seem most likely to warrant their prosperity, safety and happiness.

The people of these United States are the sovereigns, and each citizen forms an integral part of the sovereignty. To the extent of his personal interest and the interest necessitated by a due regard for the good of the whole, should he exercise the privilege he enjoys as such citizen sovereign.

As we are being educated in self-government this independence of thought and action is being developed, and it only requires a concentration or crystalization of public sentiment to the enactment and enforcement of laws.

The subject upon which the public mind seems now to be most properly exercised is the present hardship and future danger of allowing associated capital in the hands of monopolist corporations to continue their accumulations and exactions with the sole purpose of self-aggrandizement, regardless of the rights of the people from whom they have obtained their franchises, and to whom they are indebted for their entire profits.

Private citizens can hardly amass sufficient capital to become dangerous, but the danger of these is recognized in this and most of the states by the passage of laws, prohibiting the suspension of the absolute power of alienation for a longer period than the continuance of two lives in being at the creation of the estate.

Whereas, corporations never die and as in the case of railroads, all the stockholders and the employees from the president down to brakeman work for the interest of the company they represent, regardless of the rights of the people.

Monopolies are occasioned by reason of such fortunate circumstance or situation as enable persons to control the matter or commodity or are obtained by virtue of law. R. S., page 615, sec. 2039.

Either of these to a limited extent are subject to the people's control; but the last, those monopolies that are created by choice of the people, are the ones to which the public mind is doubtless next to turn its attention.

There is no mistaking the signs of the times, and whatever may be the result a change will be demanded, properly controlling concentrated capital. The one thing to which the people's attention is more directly turned at the present time is the growth and power of railroad corporations and to their utter disregard of individual rights, consulting no man save themselves, and no question other than policy for ultimate profits.

Through transportation to the sea coast is a question in which merchants, manufacturers, farmers and shippers all are interested,

and all, save some few that are directly interested in railroads, can and will unite to see to it that extortions for through freights are not long continued.

This is to be the next question at issue, and no party or individual of a party can ignore it.

If for the railroads, then to the railroads and their influence must they go for their votes; if for the people, then to the people and their influence for their votes. The oppression has become so great that unless there be a radical change by the railroad managers we may no longer expect to act in harmony, which is the normal condition; for where properly managed, both will act in unison; if not they must diverge, until one or the other controls and their rights are determined by law.

By the decision of two cases in the supreme court of the states of Iowa and Wisconsin some years since, the entire theory of corporate rights was changed, and the railroads of these states were transformed from public highways into mere private property. They were public property when they took our lands, and private corporations after they got them, and therefore exempt from legislative control, and on this basis did business until after the decision of the Granger cases. Since then they have to some extent recognized the common law principle of public control, but it has not affected materially railroad corporations extending through several states, as the principle could not be enforced except by the concerted action of the several state legislatures through which the roads run.

That the people may control the rates of tariff for freight and passengers is no longer a mooted question. The courts have lately, in every instance, decided in accordance with the old common law principle, that whenever a man or corporation undertakes to do business for the public, they are under the public control, and their rights are only such as are consistent with the interests of the people for whom they are doing business. In the decision of the case of Munn vs. State of Illinois, found in United States Reports, vol. 94, page 113, this principle was held. The court said: "Under the power inherent in every sovereignty, a government may regulate the conduct of its citizens toward each other,

and when necessary for the public good, the manner in which he shall use his own property." It also said: "When the owner of property devotes it to a use in which the public has an interest, he in effect grants to the public an interest in such use, and must, to the extent of that interest, submit to be controlled by the public, for the common good, so long as he maintains the use." The same principle was advanced by the court in the decision of Peck vs. Chicago and Northwestern Railroad Company, and in case of Lawrence vs. The Same, United States Reports, vol. 94, page 165. The court said: "When property has been clothed with a public interest, the legislature may fix a limit to that, which shall be reasonable for its use." In these cases and in the Granger cases, the principle of the public being interested in the use, the public have the reserved right to fix a limit or a maximum rate for use. In fact the railroads are in the hands of public sentiment, and if these corporations take more than reasonable rates and thereby make exorbitant profits, public sentiment is aroused. Likewise, when unjust discriminations are made, or tariffs are raised with no apparent necessity for the same, as has been the case in many instances, and at times when the profits were the greatest, by reason of the increased business, showing that it has been done as a pure matter of greed, taking advantage of the people's necessities. The power to make or unmake individuals, to build up or destroy railroad points, all tend to make the people jealous, and reform in railroad management is demanded. Since these latter decisions, it is contended by railroad men that they must do business on business principles, and that contemplates their taking advantage of the people's necessities and their geographical advantages.

To a limited extent this is true, as regards local rates, but this must not maintain to the same extent for through freights, else the entire public is at the mercy of railroads, and they may, without restraint levy a tax of millions on our people year after year upon their own ipse dixit, as has been shown by the raise in freights the past fall, and every other fall, at the close of navigation, when the roads are crowded and often every available car employed.

Pooling of earnings, consolidation and combination of roads destroy competition, so that the argument of competition regulat-

ing this matter as in other branches of industry does not apply. Otherwise than being a greater carrying capacity the country is no better off than if it had but one road to any given point.

What we want is some legislation to checkmate this arrangement so that to the extent of a healthy competition, they will be obliged to do business on ordinary business principles having some regard for justice toward all alike. The people of any community are no better off with numerous persons employed in various enterprises than with one running the whole, if all unite and agree on fixed prices; the same of railroads, if they are all agreed, and can enforce rates fixed solely by these railroad interests. They may plot in secret, no man can without law prevent. They may determine on any course, and never submit to public observation nor to the contingency of an election, and thus a power greater than this government may come to be exercised by a few whose interests are entirely antagonistic to the people without even their knowledge or consent.

The power of organizations upon our popular elections is exemplified by the evidence given before the New York legislative committee, wherein a prominent railroad man truthfully testifies that in securing men in the interests of the railroads, they thought it cheaper and safer to pick their man and then work up the caucuses and elections. In democratic districts they were democrats and in republican districts republicans, but in every place railroad men.

When railroad men accumulate their millions in a few years, railroad employees command higher salaries than men of their abilities in any other pursuit; railroad passes are free for any man that is deemed useful to advance the interests of the roads, or to conciliate the influential that may be deemed antagonistic to their schemes.

When all the ingenuity of their officials is taxed to show a large investment and small net returns, it is high time the people unite to elect men that are brave enough to stand between the railroads and the people and see that justice be done between the parties. The railroads have obtained no advantage in the courts.

Nothing has been lost to the people in the way of law; it is only

for the lack of laws. Railroads have no more legal rights than they had years ago before their pernicious influence was felt, still the extortion is continued from year to year and the hands of the people more securely tied.

While we have comparatively but little complaint to make as regards railroads in our own state, less discriminations should be allowed, and the passenger rates should be reduced on main lines as soon as may be, to two cents per mile, and I believe by the increased travel, in a short time, would yield as large returns to the roads as the present rates, thus giving poor people a chance to travel by rail, of which luxury they are now, by reason of the high rates, mostly debarred. At least, there is no sense of the three cent round trip tickets, thus discommoding the public to accommodate distinct lines of road.

There is but one course left for the public, and that is to legislate and contol this matter as far as may be necessary, having in mind the welfare of the people, and justice to the roads, on which I, for one, would be the last to make an unjust warfare.

The advantages of good, well-conducted railroads, are well appreciated by the people, but the idea that if we don't like to ship over their lines, we can take our little load of wheat and haul it to Chicago or Milwaukee, is getting old. All intelligent people know that private property is condemned to railroad use for the good of the public; the public has the same interest and right of use as they have of the wagon-road, which is taken for the public in about the same manner and under the same common law principle. The railroads or the people can neither get more advantages from the courts; all that is left is by legislation. That something should be done by the United States government to remedy the existing evils, no sane man can doubt. Perhaps some railroad men feel it themselves, but for self-protection, under the pressure of other combinations, are forced into the combinations themselves. Be this as it may, the fact remains that national control is demanded, for states can control only such lines as are within their borders.

Congress has the undoubted constitutional right to regulate commerce between the states and foreign nations.

Chief Justice Story commenting on this provision of the constitution, says: "It is a power vital to the prosperity of the Union, and without it the government would scarcely deserve the name of a national government, and would sink alike into discredit and imbecility. It would stand as a mere shadow of sovereignty to mock our hopes, and involve us in a common ruin." Legislators, as a rule, represent their constituents in all matters in which the people are agreed. There is greater danger of the people electing men whose interests are not in common with them, or that do not believe as their constituents, than in their being bought up after they are elected.

All recognize this truth, therefore the strife to elect certain men as against certain other men, when perhaps all are honest. If the half dozen railroad men in the United States are determined on continuing their robbery of the people, their only resort left is to pack the state and national legislatures with railroad men and thus prevent the passage of any law abridging their self assumed privileges.

Whatever may be their intent, congress should be devising some method whereby the people may have a voice in fixing rates; otherwise these corporations instituted by the people are the sovereigns and not the people. Whether by fixing maximum rates from objective points to certain rates per mile on all through freight or by building or purchasing a through line to the sea coast would perhaps be presumptive to suggest; but I believe that both these things should be done as soon as possible, both having in their respective capacity a tendency to effect the desired end, to wit: reasonable rates for through freights. The patronage of the government on a government railroad would be argued as an evil; the same may be said of the postoffice department, but the same necessity for each, outweighs the objections. Cheap rates for through freights ultimately mean good prices for certain manufactured articles where most of the manufacturing is done. So also it insures more profits to western farmers for our surplus productions.

Of the productions of this country only ten per cent. is exported, showing that the farmers and shippers of the west are in-

terested in cheap through freights, but little being consumed by western manufacturers, and it is not antagonistic to the interests of the eastern farmers, as the only articles that at present pay them to raise are such as are generally consumed at home in their large cities and manufactories. Likewise the eastern manufacturer is interested in cheap freights for his western bound articles, they not being brought in competition to any extent with western manufactured articles. Consumption within the United States disposes of the balance of our productions but of the ten per cent. exported, a large proportion comes from the west and in no way affects eastern productions.

The total export value from the U. S. for the year 1879 was $717,093,777, of which $604,156,492 were agricultural products, eighty-four per cent. of the whole amount. Of this it is fair to assume that as much as sixty per cent. comes from west of Chicago, thus giving us an income for products west of Chicago, on products sold in foreign markets, of $362,433,952. Supposing every dollar of this represents one bushel of wheat in Chicago, bound for a foreign market, and the railroads charge five cents per bushel too much for freight one half of the year, and that the railroads carry one-half of the freight, and water lines the other half, then the producers are out of pocket, and it is in the pockets of the railroad men — just five per cent. of one fourth of this $362,433,952, which is $4,511,183. Now if this $604,156,492 is only ten per cent. of our gross productions, it is fair to presume that the $4,511,183 is not to exceed one-tenth of this five cent unjust railroad tariff on our western productions west of Chicago, amounting in all, during each year, on the lines to the sea coast or thereabouts, to $45,111,830 on eastern bound agricultural freight, whatever may be true on other freight east and west, and for passengers both ways. I assume also, without figures, that when the profits on the best lines are from fifteen to twenty-five per cent. on investment, and fifty per cent. on gross receipts by their own figures, it is more than a fair revenue, and an imposition on the people. Take the state of Wisconsin; in 1879 we raised 20,565,720 bushels of wheat. If one-half of this was shipped by water and one-half by rail, at the figuring before stated, with the

unjust raise of five cents per bushel for one-half the year, there would be a loss on this production alone, to the farmers of this state of the snug little sum of $128,535, and to each farmer that sells one thousand bushels of wheat, a loss of $12.50, and if he sold in winter, a loss of $50.

In 1874 the United States Senate appointed a special committee, consisting of senators William Windom, John Sherman, Roscoe Conkling, H. G. Davis, of West Virginia, T. M. Norwood, of Georgia, J. W. Johnston, of Virginia, John H. Mitchell, of Oregon and S. B. Conover, of Florida, to investigate the subject. The committee devoted several months to the matter and examined it thoroughly. They reported as follows:

"I. That the powers of congress, whatever they may be, are derived directly from the people of the several states, and not from the states themselves.

"II. That every important word in the clauses which confer the 'power to regulate commerce among the several states,' and to 'make all laws which shall be necessary for carrying it into execution,' has received legislative, executive and judicial construction, and under such construction, the power of congress to regulate inter-state transportation by railroads, and to aid and facilitate commerce, is clearly established.

"III. That in the exercise of this power congress is authorized, under the grant of auxiliary power, to employ such means as are appropriate and plainly adapted to their execution.

"IV. That in the selection of means by which inter-state commerce shall be regulated, congress may—

"1. Prescribe the rules by which the instruments, vehicles and agents engaged in transporting commodities from one state into or through another shall be governed, whether such transportation is by land or water.

"2. That it may appropriate money for the construction of railways or canals, when the same shall be necessary for the regulation of commerce.

"3. That it may incorporate a company with authority to construct them.

"4. That it may exercise the right of eminent domain within a

state in order to provide for the construction of such railways and canals; or,

"5. It may, in the exercise of the right of eminent domain, take for the public use, paying just compensation therefor, any existing railway or canal owned by private persons or corporations."

As I have before stated there is no longer any doubt as to the power of supervision by the government to regulate inter-state commerce, advisability and expediency being the only questions that need now be considered. If advisable and expedient as seems to be the almost unanimous sentiment of the business and productive elements of our country, we should not longer hesitate, but make if necessary, an issue on this proposition and force the political parties into an active co-operation, and elect men of all parties on this platform, or else if need be make the distinct issue outside of all present party organizations. The danger of consolidated capital to the future welfare of our republic, really outweighs all present inconvenience, but the present evil is so apparent that it seems to me, no good citizen can be indifferent to the results.

A few weeks since the telegraph lines of these United States were consolidated in the hands of J. Gould, and Gould has lately sent his agent to the Mississippi Valley with a majority of stock to vote at a meeting of stockholders of the upper main water line to the gulf.

The Chicago & Northwestern and the Milwaukee and St. Paul control most of the northwestern railroad lines.

Vanderbilt, Gould, Scott and a few others own the eastern lines and dictate to those west, while the Southern and Central Pacific control the Pacific coast lines.

All the smaller lines are dependent on the larger and to a greater or less extent, the water lines, and these on the will of a few individuals that hold a controlling interest in the stock of the heavy lines.

Freight and passenger tariffs are held just as high as the trade will warrant (not as low as possible and pay fair percentage on cost as it should be) with now and then a let up in the shape

of a sham fight between roads, just enough to blind and propitiate the people.

Their very usefulness makes them the more easily our masters. They stretch from the most densely populated parts of our Union to the unfrequented wilds of the forests and to the boundless, homeless prairie beyond civilization, thus dictating settlement and fixing commercial points more certainly than geographical position or nature's water routes.

Great are their benefactions and equally great their exactions. Great is their power, and ready are they to make it felt. Wise men of all parties have warned us of the danger of their power, if unrestrained.

It is wiser to forsee an evil and take steps to avert it, than to pass on heedless of results until these iron cords shall have strangled from the body politic, all vital principles and powers of a free people.

DISCUSSION.

W. W. Field, Madison — I see that the Hon. I. C. Sloan is in this Assembly, and I have no doubt this entire convention would be glad to hear from him upon this question. I call upon Mr. Sloan.

Hon. I. C. Sloan, Madison — Mr. President and Gentlemen: This subject of transportation by railroads, and the charges which were made at one time, engaged my attention to a considerable extent, but it is some years since I have bestowed much thought upon it. It is a subject that no one should attempt to discuss without a good deal of thought and a good deal of investigation.

In regard to the paper which has been read here, the statements it contained are entirely correct in regard to the condition of the law upon the subject of railroad transportation. The supreme court of the United States, in the cases that were referred to in that paper, have settled, and I think settled effectually and finally, the full power of control not only of the state legislatures but of congress over this whole subject. They have held in substance that railways are public highways; that the business of transporting passengers and freight upon them is public business — that is,

that they are common carriers while engaged in that business, and the business being public in its character, it is subject to the full, entire and complete control of the legislature.

So that if the people of this state or any other state, or the people of the whole country suffer any wrong, any oppression, any extortion in regard to the amount of contribution which these railroad companies levy upon the products of the country, both agricultural and mechanical, they have only themselves to blame for the injustice which they suffer in that regard.

There was one statement in that paper which I confess somewhat surprised me, and that was that there was no cause or very little cause, to complain of the management and charges of the railroad companies in this state. I had supposed the fact was different; and yet, as I have said, I have not made recently such an investigation that I can state with any authority; but I know there have been times — very considerable periods of time — in the past, when it cost more to transport a bushel or a hundred pounds of wheat or any other grain for a distance of one hundred miles from the interior of this state to the lake shore, than it cost to carry the same quantity a thousand miles from the lake shore to the seaboard.

Mr. Field — By the same mode of conveyance.

Mr. Sloan — By the same, by rail, and, I believe, notwithstanding the increased rates which are complained of for carrying from the lake shore to the seaboard now; that the farmers are today charged as much to carry a hundred pounds of wheat from any railroad station in this county to Milwaukee or Chicago, as is charged to transport that same amount of grain to New York, Philadelphia or Baltimore. Possibly it is not so now. Some gentleman present may know what the tariff is now upon a hundred pounds of grain from this city to Chicago or Milwaukee, and what the freight is from Chicago to New York, but I am very well persuaded that the difference will not be found very great, while the distance of carrying is ten times farther.

There is competition from the lake shore to the seaboard, at least for six months in the year from the water channels, which prevents during that period, at all events, very exorbitant rates.

And there is also some competition between the three, four or five lines of road running from Chicago to the seaboard cities. Of course the tendency of all such companies is to combine and thus prevent all competition.

My idea upon this subject, expressed in a crude way, is this: The law is entirely ample and full to furnish a remedy for any injustice, as I have said. That is true, but it is the policy, which is steadily pursued by these railroad companies, to corrupt the law at its source. The representatives of the people, who are the law-makers, are in various ways subjected to such influences, that it is almost impossible to obtain a fair representation, or the expression of public sentiment upon this subject in the enactment of our laws.

That idea was illustrated more fully to my mind in our own state, than anywhere else, by what occurred seven or eight years ago. We had in this state a failure, or a partial failure of crops for two or three years previous to 1872. In 1872 we had a pretty bountiful crop of grain. It excited the avarice of the managers of the railroads in this state. Russell Sage then had supreme control of the Milwauke & St. Paul railway company, and it is to be observed that the control of these corporations usually falls into the hands of one energetic, strong-minded, pushing man.

Mr. Sage, sitting in his office in Wall street, sent out an order to the local officials of that company, directing them to increase the price of freight upon all kinds of grain, twelve and one-half per cent.; that was done at the close of the harvest in that year. It was claimed, and I think truthfully at the time, that that order was issued by Mr. Sage against the protest of Mr. Mitchell — who then occupied a subordinate position in that company — and others among the local managers of the company, but Mr. Sage persisted in that policy, for the St. Paul company, and of course the Chicago and Northwestern company immediately raised its rates the same amount. That change in rates thus made took out of the pockets of the farmers of this state, it is said, and I think I have it upon good authority, eight hundred thousand dollars in ninety days. The freights were then in 1872, before the increase, confessedly high enough. The companies

have been satisfied with them ever since 1875, but the grand blunder which the railroad companies made that year and which has never been repeated since, and never probably will be repeated again, was that they thought they could get along during the session of 1873 following this increase of rates, without furnishing to the members of our legislature free passes to ride upon the railroads. They withheld these passes and then the cauldron began to boil and bubble. They finally sent members of the legislature, as I am credibly informed, session passes, but the members had then got into such a state of virtuous indignation at not receiving annual passes, that they rejected with indignation the limited and smaller favor of session passes, as annual passes had been before given to members of the legislature. The result was that the Potter law, so called, was enacted, and the law was passed prohibiting the giving of free passes to members of the legislature or to any of the officers of the state government.

That law was maintained with considerable vigor and kept in force for a time, but in a year or two it was substantially repealed, and from that time to this, the railroad companies have taken from the people of this state by way of tolls just as much of their means and substance as they have chosen to take.

Last winter a somewhat startling act of legislation was passed. It does not perhaps attract the attention of the people of the state as some other measures might, because they are not all interested in its effect. It has been the policy of a large number of the states of the Union to enact laws by which employees of railroad companies could recover for injuries received through the negligence of their co-employees. A large number of states within a few years have passed such laws, and within the last two years England, following the example of American legislation, has also passed the same law. Last winter that law was repealed by the legislature of this state, and so far as I observed, without a single member rising in his place and offering any opposition to its repeal.

That law has been regarded generally as an act of justice to the employees engaged in a hazardous employment. Now I merely refer to that to show the control which these companies exercise over

our legislature, and to show that this subject is one which should engage the serious, thoughtful attention, not only of the people of this state but of the whole country. It is well known and not denied that the railroads represent in capital, taking their stock and bonds and all classes of obligations, probably more than three times the amount for which they can now be built and put in operation; and yet they exact from the people of this country sufficient means to pay full interest upon all this enormous watered capital. Competition in other kinds of business has free scope; the interest on money itself is falling to a low point. The earnings and profits of these railroad companies are filling their treasuries to overflowing, and every man engaged in their management, who is a man of energy and enterprise and thrift, becomes so rich that he becomes almost dangerous from the power of the money which he holds in a republican government, where equality of the people is the fundamental idea.

I have said much more upon this subject than I intended to say. It is for an intelligent people to ascertain and investigate to see whether the charge should not be lowered.

Now no injustice can be done to the railroad companies in this regard without its being also an injustice to the people.

Transportation by these companies of persons and property is a primary necessity. It is something without which the diversified business of this country cannot be carried on. It is for the interest of the people to have them make sufficient charges to keep these great highways in an efficient working condition and pay a fair percentage upon the investment representing the actual cost of the property, but when they go beyond that through combinations or through — I don't like to use the word monopoly in relation to a corporation — I don't think there is any argument in the word, and corporations are so common that we do not think a corporation has any evil elements, merely because it is a corporation,— but there is this about these railroad companies that it is impossible to establish competition with them. We are not at liberty to say: Carry our property at such prices as are just or we wont't have it carried at all.

The entire agricultural products of this state after supplying

the home demand would rot in the granaries of the producers, if they could not be transported upon these railroads to distant markets, therefore in this case they are a perfect monopoly.

After the home consumption and the home demand is supplied, the people are in the power of these carrying corporations, for the surplus must be carried on their railroads or it is worthless, and it is that very fact that has led our courts to establish this power of control on the part of the people, otherwise they could ruin and destroy the industry of this state and of every other state. When they say, "We own this property, our money has built these roads and you have no more right to interfere with our charges than you have to regulate the amount which a farmer shall charge for a bushel of wheat, or a mechanic shall charge for making a wagon," it is a fallacy that will not bear investigation a moment, for the reasons which I have glanced at. Therefore, a just control is right and proper. It is no invasion of property rights, it is no invasion of the rights of the persons who own stock or control these railroads.

The only point is to get at a standard which is just. Give them what they are fairly entitled to, but restrain them — limit them from taking more, because when they take more they take it unjustly. If they take more than a fair remuneration for the services they perform, it is an oppression and injustice. I will not call it by a harder name, but it is certainly that, and therefore there is a moral and legal right, as there is full power to restrain them from doing it. But the moment this subject is started in the legislature, a dozen members in both houses will rise up in the interest of these corporations and claim that it is an intricate and mysterious subject, this regulating of the freights and charges of these railroads, so as to produce any sort of just relation between the producers and the carriers, and therefore men who have not studied into these matters have no right to deal with it.

It is the simplest matter in the world: they have established a list of charges and they are relatively just — I mean comparatively just; compared one article with another. If they are taking from the people twenty per cent. more than is fair, all the legislatare need to do is to pass an act, as we have a

law now limiting them to their own tariff of charges of 1872, saying that they shall not charge within twenty per cent. of the amount of the charges written down in that tariff of 1872, and that accomplishes it, and saves to the transporters of property twenty per cent of the amount to be paid. It is a very simple matter. If farmers and physicians, and mechanics and lawyers were compelled to make a new tariff for these railroads and establish a just relation of charges in regard to all the various articles that are transported, and the difference between those that are carried by parcels and those that are carried by car loads, it would be a work which they would be found entirely incompetent to perform.

This relation between these charges has gradually grown up, and the experience of the companies themselves has settled down upon them. It is true they occasionally break over and charge upon some particular article more than is just in relation to others, but on the whole their tariff of charges is just enough, and fixing the tariff according to their own charges, no injustice would be done if they were lowered to such a point only, as would give them a fair income upon the capital which is invested. [Applause.]

W. H. Chandler, Sun Prairie — Mr. President, I would like to argue that question, and perhaps I ought to preface my argument by a statement or two.

In the paper read by Mr. Arnold I understood him to quote from the report made by the committee appointed by the United States Senate to investigate this question, in which they set forth with clearness and precision, just what the authority of the United States government was in this matter. It consisted of three points: First. They might declare the manner in which the implements used for the purpose of transportation should be used. Secondly. They might, in the line of eminent domain, take possession of any road that ran through several states, for the purpose of public transportation. Thirdly. They might incorporate a company and build a new road.

Now, Mr. Sloan says that if we suffer, it is because we neglect to use the power that we have, and the various decisions that have

been quoted seem to substantiate that to this extent: that the states which have granted these acts of incorporation have full power within their territory, to regulate this whole matter of charges for transportation.

Now, the question that I want to ask is — and I ask it because there is a very general and strong attempt being made to focus the public attention of the farming community upon this matter of transportation to the seaboard and through several states — I say I ask this question because there is an attempt being made to organize farmers in an attempt to secure a certain kind of legislation by congress — whether this question of the right of congress to prescribe rates of tariff over these roads running through several states is well defined or is it entirely problematical?

Certainly it was not enumerated in these provisions which the senate committee established and represented as being recognized by judicial and legislative and executive construction.

Now, I would like Mr. Sloan to tell me, whether there are decisions, or whether there is a principle underlying this thing, that will warrant us in believing that this present attempt to secure legislation by congress that shall regulate absolutely the tariff of these roads running through several states, as we regulate them in our own state, and as other states do, is legal.

Mr. Sloan — Mr. President. There is no decision, as I understand, and as I am quite sure of the supreme court of the United States or any other court, deciding in terms that congress has the power to regulate charges for freight or passengers passing from one state to another, for the reason that congress has never yet attempted to exercise that power by legislation, and therefore no case could be made which would call upon the courts to decide that point, but in the Granger cases, the supreme court of the United States placed their decision upon the common law doctrine.

We have in our state a reserved power in the constitution, authorizing the legislature to alter or amend, or annul the charter of any corporation.

Through that reserved power there could be no doubt that this state might limit those charges, but the doubt was, whether in

those states where no such power was reserved — Minnesota was one of those states — they could limit the charges.

The supreme court of the United States decided that it was a common law power. It had been exercised in England, from the earliest judicial history of that country, down to 1827, there were laws of parliament limiting and regulating the charges of every carrier. Every man who drove a cart, or a van, or a wagon, or a coach for carrying freight, — limiting and regulating the charges which he might take.

There was a similar law regulating the charges for carrying on the river Thames.

The supreme court of the United States held that that power, that legislative right, which had been so long exercised in England, was imported into this country with the common law of England, which is the ground work of our law.

Now the question in regard to our legislation upon this subject was, whether the Potter law, so called, applied or had a right to be applied to freight which passed across our state line, either coming into the state or going out of the state, constituting a part of what is known as inter-state commerce in this country, for the reason that the constitution of the United States gives congress the exclusive right to regulate commerce between states, the question was, whether that power as applied to freight passing from one state to another, was not wholly a congressional power, and not to be exercised by any state. From the fear that it might be so held, those who framed the Potter law, excepted freights that passed to or from our state into other states, but there is no doubt whatever, as I understand it, among lawyers. I have never heard a doubt expressed, that congress has full and plenary power in relation to all freights that pass from one state to another, going or coming — full and plenary power to regulate the charges at such sums as they please, while each state has the same full power to regulate the charges upon freights which originate and terminate in its own territory.

W. W. Field, Madison — I will simply say a word upon this subject. I have been very much interested in the papers which have been read, and have been especially interested in the discussion

which has ensued. I have gained much information as I trust others have in this convention upon this subject. It is a very important one, and becoming more and more important each and every year.

Now sir, it seems from the paper itself, from the decision of the court, from the remarks of Mr. Sloan who I knew was thoroughly posted upon this subject, that if the people have a right to complain and do complain, they have no one to blame but themselves. It is as entirely within their power to correct this abuse, if it is an abuse, as it is to correct any and all other abuses.

It can be done at the ballot box. It can be done by public sentiment. Public sentiment is all powerful. I do not believe there is a single member who stands up in Congress to-day, but what — if he is elected upon this issue or upon any other issue, and feels that he is absolutely instructed by his constituents to investigate and to vote upon these questions as he believes to be for their interest — will do it; and he will do it, gentlemen, regardless of any influence which these railroad men may bring to bear upon him. It is public sentiment; it is the men at home that he depends upon to send him there again; it is the men at home that he relies upon and is backed up by in all the public positions which he occupies, and I assure you it is all powerful.

I know something of what it is in a small way myself, as many of you gentlemen do. All we have to do is to fully investigate this question, satisfy ourselves that there is a wrong and apply the remedy in the proper place. Now I don't wish to abuse these men, and call them thieves and robbers and pirates. Why, gentlemen, any one of us would do just as they do, placed in the same positions, precisely. I am free to confess that what little property I have raised upon my farm this season, I would be very glad, by some manipulation that is honorable, to increase the price of it twenty, thirty or forty per cent. I don't blame these men for putting these charges upon us, if we, as citizens, when we have the remedy in our hands, will not apply it. I do not blame my friend, Mr. Sloan, or any other gentleman on the floor, for loaning money at twenty per cent., if they can get it; but I blame this state and this Union for allowing them to do it. That is all.

Now I think we have learned more upon this subject. I know I have, this evening, from those papers and the remarks which have been made, than I ever knew about it before. Now let us take it home and consider it, investigate it, talk to our neighbors in relation to it, and if there are wrongs, let us go to work at the proper place and right them.

J. N. Ames, Oregon — Mr. President and Gentlemen: Would it not be well to investigate the thing a little and see that our legislators don't ride on railroad passes. I think that is one of the greatest evils we have to encounter, because, when a man accepts the gift of an individual as I look at it, he has got to remunerate him for it.

There was a lady visiting at my house within a year past. She was thinking of going to Iowa. I presume all these men understand this, but there are some of our men at home in the country that don't. I asked her what it cost to go to that point in Iowa. She told me, but, she says, " my son son went for nothing." He had been a member of the legislature the winter before, and they were not paying him for services that he was to perform, but for what he had already done.

Now I hold that we should look at these things more than we do.

Clinton Babbitt, Beloit — Mr. President: There is one idea in Mr. Field's remarks that it seems to me we ought all to think of.

He says that whoever we send to congress or to the legislature will surely carry out the wishes of those that send them there; and that is the very devil that lies under this thing.

Now, who does send our representatives to congress and our senators. That is the question. Who nominates them, who elects them. That is the point, gentlemen.

You can sit here like Stoughton bottles all night, and it won't do you any good unless you can answer that question. Jay Gould has been honest enough to answer it. He says that they pick out their men; that when he is in a republican district, he is a republican; when he is in a democratic district, he is a democrat; but always and on all occasions, he is an Erie man. Now, gentlemen, farmers, if you are willing to be Jay Gould and Erie men, be so! If you see fit to assert your independence and be farmers

and work for farmers, and labor with farmers, and not be so cussed jealous of an honest farmer, then you are all right and have a right to speak in a convention of farmers.

J. N. Ames — Would it not be well for this convention to pass resolutions requesting our legislature to pass a law that no man should hold a position under this state government that was found riding on a railroad pass?

A. A. Arnold, Galesville — I presume if we investigated that matter, we would find railroad passes in the pockets of most all the legislators we have in the state, and perhaps most of the legislators we have in the United States.

Mr. Sloan referred to my paper in this regard. The paper was on through transportation, and not necessarily interfering particularly with the Wisconsin railroads. I said we had but little complaint to make of our railroads, comparatively. They are well managed in this state; not a man killed on the railroads in this state this year. The charges perhaps are high; the ministers are riding on half-fare passes, and they are but little troubled; and the legislators also; but the main thing I desired to embrace in this paper was this:

Law is a rule of action; law is the result of crystalized public sentiment, also, and we may have no law, but if we have, it amounts to no law; it cannot be enforced unless by virtue of this crystalized public sentiment, and for this reason I dwelt upon the subject in the informal, incomplete way in which I handled the matter in my paper.

Being only a farmer, of course I should not be posted on this question as a railroad man would be. I am not capable of handling it, but I believe the law is plain, and every man that reads can read as he runs, almost, and understand it.

H. Robbins, Platteville — These papers are so excellent I don't see anything to pitch into, and I am never happy unless there is something to pitch into.

I wish to make a remark in regard to the owners of these roads. They have common stock that has no interest in the roads. A man that has common stock has no interest in the road. The common stock costs hardly anything. The man that owns pre-

ferred stock has been paid two or three times over. Now the question is, what monied interest, in money, have the men that are controlling these roads? That is the question.

There is a road of only two miles in length which I have investigated some. That is a very short road. Their capi al stock is a hundred thousand dollars, and they have been running it four or five years. They receive at any rate over fifty thousand dollars a year gross earnings and the net earnings are some twenty-five thousand dollars. Now I would like to know what interest those men have that built that road. A monied interest. Haven't the public paid for that road more than once? Now wou'd it do any injustice, providing you should lower the freight or increase the taxes?

Taxes don't amount to anything, only about a thousand dollars on a hundred thousand,—a little over a thousand dollars a year is all they pay. Last year one thousand and eight dollars, I think, on one hundred thousand dollars in this state. Now look over the roads in Wisconsin and you will find that that is about a fair sample. You will find that the men who are controlling these roads have no interest in them. The bonds on the road have an absolute interest in the road as far as bonds go, but the common stock did not cost anything, and my friend Mr. Field knows very well that when we were in the legislature, there was a bill got through allowing the stock of certain corporations to vote, and that that stock cost not to exceed five cents on the dollar, and they cleaned out one railroad company entirely. Why? Because the common stock was allowed to vote, and a gentleman of this city paid five thousand dollars to get that bill through the legislature, and I voted for it and did not know it. (Laughter.) It is a fact. That is the way our legislation was done some years ago.

I have been looking over the report of the commissioner and I got some wonderful information from that report. I would like to have some of you look it over.

I find that there are counties, and one in particular, in the state of Wisconsin that takes more out of the treasury every year than it puts into it. Why? On account of a bill that was got through

here year before last. It is an unconstitutional bill. There is not a lawyer in this state, I will bet, who will examine that law, but what will say it is unconstitutional. It provided on account of ten years' exemptions that it shall pay five per cent. on gross earnings, and where is that to go to? It is to go to the counties where the land lies. One of those counties got last year two thousand dollars, and their whole state tax was only a little over one thousand. Now I want you to look into it and see the kind of legislation they are getting here now.

Men can get — I do not care what kind of legislation they want — they can get it. If they can't get it in one shape, they can get it in another. That is all I have to say on this subject.

These papers suit me, so I am not going to pitch into them, but I want you to investigate a little further and see how our railroads in Wisconsin are managed. That road I have reference to runs across the Wisconsin river. It is the McGregor road. Examine it thoroughly and you will find that their capital stock is a hundred thousand dollars! Their gross earnings last year were fifty thousand dollars; their net earnings twenty-five thousand dollars, and what interest have they now in that road when the public have paid for it twice over? That is the question I ask.

R. P. Main, Oregon — The railroad system has been so recently introduced into the United States that the true relation between these corporations and the people is not generally understood. Our courts of last resort, with the high courts of all nations, have declared railroads public highways, and those who operate them common carriers. But these decisions have escaped the notice of the masses entirely.

The venal and unscrupulous class of men who have engaged in these railroad enterprises, seeing themselves far in advance of public sentiment, have resorted to every means known to base humanity to accumulate fabulous fortunes for the few, at the expense of the many. Through their pass system, these corporations have bribed all our officials, from the president of the United States to the lowest half-breed who represents an assembly district on our frontier. They use almost the entire newspaper press to whitewash and pettifog their unholy and murderous acts. They have

hushed the voice of our religious press, and closed the mouths of our preachers of the gospel, so that they violate the Sabbath by running their freight trains on Sunday, without a protest from those holy men who stand upon the walls of Zion to protect the religion of Jesus Christ.

Last November when it was discovered that navigation on our lakes would close several weeks sooner than usual, and that a large amount of wheat was in the hands of the producers, a few of our railroad kings met and agreed to raise the freight from Chicago to the seaboard five cents per hundred pounds. While these companies were making millions more than they had ever in one year made before, they still made this addition, which reduces the value of the crop to the producers $42,000,000. For this outrage no excuse is offered except that the traffic will breast it. This transportation question is a question great and overshadowing, but under the manipulation of these corporations, it becomes a monster of frightful mien, of giant proportions. But this beast must be met and throttled, or our government, which was intended to be an asylum for the oppressed of all nations, will soon become a procurer for the rich and a machine to grind the laborer to earth and make him a starving beggar. These roads were built under that clause of our constitution which allows private property to be taken for public use by paying the owner thereof a just compensation. By some unexplained process, unknown to law or lawyers, this public property has all of a sudden become the private property of these corporations, to be used to crush production in every way the evil heart can devise or base man dare execute. Farmers, I call on you to assert your rights, for it is truly said, I believe, that "God made the world and the Devil made the cities," and these cities, true to the instincts of their great founder, live and riot upon contributions wrung from your toil.

Among all nations the agriculturists are the great patriarchs of the human family, and their sons and daughters must teach the rising generations to love and prize freedom, or despotism reigns and liberty perishes.

To day the Goddess of Liberty in these United States, with

uplifted hands, stands upon the brink of destruction, appealing to the tillers of the soil for assistance and protection from her great imperial foe.

Sons of freedom, will you heed her signal of distress and rush to the rescue of the noblest government ever by man established?

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TUESDAY, February 1, 1881.

Convention met at 9 o'clock A. M.

President Fratt in the chair, who introduced to the convention J. C. Arthur, a teacher at the State University, who spoke as follows:

*Gentlemen* — If you should take an infusion of hay or any such substance, and put a drop of it under the microscope, what you would see in the greatest abundance would be the common forms of bacteria. Under the microscope they look like little luminous dots. Hog cholera and some of those diseases are due to bacteria. They multiply by cutting themselves in two in the middle, and to such an extent as to produce fever, inflammation and finally to kill the animal. They are so light that they float in the air quite readily, and more than that, they produce little spores which will resist the effect of drying and beating, etc., for a very long time, and they float about in the air in great quantities. They come in contact with the animal by breathing, and produce some forms of disease, but some kinds of spores do not do any harm in that way. The way they are got into the system the surest and easiest is through some cut or sore, but a very common way is by the animal eating some rough material, something perhaps having thistles in it. Those lacerate and irritate the throat and make small openings into the throat or back part of the mouth. Then these bacteria are breathed in and strike on these openings and are taken right into the blood. That is a very common way of communicating disease. The Texas cattle disease is easily communicated in that way. It is the very small bacteria that have to do with diseases. (Charts were exhibited by the Professor illustrating the classification, forms and structure of fungi.)

The Adsporae, I take the common potato fungus to illustrate. It is not known how it reproduces itself sexually, but some classes closely related to it are very well known. A similar plant grows on wild mustard. All the fungi except the very lowest are formed of threads. The whole vegetative parts are made up of a great mass of fine threads. When they reproduce sexually two of these threads grow out toward and finally touch each other. Then there is a partition formed, and this center partition is absorbed and the substance of the two threads is mingled. The rest of the fungus drops off and lies about anywhere, resists any amount of decomposition and heat and cold, and whenever there is a convenient time for it, it grows into another plant.

The vegetative threads of the potato fungus run all through the plant, clear into the leaves and stem and roots and tubers, and they do the injury by absorbing the nourishment that should go to form the potato. (The process of reproduction was illustrated by diagrams.)

Mr. Robbins — What is your remedy for this?

Prof. Arthur — I do not know that there is any. As far as I know, nothing has been discovered. It is quite probable that some remedy may be found, but as yet, nothing is known. It would be difficult to find any in a plant that propagates itself so fast. These threads are found in the potato itself, so that when it is planted and grows into another plant, the fungus grows and ramifies through the whole. The spores have the power of locomotion and move about freely and are also acted upon by the wind.

This diagram represents the common rust on wheat. It is sometimes so abundant that in walking through the fields your clothes are covered with it. This diagram represents a cross section of a leaf of barberry of the natural thickness. When diseased it grows thicker. On the under side of the leaves there is a yellow, rusty color, which you can see with the naked eye, which is made up of little balls. In these balls are great masses of spores which keep falling out when it is open. On the upper side also are cavities containing spores. A great many kinds are found on all our plants, but so far as they are connected with wheat rust, these fungi are only on barberry. As I stated in my paper, very likely

in this country wheat rust is found on some kind of weed, but we do not know what it is yet. All the rust found on wheat is conveyed from certain plants, and it must be carried by the wind. In the spring it comes from some plant in which the spores are growing.

Mr. Field — How does it happen that I go through my field one day and there is not a particle of this red rust on the wheat, and the next day it is all covered?

Prof. Arthur — You have had a change of weather?

Mr. Field — Yes.

Prof. Arthur — These spores drop on your wheat plants and each one grows into the plant. They are microscopic. They grow through the surface of the plant right into the plant, probably through the little breathing pores that are always in a plant. Then they form threads through the plant from top to bottom. After awhile these threads accumulate at one point or line on the plant and break through the surface. The little ends come out and each one has a spore on it. First there are formed oval spores which are red, orange or yellow, whichever you choose to call them. They are found in great abundance. There are other kinds of spores which are brown or very dark and they come from the same threads in the plant, only they are produced later, and have a thick coat and are divided into two parts. As soon as the yellow spores break through the surface of the plant they fall upon the plant, carried by the wind, and stick to the surface of the plant. They may be carried a long distance. Each one of them throws out one, two or three threads. These threads run around over the surface of the plant until they find these little holes and penetrate and form more of these threads inside the plant. When you remember how exceedingly abundant these are, you can see very readily how rapidly the plants would be propagated all over a field, and this takes place largely before you notice the rust on your wheat. They are not very noticeable to a person who is not looking for them, or is not familiar with their growth, and so they have increased to a great extent before you are aware of it, and later in the season these black ones grow. These spores reproduce themselves only on the

wheat field. They come in the spring on the barberry leaf. Each spore grows on the wheat plant; would not grow on the barberry plant. These yellow ones reproduce themselves only on the wheat, and in the summer time. They are thin skinned.

But the thick-skinned ones drop to the ground and remain over winter, as they can resist the cold, and in the spring grow on the ground. They send out one, two or three long tubes — they are microscopic you will remember — and each one produces a little thin-skinned spore. These are carried by the wind everywhere and fall upon the barberry leaves or a weed or something of that kind and grow. Now the reason they appear so suddenly sometimes is this: They grow inside of the plant and very abundantly, especially if the weather is hot. If you have a heavy dew or a rain and it comes off very warm afterwards, they burst out immediately through the skin of the wheat plant and show all of a sudden, and you find your wheat covered with rust while the day before you had not noticed it, although they were there. If the weather had remained cool and dry you probably would not have noticed it; they would appear slowly and gradually until there was a change. They are injurious to the wheat if they grow luxuriantly, because they take the substance from the plant. Producing the spores takes a large amount of nutriment as it does to produce any animal or vegetable life. If the weather is so favorable as to give a very great growth to these spores just before your wheat is beginning to fill, the nourishment that would have gone into the wheat grains is taken away and goes into these spores.

Mr. Field — It rarely ever gets on the stalk of the wheat. It is simply on the leaves.

Prof. Arthur—Yes, sir; well, it is found upon the stock probably.

A member — Is it necessary that there should be any barberry leaves? We sow our wheat early and have it up before the barberry leaves are up, and I have known wheat to be struck with rust before it was six inches high in the spring.

Prof. Arthur — It is probably necessary to have this go-between of some other plant. That is made very probable by experiment. These spores which come in the spring do not seem to germinate

in any of the experiments that we have tried — they may grow a little, but they will stop very soon and die — but if you place them on a barberry leaf they will grow. So these spores on the barberry will not germinate on the barberry leaf, according to our experiments, but they will germinate on the wheat. And there was this other practical thing noticed: There was a place in England, I have forgotten the name of the place, but it was called Rust-town, from the fact that the fields were almost always so much injured by rust as to make the wheat useless. In that vicinity there were a great number of barberry bushes. The farmers maintained that the barberry bushes made the rust. The botanists laughed at them, because it seemed so utterly preposterous that the barberry had anything to do with wheat rust.

Mr. Babbitt — Will science give us a remedy for this?

Prof. Arthur — There is a difficulty there. We have not got there yet.

Mr. Babbitt — Is there a real, honest reason for supposing you ever will get there?

Prof. Arthur — Yes, this nineteenth century grows very fast, and I think when the farmers understand this matter, they will give us some observations of just this nature that the farmers gave us in respect to the barberry bushes. I doubt, if it had not been for the farmers, that we would have known in regard to these barberry bushes. The farmers were laughed at by the botanists because they thought these barberry bushes produced this rust. To prove that the barberry bushes did produce the rust, the farmers in that whole district cut them all down. As a natural consequence the rust largely and almost entirely disappeared. Dr Debarry, of Strasburg, Germany, took up the subject and investigated it from these hints given by the farmers, but we have no such investigators as Dr. Debarry in this country. I can count on the fingers of one hand every person who has added anything to our knowledge of these fungi in all America, and who to-day is doing anything with them. So long as we do not know the history of the plant, how can we find any remedies? So long as we have no one investigating these things, our remedies will come very slowly. I admit I know of no remedy, but I do not admit

that we will be obliged to live all our lives without finding out a remedy.

J. C. Plumb, Milton — Is there any difference between these fungi which inhabit vegetable and those that inhabit animal substances?

Prof. Arthur — No, merely a physiological difference. Some grow on animal and some on vegetable substances, and some on one as well as the other.

Mr. Field — I desire to ask one question. The Professor stated in his paper that smut on corn was a common cause of death to many of our cattle. I desire to know if he has any real proof now that that is the fact.

Prof. Arthur — I make that statement from the observations of the farmers of Iowa. Two or three years ago it was very prevalent in Iowa, and it was stated by the farmers there that it was the cause of death to cattle turned loose in the field.

Mr. Field — I do not believe a word of it. I know a great many who have lost cattle and I have lost them myself, but it was not from smut. A neighbor of mine who had some, and who had had this idea advanced to him, as a test fed a steer he kept in his barn for weeks on it on purpose to test it, and he said he never had a steer thrive quite so well.

President Frait — He must have been an ironclad.

Mr. Field — The trouble is here and here alone, that there is so much corn left in the field that the cattle get too much of it oftentimes and it kills them, or they eat so much of the dry fodder and are not properly watered that it causes death.

J. W. Wood, Baraboo — It is now after eleven o'clock and we have had considerable pleasant sparring with the Professor, and he seems to have got through. I do not want the occasion to pass away without expressing to him my appreciation as a farmer of the paper he has presented to us. It has been very gratifying. It has shown us many things that I am sure we ought to know. In reference to those hard names (on the diagrams showing classification, about which some jocular remarks had been made), we need spend no time over them. We know that anything definitely known must have a definite name. Now I want to move a

special vote of thanks to the Professor for the labor to which he has been and for the ability and courtesy with which he has withstood our assaults, and the clear and efficient manner in which he has presented this subject to us.

(The motion was put and unanimously carried.)

Aaron Broughton, Evansville — If you will allow a farmer to say something about those hard names, the trouble with us farmers in getting a knowledge of these things is the obstacles thrown in our way. Among those obstacles are these hard names, not only in botany, but in law and medicine, and even theology. Civilized names come from civilized nations. Now those names (on the charts) are Greek words. They were transplanted into Rome and have Roman terminations. From there they were transplanted all over the civilized world. They spread just as those spores do, and they stand right in the way of our acquiring knowledge. They find plenty of congenial soil. There is a craft about these things. We have what we call priestcraft. That is a pretension of a certain class that they have particular communications with the Most High — that revelation is given to them particularly. And we have lawyer's craft and political craft that stands in the way of our getting laws made to suit us. We have literary craft, and that is what is the matter with these words.

You send a farmer's boy here to the university to learn any particular thing, and the first thing he will see is those big words. He says, "I guess I had better go home." The Professor will say, "You had better take up Latin, and perhaps Greek, so as to understand them." The trouble is, they are wholly unnecessary. They might just as well be Anglo-Saxon. That is my humble opinion. It may be a preposterous and pernicious error, but I am satisfied it is so. We have books that analyze derivative words by giving Latin and Greek roots, like Town's Analysis of Derivative Words, and we have books that give us information concerning derivative words without any Latin or Greek, like McElligott's Analytical Manual. I have taught schools where they gave the root in Latin, and I have taught also where they gave it in Anglo-Saxon, and they have learned faster where only the Anglo-Saxon root was given.

Now what we farmers want is, to have these school books all reorganized so that we can get at the thing in pure English, so that our boys will not be dumbfounded and confounded with this Latin and Greek that they have to spend three or four years learning; and there are a great many other things which might be explained, but for lack of time and capacity I will not undertake it.

William Gill, Brooklyn — I have been told that a rose by any other name would smell as sweet. I do not think it would to me, if you gave it a four-syllabled name. But then I am not going to find any fault with the names you give to these things.

There is something more in regard to this lecture that I think might be drawn out and utilized by us farmers; one thing particularly, in regard to the dissemination of hog cholera. I have watched that thing for one year faithfully, and I would like to have some one tell me a little more than I know now about how that is distributed throughout the country. I know that is an interesting question to those who have hogs that have the cholera. It is a singular disease, and I would like to have the Professor, if he possibly can, explain more in regard to the manner in which it is scattered throughout the country. I know it would be interesting to this audience to have him explain a little more in regard to the propagation of these spores that carry that disease.

Prof. Arthur — Unfortunately I cannot tell you a great deal about it, because there is not much of anything known about it. I will go over very rapidly what is known about these small organisms. You can make the application for yourself. You know a great deal more about the disease than I do. The organisms that produce the hog cholera are little rod-shaped bodies, extremely minute, so extremely minute that the very best investigation with the very best microscope is necessary to bring them out so that you can see anything more than a mere speck. The common manner of propagation is that each one divides in the middle and each part grows as large as the former, and then they divide again, and so go on multiplying at a marvelous rate. If a few of those get in the blood of an animal they multiply and grow in the blood like any other fungus. They disorganize the system.

They take the nourishment of the animal for themselves. They multiply so greatly as to produce fever or inflammation and produce the hog cholera, which very soon results in death on account of the rapid growth of the organisms. These are breathed out from the animal and are otherwise distributed by the animal wherever it happens to go.

Mr. Field — Animals generally all die that have it.

Prof. Arthur — No, sir, they get well. Many animals have strong constitutions.

Mr. Robbins — No living man knows that you say. How do you know?

Prof. Arthur — We have seen it. Wherever the hog drinks or feeds these organisms are dropped, and when another hog comes to the same place and eats or drinks there it takes some of them into the system, and they go into the lungs first in hog cholera and are propagated that way.

The other way of propagation is that each one produces very small spores which may be carried by the wind. The other kind may be carried by the wind also. This accounts for the fact that they may appear in a district a very long ways from where any contagion has been noticed. To show how readily this can be done I want to tell you how what is called the sulphur showers originated. I suppose you have all heard of its raining sulphur and you may have seen it. I saw some last year. At Baltimore two years ago in the spring, I was called to look at a sulphur shower by a gentleman that said he knew it was sulphur. It looked like sulphur and burned like sulphur. I took some of it and put it under a microscope. These grains have a very peculiar shape. It is the pollen of pine. It is produced in great quantity and drops in a yellow dust which covers the ground and the grass and the trees. This yellow pollen is different from any other kind of pollen. There is no mistaking it under the microscope. This shower of sulphur in B lt more was nothing but this pollen, as any one could see by the microscope. The nearest pine forests to Baltimore are somewhere in South Carolina; the nearest that could have been in blossom as early in the spring as this occurred. It was very early in the spring. The distance to these pine forests

must have been three hundred and fifty miles. The wind had been blowing in that direction. During the night before this shower there had been a slight rain-fall which met this shower of dust of the pollen of the pine which was passing overhead, and brought it to the ground and we had a shower of sulphur. The evidence is almost conclusive; that is, it is as good evidence as we need that this pollen traveled three hundred and fifty miles. Pollen of the pine is many hundred times as large as these organisms. If the pine pollen could travel three hundred and fifty miles, this could travel much further, and these resist freezing, etc., and will grow whenever the occasion is offered. That accounts for the distribution. The rapid increase of the bacteria in the hog accounts for the disease. We do not know anything further.

J C. Plumb, Milton — I would like to ask the Professor to make the statement again, if the generation and spread of this whole system of fungi is not attendant upon local conditions of temperature or conditions of the circulation of the plant or animal. I speak now of these bacteria.

Prof. Arthur — To be sure, the rapid propagation, so that you would notice it, depends upon the system of the animal.

Mr. Plumb — And the condition of the plant at the particular time, in connection with the atmosphere and other conditions surrounding?

Prof. Arthur — Yes, it is very likely that all those have their influence. Just to what extent we cannot say, because the observations are not yet sufficient.

Mr. Plumb — That is the practical point. The whole theory is pretty much of an hypothesis, as the Professor has admitted to us in this whole matter. But there is this practical point: If the remedies for the germination and spread of all these fungi are dependent upon local conditions, then let us inquire what those local conditions are, and whether they may be modified by different appliances and means within the reach of the farmer and horticulturist. Now the Professor would like to have the state father and promote investigation. It is right, as he says. We cannot determine the character of a plant until we know its history. We need more than hypothesis. We need actual exami-

nation and demonstration, and experiment, which cost time and money, and I am glad that there are those in the nation, even if there are but five, who will devote their time to it, and the state should uphold and support such investigation. Do not let us forget that the spread of these fungi is dependent on local conditions, and while they are studying their history let us and let them study the local conditions, and when we know them we will be able very largely to supply a remedy.

I have a friend who has a large stock farm in the state of Iowa. While his neighbors' hogs have been dying by the hundreds and thousands throughout the county, he has lost none of his. When he went out there some three or four years ago to start that stock farm, we had a conversation on the subject. I told him then, I believed that if he would be consistent and careful in the management of feed and in the care and shelter and all the conditions of growing and caring for his hogs, that he would avoid the hog cholera. He now says he is able to avoid it entirely, while all through the county hogs are dying by the thousands and tens of thousands. He has good running water through his pasture. He feeds carefully. He has a clover run for them, and he is as careful of his large stock as the farmers would be in Wisconsin or New England, and he avoids cholera. Mr. Field, you have had same zeal of that kind. Is that your experience?

Mr. Field — I would state to the gentleman that my experience has been, that every man who keeps a hog is liable to have the hog cholera, just as the human family are liable to have the cholera or any other epidemic that is passing through the country. Of course, the better we take care of our swine, the less liable they probably are to have it.

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E. A. Woodward read the following paper:

## NOW AND FIFTY YEARS AGO.

*Mr. President, Ladies and Gentlemen* — Mr. Charles T. Congden in his record of fifty years says: "As we get assembled upon the muddy shore of the Styx, tumbling into the boat of the old ferryman, it does no harm if we wag our old heads together, and

discuss, in a friendly way, of what has gone before." So if we, whose heads have been whitened by the frost of more than three score years, in discoursing upon the past, and comparing it with the present, should incline to eulogize the former, and perhaps in some instances question the positions of the latter, and thereby entail upon us the title of Old Fogies, it is undoubtedly no more than will be said of the youth of the present day fifty years hence. Fifty years ago family government was an acknowledged necessity, and was generally exercised over the household until they attained to near their majorities; and when it ceased, the individual was supposed to be capable of self government; but the wisdom of the present age has seen fit, in most cases, to reverse this rule, and the child commences self government and domestic rule as soon as will-power is sufficiently developed, and holds the reins over submissive parents until either death relieves them from this involuntary servitude, or renunciation by the petty tyrant enables them to pass a few of their declining years in comparative freedom. The fruit of this change is perhaps first experienced in the government of our common schools, and it is probable no one thing has more conduced to make them literally free schools, so far as the actions of pupils are concerned, than this change. I use the word free in its most extensive signification. It next becomes visible in our legislative bodies, which, by modern sentimentality, tone down the laws for the punishment of crime to the mildest possible form in comparison to the offense committed, and as a result, courts and juries may often be considered institutions for clearing the accused rather than administrators of justice to protect the innocent and punish the guilty; and whenever the law is administered in its purely executive clemency, is too ready to annul the sentence for good behavior during a brief state of probation.

Fifty years ago our common schools were inferior in many respects to those of the present day. Yet I am inclined to think that modern improvements consist more in what relates to the comfort of the pupils than in the government of the schools, the text books used, or the manner of teaching. It is true that the few branches originally taught were of a more practical nature

than many of those at present. The boys and girls (pardon me for not using the terms gentlemen and ladies) left school at the age of sixteen better readers, better writers, and better spellers than the average of those of to-day; and those who had mastered Lindley Murray need have no fears of discussing the principles of English grammar with any of the normal teachers of our state.

At that time the reading books were compilations from such authors as Addison, Steele, Sterne, Young, Goldsmith, Johnson, Pope and others, who wrote at a time when the English language was at its zenith for purity; and although it is said that Pope took his inspiration from books rather than nature, yet his pastoral poetry, for smoothness of versification, has never been equalled in our language; and in scanning the periodical literature of the present age we look in vain for anything that will compare with the "Spectator," written more than one hundred and fifty years ago; and if many of our American writers of prose and more of rhyme (for poetry is seldom seen in our day) had never shamed the muse or "called her from her sacred hill," it would detract very little from the literary status of our age.

Fifty years ago cradles were an absolute necessity. One kind bore a conspicuous place among the tools of the farmer,

> In whose skilled hands with wondrous will and main
> And measured steps, swept through the ripening grain,
> Proud of his tact in length and breadth of sweep,
> He laid the swaths in beauty at his feet.

The other was watched with pride and solicitude by the mother, as its oscillatory motion lulled to repose those who were to be the future patriots and protectors of our country. The modern reaper has now taken the place of the one, with an increase in the expense of harvesting, and the miniature chaise is doing much less work in proportion to numbers than the other for a rising and more effeminate generation. Fifty years ago the monotonous thud of the flail reverberated upon the ear from early morn till closing day, through the greater part of the winter solstice, but its echoes are no longer heard. The modern thresher performs as much work in a few hours as this primitive instrument will accomplish in days, but at a vast increase in the expense.

Thus we see that the improvements by machinery consist in the amount of labor performed in a given time, and not in lessening the cost.

Then while we who are living in this so-called age of improvement, and are sometimes inclined to sneer at the primitive methods of our fathers and those who have not kept pace with the age, remember that with all the inventive genius our American people can boast there has never been a machine constructed that will sow forty acres of wheat as quickly as a good seedsman can accomplish it by hand.

Go through the whole list of grain harvesting machines, from the first invention to the last ones perfected, with their automatic binders, and not one can cut forty acres of wheat at so little expense as it can be done with the old hand cradle, followed with the rake in use fifty years ago; and the same can be threshed with the old antediluvian flail at one-half the cost of the best Case machine that follows the road.

Fifty years ago economy and industry were the legitimate sources of wealth, and in them the youth of both sexes were thoroughly trained. The men upon the farm, in the work-shop, or some of the various occupations that required physical strength and close application, the women in the diversified employments of domestic life and household duties, educated as they were upon this permanent basis, they formed alliances without money considerations, from pure, unadulterated affection. Vigorous both mentally and physically, invulnerable to many diseases which schooling without education and a want of muscular exertion has entailed upon many at the present time, they went forward animated with hope and with a fidelity worthy of imitation, and attained in a few years both wealth and position. In those days it was no stigma for men and women to work, and those who attended to their ordinary household duties were not classed by the strong minded as slaves and drudges.

> But times are altered; wealth engenders sin,
> Virtue delays and idleness begins.

It is not to be supposed that every boy is properly constituted for a farmer, any more than that all can make merchants or me-

chanics, or in fact fill any one calling; but that a reasonable proportion are well adapted for tilling the soil there is no doubt.

There is many a boy who from his first recollection could not behold a fine horse or cow without being struck with its beauty, grace of movement, and general adaptability for the use of men. You may school this boy in all the intricacies of the legal profession, or, if you please, lead him through the devious paths of learning necessary for a student of divinity or medicine, but when left to his natural propensity he will seek his first love, delighted to hold the reins over a spirited charger, or, in the language of Scripture, "He will glory in the good and his talk will be of bullocks."

It seems to be a general impression and the idea is inculcated in our schools, that our youth by book knowledge, aided by the stimulus of wealth and parental pride, can attain almost any position in life to which juvenile fancy ever aspired, regardless of the peculiarities that fate has stamped upon their mental or physical organization.

Place, if you please, upon the shoulders of a boy the ponderous head of a Webster in all the perfection of infinite wisdom, and in his physical system a languid circulation of the life giving fluid from a want of the vis a tergo to stimulate it to action, and the boy is comparatively a fool. It is like attempting to move the machinery at the Centennial exhibition with a one horse engine, or a ship becalmed with too little breeze to fill her sails.

Upon the other hand, take a brain of much less caliber and perhaps less perfect in its organization, but let the fine arterial streamlets with systolic force stimulate its nervous fibre to tensity, and it comprehends the laws and motions of the planetary system, and solves the most intricate problem in mathematical science.

When shall we learn the necessity of educating our youth for the positions which nature intended they should fill?

**Fathers and mothers who have taken much joy**
**In rearing a fine honest girl or a boy,**
**Don't ruin a farmer or spoil a good wife**
**By forcing them into professional life.**
**There's no grapes on thorns or figs upon thistles.**
**Pigs' tails are poor timber for the making of whistles,**

and are of far greater value in their natural state than the whistles after being manufactured. The question has often been asked within the past few years: "What shall we do to keep our sons at home upon the farm?" I must confess I have been a little surprised at not hearing the same desire expressed in relation to the daughters.

The general run of answers to this question have been, that some plan must be adopted to make farming interesting; there must be a certain amount of recreation connected with it — an interest in the proceeds — and not too much work; in short, the answers have been of a character which I choose to denominate the sugar plum policy, a policy which has been very successful in many of our churches for securing a large attendance at their Sunday schools. This question may be answered in a very few words. Instead of impressing upon the minds of our youth that labor is honorable and that muscular exertion is absolutely necessary for physical development, we have directly or indirectly instilled into their minds that labor is degrading, and in a majority of cases they have been apt scholars.

We have not educated them to habits of industry and economy. I will venture a broader assertion; we have given them too much school and too little work, and the result is the cry has permeated every hamlet and household in the land, "what shall we do to gain a livelihood without physical labor?" And as our schools are the stepping stones to the different forms of professional life, they are flooded with those who will not dig, and in some instances are not ashamed to beg, and this not for the love of scientific pursuits, not for their adaptability as teachers or the learned professions generally, but simply for position and bread.

I am informed by the superintendent of schools for the first district of Dane county, that one hundred and thirty teachers were required for the schools in this district the past year, and certificates had been awarded to over three hundred, giving a surplus of over one hundred and seventy in one-half of Dane county; and I have no reason to doubt that the same state of things exists in other counties in the state.

A portion of this heterogeneous mass go to make up the stock

in trade of our theological institutions, with little prospect of doing more than to illustrate by their lives and conversation the progress of dullness and misdirected effort. Others to replenish the ranks of cormorants and pettifoggers in the legal profession, animated with the same spirit that characterized some who followed Christ, not for the miracles which he did, but because they did eat of the loaves and were filled; and no insignificant portion, to swell the tide of quacks and mountebanks in the medical profession, who with their villainous compounds are far more potent for peopling the realms of Pluto than the different diseases which have been entailed upon animal life by the inevitable laws of mortality. And if any remain, they are waiting Micawber-like in dignified repose for something to turn up. I appeal to the farmers of Dane county, and those of the state, if it is not a fact that our foreign population are securing a large proportion of the landed property within its borders, and that their posterity are eating up the substance of the Anglo-Saxon race in wages for honest toil; while our sons and daughters are striving to eke out a scanty subsistence in some form of professional life, or spending their time in penury and repose; and all this for the want of an education in the principles and practice of economy and industry. In closing this article it will certainly do no harm, and perhaps tend to revive some pleasant associations, if we imagine the tide of time rolled backward some forty or fifty years, and that we are now beholding —

The scenes of our childhood, the place of our birth,
The old lean-to house with huge fireplace and hearth,
The smooth oaken floor of the parlor to tread,
Where sisters and cousins were courted and wed;
The picture of Eve representing the fall,
And the finely worked sampler that hung on the wall;
The chimney from dead works, so broad and so thick,
Enclosing an oven of stone or of brick.
And well we remember our innocent gaze,
When opening its mouth upon Thanksgiving days;
The table where strangers were welcome to sup,
Nuts, apples, cider, and the old pewter cup;
The old splintered arm-chair where grandfather sat,
The peg for his cane, and his three-cornered hat.

You can fancy him there as he dozingly sits,
And drops out the pipe from his tremulous lips.
To view the old loom, where 'twas grandmother's pride,
To boast of her cloth two-and-thirty bars wide;
The bars for the warping, the wheel for the quilling,
The shuttle that sped through the chain with the filling,
The treadles for springing, the temples to spread,
The lathe and the reed to beat up the web.
Most happy to-day are those daughters of Eve
Who boast of a mother who taught them to weave.
The old linen wheel — no contemptible thing —
On which our good mothers were all taught to spin;
The flyers, the distaff, the pitman and tread,
The shell with the liquid to moisten the thread;
How oft have we watched as she turned with her feet,
'Til its soft humming music had lulled us to sleep.
There's many a daughter of beauty and grace
That heaven has not blest with a musical taste;
A boon it would be could they only but feel
To leave the piano for distaff and wheel.
The shop where the girls picked the geese for the beds,
And the boys spent their leisure in making their sleds.
The well of pure water, so mossy and deep,
Drawn with a pole, by a ponderous sweep;
Not brackish from pumps or the wash of the sod,
A pure pearly nectar that's fit for the gods.
Let's ransack the homestead through meadow and plain,
The life of our childhood to live o'er again;
Gather flowers from the mountain, moss from the nook,
And pluck the green cresses from murmuring brook.
In the height of our joy let's peal forth a strain
And the nymph to Narcissus answer again.

DISCUSSION.

James M. Smith — I would like to ask the Doctor if he would be willing to restore the times of forty or fifty years ago if he could?

Dr. Woodward — There are certain things I would very gladly restore, and certain things I would not. If I could restore the idea of educating our youth to principles of industry and economy, as they were fifty years ago, I would sacrifice almost anything to do it.

H. Robbins, Platteville — This is a question that I can speak upon better than perhaps any other that may be presented during

this session. Fifty-five years ago this winter I went to school. I froze my heels in going — had to go four miles through the snow. I went home and turned a wheel,— not to spin; I wound the quills and spools during about three months, waiting for my heels to heal up. This paper has taken me along back through the last sixty years. We did not use a cradle. We did not have a cradle. We carried the babies in our arms. We did not have many cradles but the cradle in the wheat field sixty years ago. I have a mark on my finger that was made by the old sickle. We could reap from three-quarters of an acre to an acre a day with the sickle. On the farm where I lived we did not have a cradle sixty years ago.

I remember how I got my education. I commenced going to school winters, going about four miles to an old log school house, and we had an old fire place there where we could roll in fire logs about four feet long. The master had a whip that I think was about ten feet long, and his was of birch, and I recollect well he used to run it through that fire-place in order to toughen it, and he used to call up a lot of us boys that did not behave, four or five in a row, and you could hear that old whip snap around our legs without breaking, because it was toughened in the fire. I have been through all those scenes in the state of New York. Fifty years ago this March I went to work on a farm by the month. I got seven dollars a month and worked eight months in the year. I recollect the first year I did not spend a dollar for any purpose. I worked for the same man some seven years, having my wages increased one dollar a month every year, and I suppose that was because I was very faithful. I commenced teaching school in 1835. I had got an education by going to school about four months in the year. I never went in the summer time after I was seven years old, because I had to stay at home and work. I was only fifteen years old when I went to work for seven dollars a month. I know I had to work about sixteen hours a day during the summer time. We had forty cows and I milked my ten cows every night and morning, and during haying time the sun did not shine upon the milk pail. It was a cruel thing for the cows. I should protest now, but we had very few hired men. We had to

haul our hay in ox carts and cut all our grass with scythes, and you can calculate we went out mowing before breakfast. We were frequently out at five and went a good ways from the house and were called to breakfast by the horn.

That paper took me back to that time when I commenced teaching school in 1835. I recollect well where I was teaching. I followed the old rules. The first day I had but one scholar, and I packed him on my back about two miles to and from school. The last day I taught I had over three hundred. I have taught school in this state for two dollars a day and boarded myself. What do schoolmasters get now? For the same school they pay from four to six dollars a day and they have a janitor. I swept the school-room and saw that the hall was swept and kept in order, and I carried the wood up myself. That was in this state, and not fifty years ago. They paid me two dollars a day, and I suppose that is more than I earned, that is, according to the present idea of an education. We had three or four lady teachers, but I was at the head of the school. The school was graded before that. I thought I was keeping a pretty good school. I never went into a school where I did not have the privilege of punishing scholars if I thought they deserved it. I do not believe in making a practice of punishing scholars in school. I believe the parents should do that. But if a man goes into a school he must have order, and sometimes order cannot be maintained unless he has that authority. I know something about schools at the present day, and I know that our extravagance comes from the amount of money we are paying teachers who teach the higher branches. Plenty of them are paid sixteen dollars a day, and from that down to twelve and eight dollars a day. From four to five hundred thousand dollars has been in the treasury here, and has been all the time for the last five years. Where is that money gathered from? It is gathered from nearly every part of the state, and they are rolling in wealth here. They know nothing about hard times at all. Let them go among the farmers.

I saw a man but a little over a month ago who was splitting rails at a cent apiece, and he said he could split thirty or perhaps forty when he had a good day. He said it was better than

nothing. That was in the state of Wisconsin. I tell you the men in the capitol do not know who the taxes come from. They do not know it comes from men who are working sixteen hours a day. I am paying twenty dollars a month this season for a man who is boarding himself. It takes myself and two boys and that man all the time to do our chores, and there is no farmer that would give the whole of us twenty dollars a month in money; they could not afford it. Why? Because stock-raising in the state of Wisconsin does not pay. We have too long winters here. And taxes! I have paid over eighty cents on every acre I have for taxes for the last ten years; and I have between two and three hundred acres, and I have not a horse but what I pay taxes on. And I am paying eight per cent. on a mortgage, and paying it to a concern that don't pay any taxes. We ought to be represented on the boards of this state. I am speaking to farmers, and I say we ought to send a man here as governor who never saw the city of Madison before. I have been here three weeks, but men do not get corrupted if they come here for only one season; it takes a long time to corrupt men. They are not corrupted in a month, and they are not ready to die in a month. A man wants years of life before he becomes fit to go into another world. I am earnest in this matter because I know that our taxes are not equal. The farmers pay eighty per cent. of the taxes of the state of Wisconsin. We do that directly, and indirectly what are we doing? Indirectly we pay them all! Show me a man that does not produce anything, and does he pay any taxes? If he does he gets it off from some body else. Now I want our present legislature to revise our assessment laws.

A voice — They will do it.

Mr. Robbins — They will do it if they have time, but they won't have time. They have been here three weeks, and when a motion was made to go into committee of the whole it was voted down two to one. They have been here three weeks and have not a single bill that could go to a third reading without a suspension of the rules. I am not very mad about railroad passes. About the only detriment to the state in issuing them is, that members having passes go home to see their families and don't

forget to come back. They adjourn once every week from Friday until Monday night. Why cannot they adjourn to Tuesday morning? Because neither house can under the law adjourn over three days without the consent of the other.

Mr. Field — They used to be just as bad when we were there.

Mr. Robbins — They used to be just as bad when we were there, but *we* are not there now, and it is easier to point out the errors of others than our own. But if I was in the legislature this winter I would try to remedy the law so that every species of property should pay for its protection. I would not grumble at the extravagance of our institutions, if every species of property that was protected was made to pay taxes. I think our normal schools and the State University should be taxed. You may ask me upon what principle? Because they are not state institutions. I believe that the property which the state owns should be free from taxes; but where there is an institution that the state has not entire control of they should pay taxes, and they can afford to, because they have thousands and thousands of dollars in the treasury to-day. Take the agricultural fund and the college and the university and they have all got funds in the treasury to-day. Two hundred and forty thousand dollars, the agricultural fund, is paid to the university on account of having the agricultural department attached to it. Do they expect us to send our boys up there to learn those hard names? (Referring to charts exhibited by Prof. Arthur in illustration of the lecture on "Fungoid Growth.") No, sir, they cannot expect any such thing.

A gentleman asked, how shall we keep our boys at home. I tell you farms in this state are not paying one per cent. on the capital invested in them. You cannot expect a boy to go into any business that will not pay over one per cent. I know men are making so much from the creamery and butter business, and I am making so much selling cattle. But do we raise them ourselves? No sir, we get a portion of our profit off from labor that does not pay. I am going to buy up some steers for two and one-half cents a pound. I would like to know how that man can afford to raise them. I can buy plenty of them in the county in which I live for two and one-half cents a pound, and I

know that no farmer in the state can afford to raise them for that. They are the men that lose. I can take them perhaps and make money on them, but farming does not pay. Now I want the gentlemen of the legislature to look over the counties of the state and see if any of them do not pay any state tax. There is one county, Barron county, that takes more money out of the state treasury than it puts in, and I see that the superintendent says they pay one per cent., which is the highest school tax of any county in the state. I do not suppose they can get it exactly equal, but I would like to have the committee upon the assessment and collection of taxes see if they cannot devise some means by which all property that is protected shall bear its just proportion of taxes. I am in favor of the bill that Senator Anderson has introduced — lawyers may say it is unconstitutional, but I say it is constitutional — that a man that borrows money shall pay the taxes and then it shall be taken out of the interest, or in other words, that the mortgage itself is a part of the property. Why should not the mortgage pay taxes as well as the property?

If any one says that is unconstitutional, I say that our railroad tax is unconstitutional. Suppose some of these big companies that pay $200,000 should refuse to pay a dollar; do you suppose you could collect it through the supreme court? No, sir; you could not do any such thing. The North Wisconsin Railroad got an exemption for ten years and agreed to pay five per cent. of the gross earnings for that exemption, which, it is provided, shall go to the counties through which their lands lie. Do you suppose that is constitutional? No, sir; the supreme court would decide that that was unconstitutional whenever the question was presented to them. So I believe that that bill is correct, and unless a better one were presented I would vote for that. If they just give us that bill it will help men who are in debt. I believe some of the railroads are paying all the taxes they ought to pay, and I believe the only equitable way to collect the tax from them is just the way it is collected — out of their gross earnings. I do not believe in confiscation. I do not believe in taking a railroad away from those men after it has been paid for three or four

times over, any more than I believe in taking a man's farm away from him after it has been paid for three or four times over. Let a man fight and get at the top of the heap if he can, and let him stay there.

James K. Rider, Waterloo — I would like to have the gentleman explain this. He says his property pays one per cent. These railroad companies have improved our state, and what do they get upon their dollar? Can you make taxation equal when they get twenty five per cent. and you get one?

Mr. Robbins — It may not be made equal, but I say make it as near equal as we can.

Mr. Rider — If Senator Anderson will attach that to his bill it will not do any hurt.

Mr. Robbins — We do not want to do any injustice to the railroad companies. We could not live without them. My products would not be worth anything without them, and I do not believe in crippling them, but we want them to pay taxes as we do, as near as we can come at it.

J. A. Taylor, Sun Prairie — I am thankful for one, that we can stand this, and if we let poor whisky and tobacco alone, we can hold our heads up and say, we do not care, our farms are free; and every man that I have talked with, that commenced to farm in Wisconsin forty or fifty years ago, is aboveboard to-day. There is no man that has failed, unless it is some man that has come here and is drinking poor whisky or smoking tobacco. All the farmers except those are free to-day, and will be. Every farmer is free, unless he is trying to do something illegitimate.

W. W. Field, Madison — I want to say a word in reference to the paper of Dr. Woodward, for I do not agree with him at all on a great many things. I do not believe we can sow our grain, I do not believe we can thresh our grain, I do not believe we can gather our harvest in this day and age of the world at twice the expense we used to. Where would the help come from to gather our immense crops of grain that are raised in this western country to-day? The people are not living in the states of Wisconsin, Iowa and Minnesota to begin to cut their grain if they left all other employments, without machinery.

Mr. Arnold — He said it could be done as cheaply.

Dr. Woodward — I will call the gentleman to order. I made no such statement as he represents. I said there had not been a machine constructed that could harvest forty acres of wheat as cheaply as it could be done by the old hand cradle and the rake that followed it fifty years ago, and I can prove it. I said further that the improvement in machinery was that it had the ability of performing a much larger amount of labor in a given time. There was where the improvement was.

Aaron Broughton, Evansville — At a greater cost.

Dr. Woodward — Yes.

Mr. Field — Isn't it a fair inference that the crops of the present day can be gathered as cheaply by the old process as the new?

Dr. Woodward — No, sir, not by my statement. I will make this statement before the convention. Two years ago I put my oats in my barn. I did not have forty acres, but I had more than ten. I asked a noted farmer living near me what it cost him to put his oats into the bin by the thresher. Says he: "I cannot do it less than from ten to twelve cents a bushel." I can hire to-day oats threshed in the barn and put in the bin for four cents a bushel, net.

Mr. Field — Suppose you had a thousand acres, what would you do with it?

Dr. Woodward — I could not do it. That is not the point. How many farmers were there in Dane county last year but could have threshed all the wheat they raised with an old-fashioned flail?

# HOW PLANTS GROW.

Lecture at Science Hall of the State University, by W. A. HENRY, Professor of Agriculture.

(NOTE.— It is but just to Professor Henry to state, as his lecture was given without notes or references of any kind, it cannot be expected that it should be as free from repetitions or as concise as one which is written out beforehand. Moreover, many diagrams and blackboard illustrations were used, as well as specimens exhibited of the chemical elements talked about. The omission of these from the printed report of course greatly detracts from the value of the lecture to the general reader.— G. E. B.)

The elements which enter into plant structure I have in most cases in their simplest forms before me on the table. While we have altogether sixty-five elements which make up matter, there are only some twelve or thirteen which ordinarily enter into the composition of the plant. Some of these are essential, others non-essential. Of those which are essential we have carbon, of which charcoal is a fair representative of the solid form. Then of the gaseous elements we have three important ones in these three jars which have been filled with different gases and are held in place by water. In this jar is oxygen, here is nitrogen, and here hydrogen. You understand that all these are capable of becoming solids, but at the temperature of our room they are all gaseous, and would be at a much lower temperature. In fact it was only a couple of years ago that they were reduced to the solid form. Here is potassium, which must be kept under oil to keep it from burning. This is sodium. In this is calcium, not as pure calcium, but as a chloride. Here is magnesium, also as a compound. Then we have in some plants silica in quite large quantities. Iron is a necessary constituent. Phosphorus I have here pure. Sulphur must also enter into the structure of the plant. This bottle is filled with the gas chlorine, of a yellowish color. Chlorine with sodium we know makes common salt. Chlorine is necessary to the life of some plants, but it is not known that it is essential to the life of all. I might show you some experiments with these gases, but I hardly wish to take time under present circumstances.

Men may ask me how I know that these elements and no others

enter into the structure of plants. It has only been found out within a comparatively few years which of the elements enter into the structure of plants, and this is due to the labors of the German experimentalists. The way they were able to find it out was by growing plants in water. They took a glass jar and put a cork having a hole through the center in the top, and placed the seedling on it. The jar was filled with pure water, the seedling sending its roots into the water through the hole in the cork and its top in the air. Now by putting in one chemical after another Dr. Nobbe and other experimenters found out which elements it was necessary for the plant to have, because of course the plant will die if if has not its necessary food. They gave it potassium, sodium, chlorine, etc., and in that way found out which ones were necessary and which were not. In this way they worked, and it is wonderful what results they obtained. For instance, one German doctor grew a buckwheat plant in water which perfected more than seven hundred seeds, the test being that each seed must sprout when planted. Whether nitrogen was given to the plant through the air or by the soil puzzled the chemists perhaps more than any other one question of its nature. We know that four-fifths of the air is nitrogen, while in the soil it exists in only small quantities. Does the plant then get its nitrogen from the air? A person would naturally say "yes" to such a proposition, and so a noted French chemist maintained, and he conducted some elaborate experiments to prove it; but Lawes and Gilbert, of England, began a more careful experiment, and for two years they worked on this one problem, to see where the plant obtained its nitrogen, and they found at last that the plant can get no nitrogen from the air. Hence the farmer must rely on the soil and fertilizers for supplying nitrogen, which is a costly element, to the plant. The German experiments are exceedingly instructive, but I cannot spend more time upon them. A whole lecture might be devoted to explaining their work.

Leaving this subject, let us go to the plant itself and consider its structure. Those who have looked at the sections of plants under the microscope will understand this more clearly than those who have not, for this instrument readily reveals plant anatomy.

Some plants consist of but a single cell. You have heard of the red snow plant, which is so interesting to Arctic and Alpine travelers. It consists of but a single cell, containing red coloring matter, and is capable of reproducing itself very rapidly. Let us consider plants of a higher order which are made up of many cells; the plant unit is a single cell, and by the union of a large number of these the plant is formed. The pressure of cells against each other crowds them out of their naturally round shape. They are often elongated, and especially in the direction of the axis of the stem. Some of the cells are very long, as the bast cells of the inner bark of the basswood. Under the microscopes arranged by the windows you will see a large number of examples of cell structure. A glance at the microscopes will give you far more perfect ideas of plant structure than I can by any description. Understanding then that the whole plant is made up of individual cells which form one continuous chain from the roots to the twigs, you get some idea of the relation between the root and the leaf.

Often between contiguous cells arranged vertically the partition walls are absorbed. Then the chain of cells would form a long vertical tube. In cutting across the grain of wood we expose the end of these tubes, which may be seen with the naked eye.

I have now to speak of one fact which you learned in your natural philosophy; that if we have a glass tube across one end of which we stretch a membrane, for example a piece of bladder, which you know is ordinarily impervious to water, and fill the tube with pure water and set it in a jar filled with sweetened water, strangely enough some of the sweetened water will pass through the membrane into the tube and the pure water will flow outward until the sweetened water is equally mixed with the other. It will be the same if we put salty water on one side and pure water on the other.

Let us now examine the roots of plants. It has been found by experiment that it is only the last one-sixth of an inch of the root that elongates in growing, while the portion back of that point does not push ahead into the soil, but remains stationary.

The cells of all roots, so far as the microscope reveals, have no openings by which anything liquid or solid can pass in, but you remember the case of the sweetened water in the glass vessel which was separated by the apparently impervious membrane, so we may understand how when there is water in the soil about these rootlets with mineral matter in solution and pure water within the rootlet, the water from the soil may push its way into the cell, carrying with it plant food.

If we understand how it passes into the plant root when there are no openings, I think we can see how it may pass upward in the plant, for when the cell of the rootlet has taken up some mineral matter from the soil, the liquid in that cell is then of a different consistency from the sap in the cell next above, and some of the mineral in solution will pass into the cell above, then to the next, and so on in that way until it may reach the leaves of the plant. That explains how mineral matter is carried up in the plant. That mineral matters are in solution in the soil, of course no one will doubt. When we think of all those elements being placed in the soil and that none of them are wholly insoluble — what we ordinarily call insoluble matter is always somewhat soluble — we see how the plant can get the food inside of its cells, and after it is once inside, we see how it is able to pass upwards. It is not by currents of sap going up and down the plants as the currents of blood flow in the body, that the mineral matter is taken about the plant. It is by this method of passing from one closed cell to another.

DISCUSSION.

J. C. Plumb, Milton — What term do you give to that?

Prof. Henry — Osmosis.

Mr. Plumb — We thought capillary attraction was the force that carried sap up the tree.

Prof. Henry — If you had a long tube, capillary attraction would take it up a ways, but we do not need capillary attraction to explain this movement of plant food. The error comes from the supposition that the sap moves in currents through the long

tubes that I mentioned as existing in the wood. In truth there is no *flow of sap* in the tree.

Having explained how the mineral matter gets into the tree and is distributed, we can pass on. First remember that the mineral matter of a tree or plant is a very small part of it. Remember that the part which the plant gets out of the ground is only about three pounds out of every hundred of its total weight, excepting the water.

James M. Smith, Green Bay — Does that hold good with all plants?

Prof. Henry — That is near enough for our present purpose. A plant gets its water from the soil, and in addition to this, on the average, not above three pounds in one hundred. We will now see where most of the plant comes from. There is in the air carbon united with oxygen in the proportion of one part carbon to two parts of oxygen, which form what is familiarly known as carbonic acid gas. This is given off by the breath of animals, by volcanoes, by the burning of fuel, and the decay of organic matter. Carbonic acid gas exists in the air only in a very small quantity, between three and four parts in ten thousand parts of air. If you will make a thin cross section of the leaf of a plant, you can see under the microscope the cells between the upper and under surface. In the cells is green coloring matter, arranged in little dots floating in the cell sap, and it is owing to those little dots that the whole plant looks green. The green color is due largely to iron, as the red color of the blood is supposed to be. The plant, under the influence of sunlight, absorbs the carbonic acid gas, C O2, floating in the air. It passes into the cells of the leaf, and the little green dots of the cell unlock the combination and the O2 passes out again into the air, and the C (carbon) is left in the cell. If the carbon alone were left in the cell, perhaps it would look black like charcoal, or may be it would look clear like the diamond, which you know is pure carbon. Before losing its oxygen (and the chances are that it only loses one part of the oxygen instead of two), it unites with the water that is in the cell with it. Water is made up of two parts of hydrogen and one of oxygen or H2 O. The function of the cell in the leaf of the

plant is to separate the carbon from the oxygen, and by uniting twelve atoms of carbon with ten molecules of water to form C12 H20 O10, which is starch, a substance we could hardly think could be made of carbon and water, yet the plant does it under the influence of sunlight.

Starch then is the first product of the plant. Let us consider now what takes place with some familiar plant, say the potato plant, which has been growing until now it is prepared to form tubers. The leaves of the plant are surrounded by an atmosphere containing carbonic acid gas, which is absorbed and in the little laboratories, in some way, we scarcely know how, united with the water and starch is formed. It is not in the economy of the plant to leave the starch grains there. Here now is a problem for the plant to solve. It has created starch grains in the leaf which should be stored in the tuber. How is the transfer to be effected? Ordinarily starch is insoluble. If a teaspoonful of it is placed in water it will remain a solid, and even if the water be heated to the boiling point, it will not dissolve but only form a paste. The cell walls are without openings, and how is it to pass out? It is here as starch, but it has a journey to make down the potato stem and cannot travel as starch. The work of the cell then is to change this product. The plant leaf proceeds at once to avoid the trouble by changing the starch to glucose or some other soluble carbhydrate. Let us suppose it is glucose which is formed by the addition of two more molecules of water to the starch, which makes C12 H24 O12 (glucose). Now glucose is soluble in water, and the starch transformed into glucose, forms a sweetened mass within the cell in the leaf. As glucose it passes from cell to cell in the same way previously explained, until it comes down to the root. Now when it gets into the cells of the growing potato tuber, this part of the plant has the power of taking out those two parts of water which were added to the starch in the leaf, and back the glucose goes into starch. You see then the intimate relation between starch and glucose, and you are now prepared to understand how it may be possible for man to add, by some chemical process, two molecules of water to starch and form glucose from it. Our glucose factories buy corn, which contains

starch, and add two molecules of water and turn it into glucose, and you see that glucose is as legitimate a product of the plant as is starch, only as a rule it is a product of transition.

Suppose we next consider the beet. In this the green leaves perform the same work that they do in the potato plant. The starch is formed in the leaf, turned into some soluble carbhydrate and passes down the stem of the beet. But curiously enough, in the sugar beet, instead of converting it back into starch, it is changed into cane sugar, which is C2 (H2 O) 11, or one molecule of water more than starch, and one less than glucose. Why cane sugar should taste just twice as sweet to our tongues as glucose is a question for some one else to explain, but it is a fact. There is a difference of just one molecule of water, and you would not think that would make any difference in the taste, but it does. I have spoken of the storing of starch in the tuber of the potato, of cane sugar in the beet, and might illustrate in the same way the creation of both cane sugar and glucose in the cane plant. The purpose of all these chemical changes is the manufacturing of carbhydrates which shall appear in stem, root or seed. All the parts of a plant which will burn up by fire or decay are carbhydrates, and have come primarily from the air. In the main, the starch which is formed is built into the woody parts of the herb or tree. A stick of fire-wood or a plank has the same chemical composition as starch, and all the timber of our houses was primarily formed in the delicate green leaves of the trees. It must be understood that there is always combined with the starch, cellulose, glucose, etc., a small amount of mineral matter which is essential and which is brought up, as explained, from the roots. We thus learn that the leaves of trees, which are often considered more ornamental than useful, are members that are doing a vast amount of work. You often hear people talking of the leaves as lungs of plants. They are lungs to a certain extent, and they are also stomachs. It is found that the mineral matter of the crude sap passes upward through what is called the sap wood. It is also found that the elaborated sap comes down between the bark and the wood, in fact through the newest part of the tree. You can understand, then, how it is possible for the gardener to cut with a

knife around a tree, partly girdling it, and not prevent the sap from going up, but check in a degree the matter from coming down. The ringing of trees to make them bear more fruit is simply a method of preventing the building material from going down too far by cutting off its passage.

We find now on reviewing the subject that the plant is a creative organization; that though ordinarily attached to the soil, it gets but a small portion of its whole bulk from that source, though that small portion is of vital importance. We have noticed that from the carbonic acid gas the plant takes the carbon, and, uniting it with hydrogen and oxygen, forms some carbhydrate, as glucose, sucrose, starch or cellulose (wood), and that after the formation of the first product, which is generally starch, it may convert this into one of the other products for transportation and then change it again to build it up into seed, wood, or leaf. At one season of the year the whole effort is for leaves, at another, stem and root, and later it is for seed.

We have learned that the usual idea of sap flowing is incorrect, and that transfusion is the proper explanation. Yet after all we are far from knowing the secrets of plant life. What we have answered is but the grossest phenomena, and we are forced back to the query of what life is in our effort to solve the mystery.

Mr. Field — About what proportion of mineral matter did you say?

Prof. Henry — From one to three parts in one hundred is mineral matter.

Mr. Field — Do you mean to say that only from one to three per cent. of the food of the plant is taken up by the root?

Prof. Henry — Yes, if you except water. You see that under the influence of sunlight the plant has the power in itself of separating carbonic acid gas, throwing out the oxygen and keeping the carbon, uniting it with water and forming starch. You have then seen how that some cells have the power of turning starch into glucose and passing it to any part of the plant that it desires; toward the seed in the case of the cane, toward the tubers in the case of the potato, and toward the branches when it needs it there. It then turns it into starch or a compound similar to starch, and

you have seen that the mineral matter that we usually suppose to amount to such a large proportion of the plant is only a small proportion.

Mr. Plumb — I would ask in relation to the absorption of the spongelet, whether it has the power of choice in selecting its mineral matter from the soil.

Prof. Henry — Yes, very strangely, it has, to a certain extent. For instance, in sea water there is thirty times as much sodium as iodine, and yet the sea plants take up as much or more iodine than they do sodium. There they must have a selective force. It is not always intelligible, for a plant will often pick up a great deal more silica than it needs. Sometimes a plant will contain ten or twenty times as much silica as another plant of the same size which has perfected its seed to as great an extent and as perfectly as the first.

B. S. Hoxie, Cooksville — Talking of the sweet and sour, etc., can you tell us how that is?

Prof. Henry — No, no more than I can tell why some people take the sweets of life and some the bitter. All have the same simple elements to build from.

Mr. Plumb — Does an oak tree for instance absorb the mineral elements which constitutes oak, while the ash tree absorbs that which constitutes ash? Is it the first process or some secondary process by which it becomes an oak, an ash, a hickory or an apple?

Prof. Henry — The chemists' analysis, I suppose, will not show any difference between an oak or an ash tree. It is something too fine for analysis.

Mr. Plumb — Do you mean in the fluid taken up or in the composition itself?

Prof. Henry — In the composition itself.

Mr. Hoxie — Prof. Arthur, in speaking of the spores of the plant, said it was those spores that he pointed out that caused decay. Was it really a diseased condition? Is it not necessary for the life of the plant to possess those spores? He showed, for instance, that those spores caused disease of potatoes, and that the disease was in the leaf and went out into the tuber, and the next year the crop might be diseased.

Prof. Henry — Your idea is that those spores are the symptoms of disease.

Mr. Hoxie — I thought he conveyed that idea. I so understood it.

Prof. Henry — That idea is held by a few, but it is almost given up that fungi are the result of disease or the attendant consequence and not the cause; but nearly everybody maintains now that fungi are often the cause of disease, and that they are plants which are just as distinct, and reproduce themselves just as distinctly, as the higher ones do.

J. W. Wood, Baraboo — To illustrate the point as to the bitter principle in plants: in one starch is made, in another sugar, in another glucose. The bitter principles, I understand, are formed the same way, and are but a slight modification of the elements that make sugar; for instance, strychnine does not vary materially in its composition from sugar; it has the same elements but in a different proportion. Is it not true that the bitter principle is not gathered by the roots out of the ground, but gathered in the leaves the same as the sweet principle?

Mr. Plumb — That is what I wanted to know, whether the distinctive difference between these plants was from the first process, absorption, or the second one, elaboration.

Prof. Henry — It is elaboration in nearly every case. It is possible for the plant to absorb some poison in certain cases, but to a slight extent, and if we find a plant poisoned it is almost always on account of some compound the plant has formed within itself.

A member — If only three per cent. of the elements of the plant are taken out of the soil, why is it that by a little different preparation we can change that soil so that the product of corn, for instance, will be double that of the acre just adjoining it?

Prof. Henry — That is one of the difficult questions to answer; a plant cannot live without this mineral matter. It is very little, but it is the part that costs. We have plenty of carbon in the air, but the mineral matter is often in such a condition that the plants starve for it.

Mr. Field — Does it not use a great deal more than three per cent. when it can get it?

Prof. Henry — Yes, a plant may contain more than it really needs in some cases.

Mr. Hoxie — We often hear farmers say that their land is worn out; that it is entirely exhausted. In your opinion are the elements of the soil exhausted, or is there an abundance in the soil, only not in a condition to be assimilated?

Prof. Henry — I think the statement is correct that an average soil has plant food in it sufficient for one hundred and sixty crops. Ordinarily, where a soil is said to be exhausted, it is not because there are not nitrogen and potash enough in it, but it is because the potash and nitrogen are locked up in such a way that the plant cannot get them, and the only way is to give the soil time by allowing it to remain idle, or by exposing to the air by fallowing, and let the oxygen attack the rocks and pebbles and particles that hold the nutriment. One means is, apply fertilizers. Then certain plants act as pioneers, working in the poor soils and digging out the minneral matter which the plant needs, as for instance clover; when these are plowed under they have stored enough mineral matter near the surface where the crops need it to supply a bountiful harvest. For the farmers of Wisconsin to begin to talk about worn out soil is a disgrace. For a country that has pioneers living yet upon its soil, to talk about worn out lands is a shame.

Mr. Field — What are you going to say when the farm produces the first and second year twenty-five and thirty bushels of wheat to the acre, and now it will produce only five?

Prof. Henry — The first thing that I should do would be to study carefully to see if it were not best to give up wheat-growing.

Mr. Broughton — I would like to ask why a piece of land that will raise twenty bushels of corn per acre can be made to raise a hundred bushels by adding manure.

Prof. Henry — Because the mineral elements form only a small portion, you must not form an incorrect idea of their value. They are the valuable part. The carbon good fortune always gives.

Judge Bryant — But the manure always gives the three per cent.

President Bascom — I think the stumbling block with these farmers lies here: They have to draw a good many loads of manure, and they rarely find they have drawn too many. Here is a very large amount that has gone on the land, yet we only require one, two or three per cent. Is there any way of getting that without so many loads of manure? How does it come that it needs so many loads of manure to get that one, two or three per cent.?

Prof. Henry — When you haul out a two horse wagon load of manure, if it is manure from the straw heap, as it is often made, a little straw and much water, if all that is valuable in the manure could be got into its smallest compass, that reduced to mineral matter, instead of taking your two horse team, you could put all the mineral matter in your vest pocket and walk out into the field with it. This is of course an exaggeration, but the truth is, that everything really valuable in a straw stack does not exceed the weight of the ashes formed upon burning the stack.

Prof. R. D. Irving, Madison — You say every soil in Wisconsin or anywhere else has enough mineral matter. I will guarantee to furnish some soil in Wisconsin that has not any potash in it, never had, and never will have unless it is put there.

President Bascom — So take a load of well rotted barn-yard manure, do you think there would be any possibility of using that ten, twenty, or one hundred pounds, and throwing away all the other parts as of no value to the land?

Prof. Henry — In some cases yes, in others no. Because straw has a tendency to loosen up the soil. In sandy land it will help hold the fertilizing part. In heavy land it will help to loosen it up and allow the air to come in, so they have a mechanical value, but we must remember that it is mechanical and has no effect any other way.

President Bascom — Have they any chemical value in this respect in holding this material, which is valuable in such a shape that the plant can better get hold of it, while if we put it in mineral form the plant would not be able to get hold of it at all?

Prof. Henry — It is not best for the farmer to burn straw and throw the ashes on the land. That was the idea of Liebig and was held for some time. But the trouble is that in burning the

straw, some of the matter is put in a very insoluble form, and there are better ways.

Mr. Field — How would you prepare that straw to put it back on the land?

Prof. Henry — I think the time is coming when every bit of it will be fed or used for bedding.

Clinton Babbitt, Beloit — I have had a little experience in this straw business. I paid one farmer in Rock county $710 for the straw that he had on his place not long ago. Now could the farmer have made any better use of his straw, than to have put it into money and buy, say $50 worth of clover seed, and put it on his land and plow it under? I ask this question because I want to know whether I am instrumental in undermining the agricultural interests of the state. If I am, I do not want to have anything to do with it any more; if not, I want to say to farmers here, that there is a ready sale for every pound of straw you have got. I would pay at the rate of $7 per ton in many cases, delivered at the mill. I want to know whether it is injuring farmers to dispose of their straw.

Judge Bryant — You should be careful whom you talk to. People in this vicinity are mostly temperance people, and it is becoming a settled fact here that a man who will sell straw on his farm is merely trying to get a little whisky money that his wife knows nothing about; so the selling of straw is becoming unpopular.

Mr. Hoxie — A practical farmer told me a few years ago that if he had to draw his manure one mile from his barn he could bring that land up much cheaper by sowing clover. Now would that help out this straw question?

Prof. Henry — You will never go into a farming community where the farmers use clover for feed or plowing under and find many mortgages on the farms. You never find poor farms or thriftless farmers there. Everything is prosperity and happiness where clover is. I do not care what they do with the product of the soil, whether they sell straw or not. If they grow clover they are safe.

Mr. Broughton — I would like to ask if there is any nourishment for the land in straw.

Prof. Henry — Yes, there would be in time. When you are plowing in clover you are plowing in straw. We have an idea that the stem of wheat, rye and oats should be called straw, while corn stalks and clover are entirely different chemically. Now there is nourishment in that straw, but not so much as in clover stems. If the wheat has done its best it has sent its nourishment nearly all up into the seed, and the straw is the cellulose matter which is left. Now the cellulose, you remember, came from the air, and it would return to the air. You see how little is left when you burn your straw-stack. All of it that has gone off into gas is simply carbonic acid gas, while if you sow the mineral matter which is left as ashes you have got all the mineral matter left on your farm, but in a more insoluble form. It is partly insoluble in the straw itself, and it will take years for the soil to get it back if the straw is put back on the land, but it is better to have it there in the bank waiting for the plant to take it away than lose it entirely. But I believe a man had better sell his straw at seven dollars a ton and buy clover, or plaster, or phosphates, but let him be careful to do it and not take that seven hundred dollars and buy another eighty acres of land and go to skinning that.

Mr. Babbitt — I will ask if the Professor thinks that it is advisable for a man to keep his straw over and above what his stock requires for their convenience and health, or whether it is an old fogy notion that a man who sells his straw removes or disposes of his soil.

Prof. Henry — When a man sells his straw he is selling a valuable part of his farm, but he has to sell something, and if he can get anything like that price for it, why not sell that as well as to sell cattle? Every time an ox goes off his farm he carries a good deal of phosphate and a good deal of nitrogen, and the question is in selling products, which one can he sell and take the least from his farm. When he sells butter he takes very little from his land. Butter comes from the carbhydrates and those from the air. The question of selling straw comes down to whether a man is willing to sell his straw and buy and put into the soil in some other form that which he has taken out, and I think it is possible for a man to get his land up much quicker by getting rid of his straw.

J. M. Smith, Green Bay — You say plants only take about three per cent. from the soil. Do they all take the minerals in the same proportion and then manufacture them, for instance, into a potato or a strawberry?

Prof. Henry — Sometimes they take up a different amount than at other times, and sometimes they take more than they need. A cell at the root will take up a certain amount of mineral matter and that will be taken from cell to cell. Now when you get up to the leaf, that leaf, if it has any use for that mineral matter, will take it from the last cell and build it into the structure of the cell. As soon as it is built into that cell of course it is taken out of the liquid, and there is a lack there, and more of the mineral matter will flow up. Now if a cell is charged with mineral matter, of course it must make no draft on the next cell, and we come to a time when all of the cells contain mineral matter and there is no movement either way. They are simply charged with mineral matter and there is no movement either way.

Mr. Smith — It has always seemed to me very strange and unreasonable that I should use the same kind of manure to raise, for instance, strawberries and corn, or potatoes and red pepper, the product is so different. It seems to me unreasonable that all these plants should be produced, for instance, from barn-yard manure. We use that because we know that it contains all that plants need; but if I knew enough to know just what each plant does need, and then knew whether the soil contained it or not, and if it did not contain it, could supply the soil with just what that particular plant needed, it seems to me that would simplify farming and cultivation to a most wonderful extent. It has been a problem that I confess I am not any nearer to solving than I was forty years ago.

Prof. Henry — The wood in a tree and the starch in a pudding are about the same, chemically, and yet you would claim, according to your taste, that they were very different. So the red pepper is probably not much different in chemical composition from something that is not at all burning or biting. If you give a man the bricks he can make any kind of a house; but a plant, if you give it food, will not make any kind of a plant, yet it will make a certain kind of a plant. But your idea is applicable to a

certain extent; for instance, a corn crop needs a great deal more potash than a wheat crop. Corn crops are exhausting the soil of potash while the wheat crop is not taking off much, and a strawberry crop will take off largely potash, but in reality very little of any of the minerals become strawberries, for they are mostly water.

Mr. Field — You take our virgin soils and they will produce a great deal better crop of corn, and about the same average amount each year, than they will of wheat. What is that owing to?

Prof. Henry — The wheat is a very delicate feeder. Corn is a gross feeder, and is an American plant. Wheat comes from Europe, and does not take kindly to our careless methods of cultivation. A corn plant will sometimes send its roots fifteen feet for nourishment, and a wheat plant never reaches over six or seven. Corn is a rank feeder like clover, and we should remember that it takes a great deal of potash out of the soil. With ordinary barnyard manure we can generally supply enough.

A. A. Arnold, Galesville — There is one question I think of some importance. The Indians have always picked corn close to the ground, and in doing so they have got early varieties. Can you tell whether corn is early or late by the number of joints it has in the ground?

Prof. Henry — No, sir.

Mr. Arnold — Is it not the fact that the earlier the corn, the closer it is to the ground?

Prof. Henry — Yes.

Mr. Arnold — Then in picking the corn, is it not best for Wisconsin farmers to pick the ears that are ripening close to the ground?

Prof. Henry — That is an experiment for you to try.

J. M. Smith — Is there any plant food in pure white sand?

Prof. Henry — No, sir, nothing except silica, if it is pure white sand. I take you at your word, *pure* white sand.

Mr. Smith — I asked the question because in some of my crops, for instance radish, it grows better in a pure white sand than anything else I have ever tried. You can raise them almost trans-

parent in pure white sand, with very little fertilizers, and they grow very quickly.

A member — Is there any plant food in granite?

Prof. Henry — There are two or three elements of plant food in granite.

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## THE TASK BEFORE THE AGRICULTURAL SOCIETIES OF THE COUNTRY IN THE NEAR FUTURE.

(By PETER T. SCHOTZKA, Esq., Gardener Insane Asylum.)

No one will deny the influence of our agricultural societies in the good results realized from the farms in the country, but we cannot help admitting that one branch necessary to successful farming as well as to the health and prosperity of the country has been so far sadly neglected, and this is

### THE FORESTS OF THE COUNTRY.

We are aware that the national agricultural department in Washington has made several efforts to have the government take the preservation and restoration of the forests in hand, and that the secretary of the interior, authorized by congress, has adopted some means to prevent the cutting down of the forests in the territories. But all this is not sufficient for the preservation of that extent of forests which is needed for agricultural as well as manufacturing purposes.

The forests should cover from one-quarter to one-third of the area of a country, if it is to be healthy and fitted to fulfill the conditions under which agriculture may be carried on with success.

And not only is the extent of the forests to be considered. We must also take into account their proper distribution over the face of the country, if we would secure the utmost possible benefit to its inhabitants. The shelter and the humid healthful atmosphere of the forests in the far western territories have no effect upon the inhabitants of Wisconsin or New York.

As the time between the planting and harvest of forest trees is between eighty years for pine and three hundred years for white

oak trees, it is of great importance to select for arboriculture those soils of the country where no other crops could possibly be produced, and limit the cost of the first planting to the lowest possible figures.

When we consider that some soils are in reality not fit for agriculture, and have to be termed on the assessor's list and on the maps as "unculturable land," would it not be a welcome sight to see young forests springing up in such places, and, though growing slowly, benefiting the surrounding agricultural districts with a humid atmosphere, shelter against high winds, and against changes of temperature, frequently so sudden and so disastrous?

In Europe the various governments have found it necessary to make the care of the forests a particular subject of consideration and legislation, and have created special official bureaus under the management of competent men, who had to serve a long apprenticeship, graduate in the science and art of forest-culture, and who have made the forests a source of revenue to the governments amounting to millions of dollars, from the poorest soil of that country. While the direct net income of these forests is counted by millions, their influence upon health and agriculture cannot be estimated. And when we consider the rapid increase of population in our own country, the wants already made upon the forests, and the present comparative scarcity of lumber, it is easy to see that here also similar measures will soon have to be adopted.

It will perhaps be objected that in the vast area of these states the millions of acres of woodland still remaining will be sufficient for all the wants of the country for years to come. But it must be remembered—

1. That this abundance of wood is found just in those parts of the country where it is least needed, and that in consequence of the expense of bringing so bulky an article as lumber to the centres of demand, it is comparatively valueless where produced, and is for the most part left to fall before the axe of the settler.

2. That two-thirds of the timber left to us is of such quality as to be only fit for fuel.

3. That in the census and tax statements a large area is classed as woods without deserving this classification.

4. That Chicago alone employs a capital of $80,000,000 in the lumber trade, and hundreds of thousands of acres of timber are annually sacrificed.

5. That Michigan and Wisconsin, the main pine timber states, which had ten million acres of the finest timber before settlement began, have only about two million acres left, and this, at the present rate, will be cut down in about five years.

6. That according to the census of 1860 the value of the lumber improvements in the United States was $3,322,522,000. All this had been cut from the soil and most of it within thirty years previous, and nothing has been done to replace it.

7. That there are five hundred thousand artisans in wood in this country, and if we estimate the value of their labor at $1,000 each per annum, we have an aggregate of $500,000,000 of wood per annum consumed as raw material for their use.

8. That it takes one and one-third acres on the average to produce one cord of wood annually.

9. That it takes three hundred acres for the production of wood sufficient to build and keep up one mile of railroad year by year.

10. That the United States sends $11,000,000 per annum to Canada for lumber, while millions of acres of land, capable of producing the finest timber, are lying waste in our own country.

11. That the farmer from year to year cuts down vast forests, to enlarge his fields, and only saves what will suffice for his domestic uses, and seldom that.

12. That the population of the country is daily increasing, the wood consuming industries are developing year by year to larger dimensions, and hundreds of miles of new railroads are added annually to those already in operation; and in general, that while the wood producing area has been greatly reduced, the demands upon the wood have multiplied, and since the larger area has been so greatly reduced in supplying the smaller demands, how will the smaller area supply the larger consumption?

From the above facts it is evident that unless measures are speedily taken to replace by plantation the supplies consumed in the destruction of our old forests, there will be an actual famine for wood in this country within the next thirty years.

Can this matter of forest culture be safely left to private enterprise?

A period of from eighty to two hundred years is required for the growth and maturity of valuable forest trees. Now if so many neglect to plant fruit trees and grape vines, the product of which they can enjoy in a few years, will they plant forest trees, whose completed growth they will never see?

To carry on the culture of forest trees successfully, it is also necessary that extensive regions should be devoted to it, for the trees that from year to year are ready for the woodman's axe are necessarily a considerable distance apart. In small isolated areas there could not be an economical adaptation of the means to the end. Forest culture can only be carried on upon a large scale.

But there is still another reason why the supply of timber cannot be left to private parties. There is needed for the profitable growth of forest trees a scientific and technical knowledge which few farmers have it in their power to acquire. This knowledge, so far as it is not purely scientific, must necessarily be to a great degree traditional. It cannot be acquired by personal experience. The mistakes of one year cannot be discovered, as in the case of ordinary farm crops, by the immediate results, for the forest tree's life outmeasures man's; the cultivator sees his error, if at all, when it is too late to remedy it.

In Germany, therefore, where these facts are fully appreciated, the forester has to undergo a special scientific and technical education. He has to serve a long apprenticeship. The culture of trees and the management of the forests become the business and study of his life.

From all this and numerous other reasons, it is evident that upon the government rests the necessity and duty of providing against the anticipated deficiency in the supply of timber, by initiating and controlling the plantation of new forests, as well as the preservation of the old.

It is not necessary to cite the disastrous consequences which have occurred in those parts of the globe where the destruction of forests has taken place, and which have been described by travel-

ers in a most alarming manner. They are doubtless familiar to others as well as myself.

In 1869 I sent a memorial to congress in respect to the destruction of our old forests. I have not changed my opinion on this subject since and believe that it cannot be refuted.

I hope that all far-sighted men will share it with me and assist me in my patriotic recommendation.

DISCUSSION.

Isaac Huyck, Sun Prairie — I have a small piece of timber composed of black oaks, etc., and they are dying. I wish to replace them and keep that grove as it is. What is the best timber that I can put in there to replace those trees that are dying? They are what is commonly called second growth; the older trees are now dead and the younger ones are dying.

Geo. P. Peffer, Pewaukee — Can you tell the cause of their dying? Is it drouth?

Mr. Huyck — I think not.

Peter P. Schotzka — Are they dying from the top?

Mr. Huyck — I think they are.

Mr. Schotzka — The tap root is coming to the poor soil, and the very moment that tap root strikes the poor soil the top will die out.

Mr. Huyck — I guess I was a little misunderstood by the gentleman in regard to the dying out of this timber. I will state that the timber that is dying out is not confined to one kind of a tree. He states that it dies from the effects of the tap root reaching the poor soil. The poplars that are in that space die as readily as the black oak, while the burr oak standing on the same space still lives. If the gentleman can say that poplar has a tap root which reaches down to poor soil I will believe it.

Senator M. Anderson, Cross Plains — I would like to ask Mr. Huyck if cattle run in that grove.

Mr. Huyck — Yes.

Mr. Schotzka — That is sufficient.

Senator Anderson — It smothers the roots.

Mr. Huyck — That I do not think will answer, because I can

cite these gentlemen to pieces of ground that are not pastured that this circle is increasing in. It begins in one corner of a piece of ground and will spread even where there is no pasture.

Mr. Schotzka — Certain trees will not grow on every kind of soil. In the old country we have to study hard to find out which is the right kind of soil for every tree. We can never say anything about what is the matter with a certain kind of tree, unless we examine the soil. We can suggest what may be, but we cannot say positively what is the matter. I suppose the soil is not fitted for that kind of tree.

J. N. Ames, Oregon — My experience is that poplar is a short-lived tree anyway. I have probably more timber than any other man in my town. I have probably seventy-five acres of young trees, and people are surprised that I do not cut it down and send it to market, but I thought it was better to send my boys to school and let my timber stand. The result is, I have some of the finest groves in the town, and my cattle have never run in them. I have no trouble with trees except the poplars, and they are short-lived, I find. I find that the black oak springs up where there were burr oak openings. That seems to be the coming timber. I think the people have been too careless altogether with regard to it. We talk about these things; we reason here together, but what does it amount to to talk these things over and never take any action? I have taxed myself with action, and if you were to see my wood lots you would say I was correct. A great many people say: Who cares for the next generation? I do. I want to leave an inheritance to my boys, so that they will thank me for my care and thought.

Mr. Huyck — Have none of the black oaks died out in your grove of young timber?

Mr. Ames — No, sir; it is the poplars that die.

Geo. P. Peffer, Pewaukee — This gentleman was remarking about young oaks dying out. Where I am living we have second growth timber, that is, ever since 1864. It is twice now to my recollection that the black oak groves have more or less been dying out, but invariably on the south and southwest sides. Some of them had been pastured and some had not, but on close examination I

find that the forest leaves had been blown off by the west winds, and there was no snow in the fore part of winter, and the roots got killed by frost. We had the fall set in dry and it thawed out in the spring dry, no moisture during the winter, and as far as there was no mulch but leaves on the surface, invariably the trees, if they did not die right out, commenced to die from the tops down, and dwindled down for a year or so, and finally died. Fire blight also will have an effect in the same way. That is all I can say about it. As to setting out new trees in those places, I should take box elder, or maple, or white ash. Either of those trees will grow on those places. Black walnut is good.

William Gill, Brooklyn — My woods are getting somewhat similar to the woods of the gentleman from Sun Prairie, but I do not feel any alarm about it, because there is plenty of burr oak and white oak to occupy the ground. I simply concluded that black oaks had to get out of the way. I picked up in December more than enough black oaks to furnish me with wood all this winter, but there is plenty of white oaks and burr oaks to occupy the ground to better advantage than the black oaks ever would. I do not feel any alarm about their going. It is because there is not room for all; something has got to get out, and it is an illustration of the survival of the fittest.

Clinton Babbitt, Beloit — I can give you, from experience, the way to save these black oaks. I have done that. I think it is better than to supply their place. You must remember that these black oaks have come down to us from a former generation — they were the associates of the Indian. They are very pleasant mixed in with a few burr oaks; they are in my opinion very beautiful. Now I have a number of acres in my front yard — no cattle, of course, are permitted to run among them. A great many years ago I discovered that one near the window where I wanted it for shade, began to decay and die down some ten feet. I cut it off, and it is as fine a tree to-day as you usually see. Now I believe that is the way to save the tree. Manure the land, put on ashes and as much of the leaf manure as possible, and mould and all that sort of thing, and I believe those trees can be saved. I cannot give any scientific reason for it, but I have tried it fifteen

years, and that tree still lives in spite of all that science has told me: that they would not survive any longer than the Indian; that it had got to go with civilization. I do not believe any such thing. I believe they will live if they are cut off from the top, and I believe it for the reason that the trees have lived.

Mr. Schotzka — There is no saving in sparing your old trees. A tree gets to a certain age just as we do, and then there is no more use to it. If you leave that tree standing you only lose capital. Cut them down as soon as the annual increase gets up to the average growth and put another one there. Then you have always got thrifty, growing trees and not old forests standing there only to fall back. At the same time we have to look after our mountains. The forests on the hills are the main thing. They are the lungs for the country. They spread good fresh air all over the country. The forests down in the valley cannot. There is unhealthy air if you keep forests there. Their proper place is on the mountains where nothing else can be raised, and by and by the forests will be brought to such an extent that the farmer can come up with the plow. No other crop will grow there but forests. But suppose you leave your mountains naked and heavy rain falls come; they will wash the good soil off and leave nothing but rocks there, and that piece of ground is lost for hundreds of years. Therefore leave the forests on the mountains where they are a beauty to the country and bring health to every man. There they do not disturb your income. There they are just where you want them. And put forests on every piece of ground you cannot use for anything else.

J. W. Wood, Baraboo — When I am at home, my daily occupation is chopping down forest trees; getting them out of the way. I have too many, and of course I must feel a little touched by these friends who advocate the planting of forests, because that is not my practice nor my experience. I would make one general assertion in reference to forest countries, and that is that a heavy timbered forest country is one always of slow settlement, where the people suffer a great many privations, and it takes a generation or two to get the country into good living order. That is the general history of timber land in our country. Where the

main body of the timber is cut off, and once in a while a patch preserved for a generation or two, that particular patch becomes of value; but if all or a great portion of the timber had been left, there would not be any particular value attached to it. I have acres now of timber land which will yield fifty or sixty cords of wood to the acre, and aside from the logs which I haul away. I would give an acre of it any time if it could be changed into an acre of good clover. That is my estimate of timber in a timber country. A piece of good timber in a prairie country, if it could be had, would be a good thing. It is an easy thing to talk about planting a forest. I do not think it is a possible thing to raise a genuine forest by planting. From the trees I cut I will oftentimes get forty or fifty feet of body, straight, without a limb. I have had white oaks and basswood from which I got sixty and sixty-four feet of wood fit for timber out of one tree.

I have seen a good many trees that have been planted, and I have seen them grow up to good size, but I have never seen one that would make a sawlog; and when we talk about planting trees for economical purposes other than firewood, I do not believe it is practicable. I judge that the process by which nature has done it is, that when the first growth sprung up to a reasonable degree of height, perhaps to what our planted trees might grow, that then other trees would start, and, wanting the sunlight, would reach a little above the first, and so successive growths would keep on from generation to generation until we would have our native forest timber, which is very fine. But I would like to know if there is a man here that ever saw a planted tree that made a good, comely sawlog. I never did.

In reference to the black walnut, I remember, when I was a boy, hunting up the black walnut trees in the woods, and they would be fine large trees. We would get four or five logs out of a tree. I got nuts out of a tree and planted them when I was a boy. Those trees would grow large enough for a sawlog, and they have been bearing now for years. A few years ago I gathered some of the walnuts from the trees that I planted when I was a boy. I planted some of them and I have now got the second crop in bearing. They are a fine tree, but they do not make

timber. Parts might make veneering or something of that kind, but there is nothing like the old original trees, and I think men will be disappointed that plant, and especially on poor land. The gentleman says there is poor land that ought to be devoted to timber. You notice the timber that grows on poor land and the timber is poor. If you want good timber for any purpose it must grow on good land. The better the land the better the timber. I have seen pines growing on land that would be pretty sandy for cultivation, but as a general thing the pine trees of better quality grow on good soil. You cannot grow good timber on poor soil. I think that a paradise of a country would be a prairie country which would admit of rapid settlement and good culture, and then let every man have an interest which would lead him to plant a patch of timber for shelter, and in a few years he can get his firewood, and everything would be better than it could be in two or three generations in a timber country.

Mr. Schotzka — When we started to raise farm crops in this country, did not we find everything beautiful? Wheat was growing up to the ceiling. But where is that wheat? It is the same thing with timber. But we need more for the present than timber. At the same time, to raise wheat we must have timber to give us shelter and the humid atmosphere and protection and everything. Timber is not raised for agriculture alone, but for manufacturing purposes. But, gentlemen, this country will be populated more than it is at present. It will be populated so that every foot of land will be taken in. Should not we consider this point and put the forests to such uses, even if they do not grow much? Then we have forests anyhow and something to protect our agricultural products on those places, and not sow wheat until we have to cut down the forest in the low places, and the hills are naked and washed off.

Wood serves two purposes: first, to supply the wants of the country, the manufacturing and ship-building, and all kinds of business; and at the same time, from one-quarter to one-third of the whole country must be covered with wood to protect agriculture, and that is the main point of all. You have no idea how much timber is cut down. People see fifty or a hundred acres of

forest and say, "what a big forest; there is plenty yet." If they only had an idea what calls are made on the forest, they would give up right away and say, "that little bit of a forest will not build three shanties." Think of fifty millions of dollars of wood in one single city. How many millions of trees are sacrificed to that capital and how many other cities there are. They are slaughtering the forests. I would like to see some one who can deny that; and if you want a true statement, just to the very hair, I will give it to you by the next meeting. I have not time to consider the whole matter.

Mr. Theobold, Iowa county — I agree a good deal with the gentleman that spoke last on the subject of forests. I was a little boy when my father went to work on a farm in the woods, and as soon as I grew big enough and heard of the prairies of the west, I cleared out for the prairies. I have never been sorry that I came to the prairie. I did not exactly get on to the prairie. We were rather afraid in those days to get too far away from wood and water, and we got somewhat into the opening, and we are not as well off as a great many of my neighbors that got on to the prairie. Now these openings are growing up to a young growth of pine, young oak and poplar. I believe there is a hundred cords of wood to-day around my neighborhood to one that there was when I came into the country. It is wonderful how the young timber has grown in the last thirty years, since the fires were stopped from running on the prairie. Of course I agree too with men that want to preserve the timber for generations that are to come after us. I remember getting forty acres of land of Uncle Sam thirty-three years ago this winter. Myself and some of my neighbors cleaned the timber entirely off it for rails, and to-day I own that forty acres of land, and I suppose there is fifty cords of wood on every acre of it. I do not think we have any need to fear if we preserve our young timber that is growing upon land that is almost worthless for anything else. I have, I think, one hundred and fifty acres of timber to-day, and a great deal of it is occupying good land. I told my son a little while ago that we would have to chop it down in order that we might make it pay us something for taxes, for it was not worth the taxes on it.

J. C. Plumb, Milton — There is a practical side to this question. These farmers here who have worn out their youth in cutting down timber feel as if they did not care to do it again. We do not want them to. I have examined this subject in connection with my business enough to be satisfied that in the next ten years there is going to be a great want felt for good, first-class timber. As Mr. Huyck says, the groves around us are dying out and must be replaced. Good, first-class timber, especially pine, is disappearing rapidly. I want to commend the concise and valuable paper which our German friend has read here to-night (Mr. Schotzka). It is full of good meat. A year ago last November I spent a week in Kewaunee and Door counties, and that once most beautiful and heavily timbered portion of our state is now almost as desolate as the prairie for want of timber. Large sections have been cleaned out. I said to the farmers, "You are just about as bad off as they are on the prairies for the want of timber, and if you keep on cutting down the last tree, you will soon be in desolation." This last November I was four hundred and fifty miles southwest of St. Louis, in the town of Wichita, and passing along the street I saw a lumber yard with the sign "Wisconsin Lumber." I found lumber through southern Kansas was selling for from two to three dollars a thousand, only, more than the retail price in Wisconsin. Now what does that mean? I found Wisconsin lumber all through the southern and western states, everywhere. It means an immense drain from those great prairies, which are building up their buildings on northern lumber. The inevitable result must be the exhaustion of the supply. Then people have an idea that Wisconsin is a big state; when you get one hundred and fifty miles north from here you only strike the center of the state, and from there to the lake shore it is a heavy timbered region; whereas the timber field at its greatest width is only about a hundred miles wide. When you get fifty miles above the central part of Wisconsin you leave the heavy timber. From there to the lake shore it is of an inferior character. On the other hand the belt narrows both east and west, so that the northwestern portion of the state is lightly timbered and the northeastern part, though better supplied, is becoming very thin.

Now the result is inevitable. I believe the farmers had better begin planting at home.

Now I want to say to my friend Huyck to put in the white ash; black oaks are bound to go. Look at this capitol park. Those of you who were through this park twenty-five years ago know that the black oak and other native trees were the main trees here; there was little of anything else. To-day not one-tenth of the trees here are native trees. The native trees have passed away, and the trees here now are trees which have been planted here. So it must be. I believe those black oaks were starved to death. The fact which Mr. Babbitt gave proves it; the tramping of the ground, the blowing off of the leaves and other causes have produced an exhaustion of the moisture on the which tree feeds. A black oak whenever it is tramped, under any conditions, dies. It dies because the ground is packed and cannot hold moisture, and hence it starves. Cutting off the tree saves it from immediate death. So I say plant a white ash. Save all the burr oaks because they are the trees that will stay. Plant the hard wood trees first. But there is no tree that can be planted so easily and which will grow so readily, and is worth so much in the end, as our native white ash.

H. Robbins, Platteville — I think the question before us is, what shall we set out? What kind of trees shall we set out for forest trees? Down on the prairies where we want wind-breaks, where we have cut down our timber, we want to replenish it, and the practical question is, what shall we set out? I had sixty thousand evergreens imported from Scotland. The first year I lost six or seven thousand. I have now four thousand that I have set out as standard trees on my farm. I had a good many that were entirely worthless. But I can select out of those, and the first one that I would select would be the European larch. I have the European larch that have not been out now ten years, that I can cut from two to three posts off from to-day. They are not as large as our fence posts generally, but they are large enough for a wire fence. I have what is called the Ontario poplar. It was taken from Scotland. It is a little different from our poplar. That is not the cottonwood. That grows very fast and makes

very good timber. Those that were set out at the same time are perhaps twenty feet high and some of them over a foot through. They have been out less than ten years. I have the Waymouth pine. It is called the Waymouth pine in Scotland. I think it is called the white pine here. I have some of those trees that are from twenty to thirty feet high and they were set out in the nursery very thick when they were small. I have not thinned them out, and they make one of the best wind-breaks. They are as good as a tight fence. They are better than a tight fence. I have rows there now that are better than a tight fence and they are from fifteen to twenty feet high, and they have been out less than ten years.

I have in my orchard about two hundred trees. When I put out my evergreens I put out my orchard at the same time. I have not thinned them out much, but in going through last fall there were a good many trees I had not seen for two or three years, and I found them just as thick as they could hang with winter apples. The blight had not touched the leaf. In other places where the wind and sun came to them they would be sun-blighted. In my evergreen forest I did not find a tree where the leaf was even scorched. We in the southern part of the state want to plant some kind of trees, and the question is, what kind of trees can we plant that will be most profitable and will grow fastest. I tried the soft maple. I did not like it at all, although I have got a fine wind-break from the soft maple, but I would not recommend anybody to plant that tree. When it comes to Christmas almost everybody wants an evergreen, and I have been letting them take them for twenty-five cents apiece. Almost everybody takes tall trees. I am going to stop that, because they are worth over twenty-five cents apiece to me to let them go for timber. Neighbors have come there and hauled off trees that you could not get more than ten into a wagon, and I have never charged to exceed twenty-five to thirty-five cents. For the Norway spruce I charged thirty-five cents. All other varieties except the larch I have sold at twenty-five cents, and there have been thousands of them distributed through our section of the country.

George A. Austin, Neillsville — Coming from the pine woods

of the north, I would like to defend the lumbermen. From the remarks made by the gentlemen, most of them seem to think they are slaughtering pine for the sake of slaughtering. The fact is they are compelled to cut the pine to save it, and the estimates made by the best judges in the pine districts for the last ten years are that more pine has been destroyed by fire running in the woods than has been cut off and run down the stream to market. There are frequently large tracts of pine lands where the fire goes through them, and they have to cut them and get them to the market for what they will bring to save them. Within one or two years after the fire goes through they become worm-eaten and worthless.

While up I wish to make one suggestion in regard to forests being necessary to the growth of cereals, and wheat particularly. I am willing to admit that forests are a good thing, although I come from a country where we have a great deal too much of a good thing. I would call your attention to the fact that while on the prairies to the west of us, where you can ride all day and not see a forest tree nor a forest; wheat grows, matures, ripens and gives a good crop. With us, you have to ride a considerable distance to find an opening, and when you find one you can see across it. You cannot get out of sight of timber, and hardly out of a stone's throw from it; and our wheat crop is a failure. I come from Clark county, and it is the same thing in Chippewa, Eau Claire and all those timber counties of the north on the Chippewa, Eau Claire and Black rivers, and even the headwaters of the Yellow river. I think it is worthy of consideration by the members of this convention who think that it is absolutely necessary to have forests to grow wheat, to contrast their theories with the fact. The fact is they do grow wheat on the prairies, and the fact is they cannot grow it in the timber.

W. W. Field, Madison — I came to this state in 1852. I have been through the southern portion a good deal since that time. I have not been a close observer in relation to this matter because I never had any fears but what we had plenty of timber in Wisconsin, but from my observations I believe that we have more timber to-day in the southern portion of the state of Wisconsin

than we had thirty years ago, and really you may say not an acre of it planted. Now so far as cutting off all the timber in the northern portion of the state is concerned, I have no doubt they are cutting it off faster than it is growing, but every acre of timber which they clear off there to-day, in thirty years will be again covered with a beautiful growth of timber, if they will keep out the fire, and if they do not, it is wholly unnecessary to plant timber, for unless you work that land and work it every year for a long time, fires are liable to run through it and kill your young timber. That is true everywhere. Now so far as one gentleman states that it is so important for the raising of all our grains, that we should have timber, I wish to say to him that I have seen thousands of acres raised last season where there was not a stick of timber within sight, and as fine as I ever saw raised anywhere. Now I think if anybody is going to talk about raising timber, let these great prairie states west of us take up the question. Wisconsin never need be concerned; she will have enough timber as long as our children and our children's children remain to people and cultivate the lands of this state.

Mr. Stickney — In relation to the timber planting, in the first list I gave, I gave them in the order in which I would consider them of the greatest value when grown, but in the order of planting I would reverse the order completely; commence to plant with white willows and cottonwoods, leaving the willows out if I could have the cottonwoods, and simply because the cottonwood is so very hardy and takes hold so very readily, it forms a shelter for the others, and also it gives something for timber and fuel sooner that any of the others, though not of good quality.

I am aware there are many trees recommended, especially for high ornamentation, not recommended here. I have only given the most valuable for use. I leave out the locust because in the south and central part of this state it has proved almost worthless, owing to the depredations of the borer. It is a valuable timber. It is a disagreeable timber to have around, from its thorns and its propensity to run all over creation, but it has a value. The common yellow locust of our country I regard as equal to red cedar, perhaps, as a fence post. I value it very highly, and it would be

almost invaluable in all localities where it would grow, if it were not for the depredations of the borer; but as a rule, all that are planted are either destroyed or rendered useless by the borer, and that being the case, it has by common consent I think been thrown out from all lists of nurserymen, and of general planting. For that reason I left it out. The tree called the black oak, a tree with a smooth bark and quite black — the honey locust — does not have any of the enduring qualities of the other, at least not to any such degree.

Aaron Broughton, Evansville — To encourage timber culture, would it not be well to exempt timber land from taxation?

Mr. Stickney — I presume it would, and that is being done largely. While I am on the floor I would like to say one word in answer to Mr. Wood. I agree in the main with Mr. Wood in the first part of his remarks. When you have old, thoroughly grown timber, it is just as important to harvest that crop of timber as it is to harvest a crop of grain when it is ripe. It has then attained its best estate and is going back. In this one hundred acres of timber that I am now cutting off I gave the age of the oaks as three hundred years. I have really counted tree after tree that counted four hundred years as the age of those oaks, but I wanted to keep within the bounds of possibility of believing. I have not a doubt in my mind that those trees, for the whole lot, could have had the same market one hundred years ago and brought the same price then that they bring to-day, and they would have been vastly more valuable then than now. I think they have been losing in value for a hundred years. The finest looking trees amongst them, three feet in width at the butt, have decayed places up towards the top where a limb has died and spoiled them for timber beyond that, and all the crop is ripe and ready for the harvest. It is a lack of economy not to harvest it and get the most value out of it that can be got out of it. At the same time we must not lose sight of the fact that it takes a long time to renew, and we are not taking the energetic measures that we should to renew, but there will arise a remedy for all that. Germany and other European countries have their remedy. A farmer is obliged there to take off and put in each year so much land in timber, to put

out so much land in timber and to remove so much on certain lands, if not on all. I do not know that they are on all. Now does anybody doubt that when the pressure comes upon us as it came upon them, when fuel and lumber become so scarce as to make it an object to do that, that this intelligent, wide awake thoroughly alive people will do what is needed and enact laws? Not in the least. It may be in the remote future, and I think it is, from the fact that we have thousands and thousands of acres of timber, and growing timber, and timber inaccessible to-day, but when the demand sharpens a little, new lines of transportation will be pushed into those places and it will be brought to us; but when the time comes that that supply begins to fail, we are not so stupid as to sit idly by and freeze to death. Mr. Wood is not as good a student of nature as I supposed he was. I am very much disappointed in him. All I want to correct is the statement he made that he did not believe it was possible to raise good timber from planting. That cannot be so. If Mr. Wood will go and count the rings on those large oaks that he is now destroying, he will find that it has taken one and perhaps two hundred years to make them what they are. If Mr. Wood will go into any grove about him of young growing timber that has sprung up wild and is now twenty feet high, he will find that the thickness of that planting has crowded that timber up until he has got just as straight and trim and handsome little bodies to make large sticks like those he is cutting, a hundred years from now, as those he is now cutting. What we want is simply to follow nature, and in planting, where it must stand forty feet high, plant within four feet of each other, so that the growth you give by cultivation and otherwise shall be pushed right up in these straight rows and bodies instead of being allowed to sprangle out and have all the breadth it needs. That mistake was made in tree planting in the south. They thought they could prune those trees and get them into shape. They soon saw it cost more to do that pruning and then have them sprangling out, than it would to plant properly. The cost of planting is trifling, and after a while the thinning out will pay for that labor, for hop-poles and other uses.

J. N. Ames, Oregon — What will apply to one locality will not

apply to another. In our deliberations here we should so set forth our views as not to discourage those who need encouragement. I do not get up here to argue on my own account, because I have plenty of timber. Another man from a heavy timbered country says it is a nusiance to him, while in more sparsely settled countries they need encouragement and instructions how to manage.

Now there was an argument up the other day that I could not indorse — the idea of Mr. Babbitt's paying $7.00 for straw. One man said he would sell his straw for three dollars a ton, and another was willing to sell his for a dollar and a half. That might do for some men, but I am speaking of a man whose land might not need any manure. He does not know what to do. He cannot raise a crop of oats. But in my case I do need it. I have a soil that needs manure, and I say we must put back something. That class of men who will burn their straw are very apt to be the class of men that have not the means to use it in some other shape. Therefore it is very essential in all our deliberations to be careful that we do not throw a wet cloth on some sections where they need assistance.

J. W. Wood, Baraboo — I think friend Stickney might not have been present when President Fratt read his address. In that he said, if I understood it, that men should not be held responsible for what they said here. If I did say anything that prompted him to the spirited discussion we have heard, I think it was doubtless well said. I would add one more thing to what I said. I have had some experience in the timber section. When I speak of timber, I do not mean the burr oak and white oak ridges and the black oak and poplar that come so thick, but we have timber in the Baraboo valley; tall, straight timber. On the place where I live the building site was selected at an early day and quite a number of fine, tall, straight maples were left as ornament as a matter of course, and when I went there they were in very good condition and I was very glad they were there, but I have always thought that this timber will not stand the advance of civilization. Those trees commenced dying in the top. Maple, after the limbs are dead, very soon becomes unsafe. It breaks

easily and rots fast, and every spring I have deemed it prudent and necessary to go and chop down some of those beautiful trees because they were unsafe in the yard, and I have had to replace them with new stocks of smaller trees which will grow up under the new conditions and adapt themselves to it; and now if I was going into a timber country and wanted to have an ornamented place, I would clear my building spot right off of everything that was there in its wild, native state and reset trees. You can all find trees in the timber which will do to reset and which will assume the proper top and proportions and conditions for the open country, but it is a fact that native timber does not stand civilization. You might think you could leave patches here and there, but the moment you take away the support on one side, trees will begin to blow down and break off and rot, and it is a continual threatening of danger. I have never had any harm done by their falling, but it is not an unusual thing on a windy day to hear trees crackling and falling within thirty or forty rods of my house, and I went the other day and chopped down several trees that were getting weak and I was getting afraid of them. The timber gets ripe and then is the time to harvest it, and we cannot leave patches of heavy timber in a heavy timbered region and have them continue as good as we left them, especially if we let stock run through.

J. C. Ford, Madison — I would like to ask the gentleman who has reported the recommendation of the committee, why they did not include the black walnut in trees that are to be planted on the lines of farms or the street. It is recommended there among the first list of rapidly growing trees, and it is certainly a very ornamental tree. It is a tree that bears abundantly of choice fruit, and the lumber is very valuable when grown. The tree is not so apt to be broken down by the wind, I think. The branches are quite sturdy, and it seems to me if the people in the country would plant those trees on the lines of the streets, say four rods apart, so that they would not shade the farms too much, they would have both fruit and lumber in case the tree was blown down, or if they wished to cut it down for any reason.

Mr. Stickney — The gentleman will notice in the list I gave

that I reverse the list in planting. That would bring the black walnut last on the list, simply because it is not the most rapid growing of those trees. All the gentleman claims for the tree in quality is true, but if you will notice it wherever you may find it standing singly, you will see certain little objections to it as a street tree. It might do very well as a street tree on the country roads, but not in towns or villages.

Mr. Ford—I spoke of it simply in reference to the country. The reason I spoke of it is, I had no idea it would grow in this country till within a few years. My brother has a few young trees on the street in this city that are bearing abundantly, and they are probably over twenty years old, and perhaps the diameter of that column. They will bear perhaps two or three bushels apiece, and are a very handsome tree in the grounds.

Mr. Stickney — I have been in Wisconsin thirty-two years, and I have on my grounds now trees of the third generation bearing nuts now, in thirty-two years. If you will observe a black walnut anywhere standing singly you will observe that vegetation under it is comparatively scant as compared with a linden or almost any other tree. Whether it is the drip from the tree or the intense feeding of its roots I do not know. It is a very gross feeder. It is a very great exhauster of soil. You will find no crop growing under it, or immediately under it, with the same thrift that it grows under other trees of similar size. You all know that it sheds its foliage very freely. It comes out a little late in the spring, which is rather against it as a street tree. You all know also that semi-occasionally it is partially or entirely denuded about midsummer by a certain caterpillar which, after having taken the tree entirely off, gathers on the body in a rather uninviting mass and goes through its transformation. The drip has a discoloring quality that will disfigure a fence or be seen on the ground under it. It is not a real cleanly, nice, inviting tree as a shade tree. All its timber qualities, its free growth and all that, are excellent, but it is a tree that I do not think we can generally favor as a street tree, particularly in a village or a city. On the main highway where there is four rods of space comparatively going to waste, I think it might very well be planted and it would be a good way of utilizing that waste ground.

Mr. Ames — I have seen a statement somewhere that it is not safe to have them near an orchard. I wish some gentleman would explain that.

Mr. Stickney — It is such a wonderful feeder.

Mr. Ford — I think it would be well to ascertain whether it is a fact.

Mr. Ames — I have seen it so stated.

Mr. Ford — I know that in the neighborhood of these trees here, are fruit trees growing abundantly.

James M. Smith, Green Bay — In my native home on my father's farm, I remember of black walnut trees in the orchard, and I never knew any difference between the bearing of the apple trees near them and those far away. The ground was manured in the orchard and cultivated.

Dr. P. R. Hoy, Racine — One reason, and perhaps the greatest reason why the underbrush does not grow under the black walnut is, that the juice of the leaf is poisonous to almost all vegetation. We all know that the juice of the leaf will keep away almost all insects. If you make a decoction of it and sponge off a horse with it, it will keep off flies. The poison in the leaves is the reason there is very little underbrush under the black walnut. I understood last night there were questions asked why trees were killed by a certain worm that mined under the bark. It is a species of beetle. Most of the species are very beautiful. The worm runs around under the bark and makes all sorts of figures, and of course if it runs all around, it is death to the tree or branch. It is a small beetle, nearly like what we call the springing beetle. There is one that does great damage to the apple trees in orchards, especially if the apple tree is a little touched with frost on one side. There they will get hold and run clear around and destroy the tree, and the wind will take it down. The larvæ of these long-horned beetles go right into the tree; for instance, the hickory and maple, and I have discovered one this last year that goes into the black walnut, but they are a very rare beetle, and not likely to do much harm. The one that destroys the locust tree everyone is acquainted with. It is a beautiful, striped, long-horned beetle. The larvæ of the beetles destroy the tree.

J. C. Plumb, Milton — I desire to answer the objection which was made to the continuance of native forest trees. Some years ago I was in the western limit almost of Waupaca county, and I saw where a farmer had tapped his native sugar grove. They were old trees, as old as any in the country. He had cut them down about one-third at the top. I noticed that he had been doing it for several years in succession. I inquired what he meant by it and what the result was. He was a native of Germany. He said it was the only way he could save his native sugar grove, and it was so far a success. I believe that will prove true of all classes of trees. The native sugar maple is a tree of such value in itself, that if by cutting off one-third of the top when the forests are removed it can be perpetuated, it is certainly worth the experiment.

Mr. Wood — That has been done a good deal in our country, but when you cut off these side branches it makes a hideous looking tree.

H. Robbins, Platteville — Over thirty years ago I went into the forest and got the hard maple and ash — I suppose it was a white ash, but it might have been the black ash — and I got the elm. Those trees I set out about thirty-five years ago, and I have watched their growth since that time. I cut down one of the ash last spring. It was about six inches through, being a slow grower. It was probably fifty feet high, and it was so it shaded my house. I wanted to let the sun into my house; that is why I cut it down. The maple, I think, is the hardiest tree I got from the forest, and set around my house. On many of the hard maple, even the limbs have not died. Now the largest are about thirteen inches through. The elm is from sixteen to eighteen inches through, and the ash about six. That is about the way those trees have grown in the southwestern part of the state, but I did not think they were ornamental enough, and so I set out evergreens. The Scotch pine is perhaps as good a tree as we set out as an evergreen. I see the European larch does not have much favor in that paper as a tree of utility and beauty. It is the first thing that comes out in the spring, though it is not an evergreen. You will find the European larch leaves out in the spring from one to two weeks

ahead of any other tree. It is the handsomest tree among the evergreens that I have got. I class it with the evergreens because it is so beautiful and comes out so early in the spring, and it is a very rapid grower, and it grows as it does in the forest, that is, very close together. I have no doubt I have some that are forty feet tall to-day.

Mr. Ames — Is it anything like the tamarack?

Mr. Robbins — A northern man might say it was the tamarack. I do not know but it is the American tamarack. The Scotch fir is a very beautiful tree. I have them and the Waymouth pine, which is the white pine; the European larch and the Scotch fir and the Scotch pine. The Scotch fir is a much finer tree than the Austrian pine. The Austrian pine is a coarse tree and a rapid grower, and makes a fine windbreak; but I have more Austrian pines than any other, from the fact that there is hardly any sale for them. I suppose I have three thousand to-day on my place, two and three and four inches through. They have been set out about seven or eight years. My idea is, we can raise timber in our country if we want to for firewood, but I do not know about raising these forest trees. The reason I cut down that ash was because it grew so slow I knew I should never see much benefit from it. It made four rails; it had only been out about thirty years. I do not know but for firewood that would pay. I believe that in the town I live in there is more firewood to-day than there was forty years ago. In some towns west of where I live, where they had heavy timber, they have cut off their timber, but we have preserved ours. Wood is cheaper to-day in Platteville than it was thirty years ago. My opinion is there is no cause of alarm for firewood, but I think our pines are going too fast.

Mr. Plumb — Last week or week before last I was at De Pere in this state. The managing man of the largest woodware establishment in the state put to me the question, as to the expediency of the plan of growing hop poles. I said: "Do you want to grow them?" He said: "Yes, we want to." He finally said to me that the company had one hundred and sixty acres that they were determined to put into hop poles, and the most practical manner was the question that they were earnestly looking for in-

formation upon. I figured up how much it would cost. He said they were buying them to-day for less than that amount. I asked him then, why not buy them. Said he: "The question of cost is not anything, it is the question of supply. At the rate they are being exhausted, by the time I can get a crop of hop poles they will be entirely exhausted, and we shall have to go out of the state for them." That is the opinion of a man who is buying very extensively in that direction, and they say it holds true of other classes of valuable timber.

G. J. Kellogg, Janesville—The Yankee will supply that deficiency when it comes to that point. The greater trouble is to supply our pine lumber. We have wood enough in the southern part of the state where there was a scarcity of wood years ago, as Mr. Robbins says. There is more land now in second-growth wood than there was thirty years ago. But the trouble is for our pine forests. If the state will not take it in hand to preserve in some way the future supply of lumber where the pine forests have been cut off, we shall be short. We cannot set out and grow timber sufficient for our lumber supply. Now, in regard to these deciduous trees, I think the butternut ahead of anything else, unless it may be the hickorynut, for a good producing tree. It produces very rapidly, bears young and is a very fine, ornamental shade tree for a street or for a line tree. I would prefer it much to the black walnut so far as its producing qualities are concerned. It is very easily grown. The hickory, I find, is very difficult to grow. That is perhaps the best nut we can grow in the state. It is very difficult to transplant and I have found it very difficult to germinate. I wish we had more time for this deciduous tree question, but we have other papers pressing upon us and I do not want to take your time.

Geo. A. Austin, Neillsville—I do not see what the legislature can do to protect the pine forests by stopping cutting, or by preventing anything else being done to the ground after the pine is cut off, from this fact: You cut down a pine forest, and it does not reproduce pine; it grows up hard wood. If nothing else comes up, it is poplar. Usually, in Clark county, where I am best acquainted, it comes up to maple. Unless the legislature

can get a corner on Providence, and make it change its laws, I do not know what they can do about it.

A. G. Tuttle, Baraboo — I have seen that same thing in Michigan, that it does not reproduce pine after it is cut off. Where I was traveling I found an abundance of young pine, from a foot to two and three feet high, to stock the whole country, but it was agreed in Michigan that the timber that was produced after cutting off the pine was oak. Now, the way pine is being cut off and used up, if we have such winters as this, it will not be long before a large proportion of the pine will be destroyed; but still I believe there is more being destroyed by fire than by the axe.

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## ENSILAGE.

By Hon. I. C. SLOAN, Madison.

"Ensilage" is a word recently imported into our language, and as a verb means to preserve green forage in a pit. Silo is the pit in which it is preserved. Ensilage as a noun means the forage in its preserved condition. These words impart to the American mind a new idea, and signify a new method of preserving forage crops for the winter feeding of farm stock.

This method, in brief, consists in cutting fodder crops in an entirely green state into comparatively small particles, packing them in pits under a very considerable pressure, and thus preserving until the winter season, for feeding to farm stock of all kinds.

So far as we have information, this method of preserving green fodder, in its present improved condition, originated with Mr. Auguste Goffart, of France. He commenced experimenting in 1850, and has pursued his experiments with zeal and intelligence to the present time. In 1852 Goffart built the first silos of masonry of which I can find any account, but his purpose then was only to preserve the fodder for a short time, and they were usually emptied within three or four weeks after they were filled. It was not until 1872 that he had his first real success in preserving fodder for such length of time as he desired to keep it. That year he raised two hundred tons of green maize, which he packed

in his silos in October, and did not commence feeding it until the following March, when it was found to be in a perfect state of preservation, and so continued until it was all fed out.

(The discoveries which he made that year, and which seem to have made the method a complete success, were that the fodder should be cut into very short pieces, not more than four-tenths of an inch in length, and that after placing it in the silos heavy weights of stone or other material should be placed upon the planks that covered the fodder, not less than one hundred pounds to the square foot, to expel the air from the fodder and exclude the external air, as far as possible.)

The value of Goffart's experiments was soon recognized in France, and in 1876 the French government, in recognition of the value of his discovery, bestowed upon him the decoration of the Legion of Honor.

It will be observed that this method of preserving fodder is of very recent origin, and so far as I know, was first put in practice in this country within the last two years, but has spread very rapidly, and a large number of silos have been built in the eastern states, from which farmers are now feeding their stock.

The process is a very simple one and can be readily understood and practiced by any intelligent farmer. The three conditions which seem to be necessary to success are: the exclusion of air to as great an extent as possible; the entire exclusion of water, and as little change in temperature as practicable.

Silos are built of some kind of masonry, stone, brick or concrete, pointed or plastered on the inside with water-lime cement, grouted on the bottom with the same material, so as to be entirely water tight. So far as the size and shape of the silos are concerned there seems to be practically no limit, except the need, the means, and the convenience of the builder.

Dr. Bailey, of Massachusetts, who has published a book on the subject, and has had silos in successful operation for the last two years, recommends that they be built double, each twelve feet deep, twelve feet wide and twenty-four to thirty feet long. These will have a capacity of from eighty to one hundred tons of fodder each. The compressed ensilage is said to weigh from forty-five

to forty-eight pounds per cubic foot. The only advantage of building them double seems to be that the center wall is the side of each silo, and dispenses with the cost of one side wall. They are roofed over with any material that will exclude water.

Silos are claimed to be most valuable for preserving green corn fodder, for the reason that a much larger crop in weight and feeding value of corn fodder can be raised than of any other forage crop now grown in this country, but all other green crops can be successfully preserved by this method.

The process of filling the silos and pressing down the fodder is very simple; it is cut either by hand or reaper when in proper condition, which is said to be with corn when in tassel, and with all other forage crops when in blossom, drawn directly to the silo (it makes no difference whether the weather is wet or dry), run through a horse-power cutter, cut not to exceed one-half inch in length (said to be better if only three-tenths of an inch), packed into the silo by two or more men who spread it evenly, and tread it down as compactly as possible as the cutting proceeds, until the silo is filled, which may occupy from three to ten days according to the quantity raised; a few inches of straw is then placed on the top, covered over with plank or boards fitting closely together, and cut such even length that they will settle down as the ensilage settles; the planks are weighted with stone or other heavy material, not less than one hundred pounds to the square foot. Experience shows that the ensilage will settle down about two and one-half feet to every ten feet in depth of the silo. The failure in preserving fodder by this method for any length of time at first seems to have resulted from not cutting it short enough, and not subjecting it to a sufficient pressure to expel the air it contained and make it sufficiently compact, so as to prevent any air from penetrating it, as the oxygen of the atmosphere would soon cause fermentation and decay.

Fodder preserved by this method, it is claimed, will keep for any length of time, not only through the winter but through the summer also, if desired; some fermentation takes place, but not enough to injure its feeding value. Some of the more zealous advocates of the system claim that its nutritive qualities are very

considerably increased by the chemical change in its ingredients which is produced by the slight fermentation that takes place. When taken from the silo fermentation begins; first alcoholic, then acetic, lastly lactic, and it soon becomes putrid. It is said to be improved by leaving it in piles, after taken out, from eight to fifteen hours; its temperature is increased during that time, but if left more than thirty hours it becomes unfit as food for stock.

That green fodder can be preserved in this manner has, I think, been proved by the practical experiments of farmers in this country, beyond all reasonable doubt.

If I am right in this, the only practical question remaining is, what is the feeding value of forage thus preserved, as compared with the cost of the silos and the expense of preserving and feeding it?

Without personal experience on this subject, I propose to present such facts as I have been able to gather from the agricultural publications of the day. That there should be a wide difference of opinion in relation to a method of feeding stock which has been in practice so short a time is to be expected, and it is undoubtedly the part of prudence to accept the evidence of its value with caution, and subject it to the severest scrutiny.

Among the most enthusiastic advocates of this system is Dr. Bailey, before referred to. He claims that from forty to seventy-five tons of green corn fodder can be produced on an acre of land, and the claim is put forth that even ninety tons have been produced. It is conceded, of course, that to produce these larger crops the land must be in the highest state of fertility, the largest growing corn must be planted, such as the southern horse-tooth, or what Dr. Bailey terms the mammoth ensilage corn, in drills from three to four feet apart, well cultivated, when it is said the stalks will grow from fourteen to eighteen feet high and weigh from four to nine pounds each. If it be possible to grow anything like such crops as these, it is evident the product per acre in feeding value must be very large, whatever its relative nutritive value may be.

He also claims that two tons of corn ensilage is equal to one ton of timothy hay for feeding purposes; and Goffart puts forth

the same claim, though he adds that the hay in his district is poor.

If there is any truth in this claim, the great value of ensilage is apparent, whatever may be the amount which can be grown to the acre. If we assume that two tons of timothy hay will keep a full grown animal of average size during the ordinary winter season in this climate, the smaller yield stated by Dr. Bailey, of forty tons per acre, would keep ten such animals during the winter, or five during the entire year.

Under date of November 11, 1880, James B. Brown, of New York, writes that corn fodder is in its highest perfection when in tassel; that the period of perfection does not last more than twelve days; that during this period the southern horse-tooth corn stalk is nearly as sweet as sugar cane in January; that it is best of all the ensilage, and that that is the only system by which this gigantic, nutritious grass can be preserved in its perfection; that the system of ensilage, when generally adopted, will increase the capacity of the United States to support population ten fold; that from thirty to fifty cows can be kept where one only can be kept by pasture and meadow; that it ordinarily takes six acres of land to feed a cow a year, as they are at present fed; that a few fields in the state of New York have the past season borne ninety tons of green corn stalks to the acre. It is proper to say that Mr. Brown translated Goffart's book into the English language; that he is actually feeding ensilage, and is more enthusiastic than even Dr. Bailey in its praise, but I believe his opinions should be received with a good deal of caution and allowance.

Under date of November 25, 1880, G. Morton, of Chittenden county, Vt., writes that he opened his silo a week previous; the preservation of its contents was perfect; that every animal on the place, even to the pigs, ate it greedily; that he filled one silo twenty-nine by twelve feet, and eight feet deep; that he has fifty tons of ensilage, and the whole cost of putting it in was $10. On the other hand, another correspondent signing E. W. S., Erie county, N. Y., dissents very materially from what he deems the extravagant claims of Dr. Bailey and Mr. Brown, above stated. He admits that corn fodder preserved by this system has great value,

but claims that clover is nearly or quite as valuable for ensilaging; that twenty tons of green clover may as often be taken at three cuttings from an acre as forty tons of corn fodder, and that twenty tons of clover is at least equal in value for feeding to forty tons of corn fodder. I have no doubt of the correctness of the last statement as to the relative value of clover.

This writer also claims that the statements that seventy to ninety tons of corn fodder have been grown to the acre are greatly exaggerated, and brings down the amounts in two cases, that of Whitman & Burrell, of Little Falls, and B. A. Avery, of Syracuse, which were said to amount to ninety tons to the acre, to thirty-three tons in one case and twenty-five and one-half tons in the other, by computing the capacity of their respective silos; but admits that even the smaller quantity would feed two cows a year or four cows through the winter; and this he says is good enough; that if two or even one cow can be kept on the produce of an acre for a year, it increases the capacity of land to support cattle from six to twelve fold, and to show his faith in the system, states that the coming summer he intends to build a double silo with a capacity of five hundred tons.

F. S. Peer, of Wayne county, N. Y., writes that he has turned an old stone barn into a silo which has a capacity of three hundred and fifty tons; that he thought five acres of western corn fodder would fill it, but that with the addition of an extra acre it filled it only half full; that he was four days cutting and putting in his six acres; on an average, forty tons per day; that it cost thirty-three and one-third cents per ton to cut and pack it. It was drilled in rows three feet apart; some of it grew to a height of nine feet; that a No. 3 D. M. Osborn reaper cut it without trouble; that he finished putting on the stone weights September 15; opened the silo November 12; found the ensilage in a perfect state of preservation; had been feeding it for four weeks to all his stock, cattle, sheep, colts and swine; all ate it greedily; that after the third day's feeding, the cows nearly doubled in the quantity of milk they had been giving.

G. M., of Essex, Vt., writes that when he bought his farm it would not keep more than six or seven cows; that last summer

he built a silo according to Dr. Bailey's direction; has been feeding ensilage six weeks; his cows have gained one-third in milk, and made as good butter as in June; feeds a little wheat bran with it to his pigs; his large shoats have had nothing else for four weeks and are thriving splendily on it; that he has enough ensilage to feed twenty-seven head of cattle during the winter; that it is not sour, and that he raised more than seventy-five tons of fodder corn to the acre, which his neighbor saw weighed.

L. A. G., of Monsey, Rockland county, N. Y., writes that he dug a cellar under a part of his barn twenty-eight feet long, twelve feet wide and seven feet deep; walled the two ends and one side with stone; the other side boarded against the earth with hemlock boards, leaving the bottom of earth, which was very hard and dry. Planted two and one-half acres of corn in drills three feet apart; kernels dropped five or six inches apart in the row; cut several stalks which measured eleven and twelve feet in height. Commenced cutting September 11; run it through what he calls a "Lion masticator," which cut it fine, crushed the cobs and stalks very fine; that the corn had some very fine ears on part of it, some quite glazed; that he packed it in the silo with alternate layers of eight to ten inches of rye and straw cut fine, then twelve to fifteen inches of the fodder, until the silo was filed; that it settled about two feet, leaving five feet in depth of solid contents. Assuming that the ensilage would weigh fifty pounds to the cubic foot, he computes that he raised about twelve and one-half tons to the acre; that he had about thirty tons of straw and corn fodder in the silo. He estimates that this will feed three or four head of cattle for a whole year, or eight head for one hundred and eighty days; that any good farmer can by this method keep two head of cattle upon one acre of ground; that the cost of cutting and packing his ensilage was thirty-three dollars.

It is evident that this writer allowed his corn to stand too long and become too ripe to accord with the recommendation of the advocate of ensilage. The above statements, with the exception of some of those of Dr. Bailey, have all been taken from correspondence in the *Country Gentlemen*, an agricultural paper of considerable merit.

A reporter for the *Country Gentlemen* has recently visited Whitman & Burrell's farm at Little Falls, New York, and procured drawings of their barns and silos, which are published in a recent number of that paper, accompanied by a full description. Their barn is three stories high, situated on a side hill, from which they can drive into the upper story; the silo was built between the barn and the hill; the wall against the bank is of stone three feet thick, the others are two feet; the whole length of the two silos is fifty-six feet, the width inside sixteen feet and the depth twenty feet; the sides and bottom are smoothly covered with cement; a partition across the middle makes two compartments; when full they will hold four hundred tons of ensilage; there are doors in each compartment opening into the first and second story of the barn; they raised the last season less than eight acres of southern horse-tooth corn fodder on a part of their farm on the Mohawk flats; it was drilled in rows fourteen inches apart, with six or eight kernels to the foot, and grew ten or eleven feet high; the largest stalks weighed five and a half pounds each; it was cut by hand with a sickle; run through a cutting machine into the silo; cut over a hundred loads a day; three men received it in the silo, spread it evenly and trod it down as compactly as possible; it was cut three-eighths of an inch long, and the yield was estimated at over twenty-five tons to the acre and filled the silos half full; after the planks and stones were placed on the ensilage in September, it settled two and a half feet in a few days; the ensilage was found to weigh forty-seven pounds per cubic foot, requiring forty-two cubic feet for a ton; it cost about a dollar a ton to cut and secure the crop in the silo; they feed sixty-five pounds of ensilage, four pounds of middlings and half a pound of cotton-seed meal to each cow, daily; they intend next year to plant sixteen acres of fodder corn, which they estimate will produce four hundred tons of ensilage, equal in feeding value to one hundred and fifty tons of good hay.

Mr. Burrell states that he is confident that he could keep seventy-five cows through the year on his twenty-five acres of Mohawk flats by the following course: He would plant sixteen or eighteen acres with corn fodder, the remainder with Hungarian

grass; as soon as these crops are removed to the silos, he would sow the whole ground with winter rye, to be ready to cut chiefly for the silos about the first of June, which he estimates would give him about one hundred tons of green rye ensilage, or four tons per acre; the corn fodder and Hungarian grass would then be immediately sown again; enough manure would be made by the herd to keep the land in the highest state of fertility.

This writer recommends that where silos are to be built in level ground, that the excavation be ten or twelve feet below the surface, letting the walls extend ten feet above the surface, using the excavated earth to bank about the walls and thus prevent freezing. But it is evident that shallower silos when built on level ground would be less expensive and more convenient to feed from.

I find in the New York *Tribune* an account of the silo of Dr. William H. Tanner, of South Amenia, Dutchess county, N. Y., who sent invitations to a large number of farmers to meet at what is called a "silo matinee" to inspect the condition of his ensilage. The writer attended the meeting. The doctor's silo is thirty-five feet long, fifteen feet wide and twenty deep; cost three hundred dollars, and would hold two hundred and fifty tons of fodder. He was feeding eighty-six cows, but with only one feed of ensilage per day. He was of the opinion that it had increased the quantity of milk given by the cows, but as they had other feed it was uncertain what effect the ensilage had in that respect. He estimated that there were a hundred and sixty tons of the ensilage in the silo, which had been produced on ten acres of land.

This same correspondent also visited the silos of James S. Chaffee in the same town. He was feeding about thirty cows, two messes of ensilage per day. It was well preserved and the cows ate it greedily; he had no doubt the milk production was greatly increased by it. It cost him two dollars per ton to raise the corn and put it into the silo. He intends to build another silo the coming year, for Hungarian grass and clover, which when fed with corn ensilage would make a perfect feed.

I have thus brought together such facts as were accessible for the

purpose of furnishing all the information within reach, so that the farmers present may judge for themselves as to the value of this new method of preserving feed for farm stock. It will be noticed at once that there is a very wide range in the views of those who have adopted this system as to the quantity of fodder which can be produced to the acre, and some difference as to its feeding value.

Upon the solution of these two questions will very largely depend the practical value of the system.

Upon the first question, as to the quantity which can be produced upon one acre, the opinion of farmers ought to be by far the best authority, but it will be observed in the evidence which I have gathered upon the subject there is such a wide difference, ranging from twelve to ninety tons per acre, that nothing can be taken as established by it, and probably there has not been a sufficient test by the actual weighing of the crop to furnish any correct basis for a conclusion. Farmers sometimes have a very loose method of estimating the quantity per acre of a crop grown. More frequently than otherwise a few hills or the produce of a small space is gathered and weighed and the balance of the field estimated. This mode gives opportunity for very considerable errors to creep in, and the conclusion is unreliable; but we all know that corn is, as some of the writers have called it, a gigantic grass, and it is probable that a very large quantity in comparison with other forage crops can be raised if the lands is put into the highest state of fertility, the largest growing kinds planted, and the culture is thorough. I find in a letter from M. Goffart to J. B. Brown, of New York, dated December 19, 1879, the statement that he raised that season seventy-five acres of corn fodder which produced two thousand three hundred and seventy-six tons, something over thirty-one tons per acre.

The opinion I have formed from all the testimony I have collected is, that at least thirty tons of fodder may be raised on the average on good suitable land, well and seasonably planted and cultivated, and that in land of the highest fertility, planted with the best and largest kinds of corn, much larger crops may be grown.

In respect to the question, What is the feeding value of ensilaged corn fodder? I confess that I have very considerable misgivings as to the correctness of the opinions which I have quoted.

Dr. Bailey places its feeding value in comparison with good hay as two to one, that is, that two tons of ensilaged corn fodder is equal to one ton of hay. Whitman & Burrell's estimate is, that four tons of the fodder are equal to a ton and a half of hay, and M. Goffart thinks that two tons of fodder are equal to one ton of such hay as is raised in his district, which he admits is poor.

If these estimates are at all reliable and the moderate crops of twenty-five to thirty tons per acre can be produced, the great value of the system is at once evident. Taking a product of say twenty-four tons per acre of fodder and the lowest ratio of four of ensilage to one and a half of hay, we have the equivalent of nine tons of hay to the acre. I believe it is the received opinion among farmers, that two tons of hay or its equivalent will keep an average size, full grown animal through the winter, and that four tons or its equivalent will keep such an animal a year. We thus see that one acre of fodder preserved by this method will keep at least four head of stock through the winter, and two head during the whole year; and if the larger quantity, as sixty or ninety tons of fodder, can be grown on an acre, two or three times as many can be kept.

The nutritive elements of feeding stuffs have been put by chemists into three classes:

1st. The albuminoids, which include the casein or curd of milk, the white of eggs, the gluten in wheat, etc., and go to form and supply the wear of the muscles, tendons and various tissues and membranes of animals; these all contain a large per cent. of nitrogen.

2d. The carbhydrates or nitrogen free extracts; these include starch, sugar, gum, etc. They supply the fuel or heat necessary to animal life and contain no nitrogen.

3d. Fat. This latter class is found in much smaller quantity in forage than the other substances, and in quality resembles the carbhydrates, and performs the same functions in the support of animal life.

Of these substances the albuminoids are the most valuable, and are estimated to be worth four and one-third cents per pound for feeding purposes. Fat ranks next in value and is of the same estimated value. The nitrogen free extracts are the least valuable, and are estimated as only worth nine-tenths of a cent per pound.

On consulting a paper issued by the Connecticut Agricultural Experiment Station for 1879, I find a table containing the analyses of various feeding stuffs as made by Dr. Wolff, a German agricultural chemist, in which is given the detailed analysis of timothy hay and green maize fodder, in which Dr. Wolff finds that the timothy hay contains 9.7 per cent. of albuminoids, 45.8 per cent. of nitrogen free extracts and 3 per cent. of fat; and that the maize fodder contains 1.2 per cent. of albuminoids, 7.6 per cent. of nitrogen free extracts and 0.5 of one per cent. of fat; and he estimates the feeding value of timothy hay to be sixty-nine cents and of green maize fodder ten cents per hundred pounds.

I also find in the same paper a number of analyses of both timothy hay and green corn fodder, made by Professors W. O. Atwater and S. W. Johnson, agricultural chemists of reputation in this country, in which the nutritive elements of timothy hay are found to be considerably less than by the German analysis, and of green corn fodder about the same.

If these analyses furnish anything like a true test of the feeding value of green corn fodder as compared with timothy hay, it is at once apparent that the more zealous advocates of ensilage are laboring under a very considerable error in respect to its nutritive value.

According to the German analyses seven tons of corn fodder is only about equal to one ton of timothy hay, and it would require a crop of nearly twenty-eight tons per acre to keep a cow a year or two cows through the winter; but even this would be a great improvement on the present system of feeding, which is said to require five or six acres of land to feed one cow for a year. By the American analyses, the difference between green corn fodder and timothy hay is considerably less than by the German.

But it is said the proof of the pudding is in the eating of it,

and it is stoutly maintained by all or nearly all who are feeding ensilage, that from sixty to seventy pounds per day, with the addition of five or six pounds of some nitrogenous food, such as wheat, bran, middlings, ground oats, flax-seed meal or cotton-seed meal, will not only maintain milch cows in a full flow of milk, but will largely increase the quantity they give, and that other animals of average size will fatten rapidly on that quantity of the same feed. It is admitted by all that ensilaged green corn fodder is deficient in albuminoids or nitrogenous elements, and therefore needs the addition of the kinds and quantity of food above stated, to the daily amount of preserved fodder.

In preserving other forage crops by this method, there would be a great saving in one respect. It is a fair estimate, I think, to say that at least thirty per cent. of the value of all the hay cut in this country is lost through wet weather, dews, etc., in curing. This loss would be wholly saved, and it is not more expensive to draw all forage crops as soon as cut, run them through the cutter and pack in the silo, than the ordinary method of curing now practiced. Another gain would be in the fact that the fodder is preserved in its green and succulent condition, thus giving the animals the equivalent of perpetual summer pasturage.

There is another view of this matter, which may, if properly investigated, show a great gain in another direction. It is claimed by Dr. Bailey that there is considerable loss of the feeding value of forage crops in the process of drying by the ordinary methods, aside from the loss occasioned by bad weather. He claims that the nutritive elements are to a considerable extent held in solution in the water, which constitutes so large a portion of such crops in their green state, and that the evaporation of the water in drying sets free and carries away a good deal of these nutritive elements. Whoever has walked over a field of new mown hay as it was drying in the bright sunshine, can well believe that the fragrance which exhales from it and fills the air is composed of valuable properties which it is losing.

I find evidence strongly to corroborate this theory in the paper referred to, put forth by the Connecticut Experimental Station. Samples of hay were sent to the station from the New Hampshire

Agricultural College farm to be analyzed; it was cut July 1, weighed three thousand four hundred and forty-four pounds per acre, was analyzed soon after and found to contain:

| | *Pounds.* |
|---|---|
| Albuminods | 213.528 |
| N. fr. extracts | 1,656.564 |
| Fat | 68.88 |

Samples of the same hay were analyzed in February following at the time of feeding out, when the total weight per acre was found to be two thousand seven hundred and sixty pounds, and it contained:

| | *Pounds.* |
|---|---|
| Albuminods | 181.06 |
| N. fr. extracts | 1,409.53 |
| Fat | 57.96 |

Showing that between the time of curing and the time of feeding it had lost largely in weight and also largely in its nutritive elements.

Here you will see was a very considerable loss in the feeding value of the hay between the time it was cured and the time it was fed out. How much loss of nutritive elements occurred during the curing process we have no means of ascertaining, but have a right to infer that it was large. A very much larger quantity of water was lost by evaporation during the process of curing than during the period which intervened between putting the hay into the barn and feeding it out, and it is fair to presume a corresponding amount of nutritive elements were lost.

These problems can only be finally settled by chemical analyses performed and carried on in connection with the cutting, curing and feeding forage crops.

The farmers of this state have not yet derived anything like the benefit from the agricultural department of our state university which they are entitled to. I am glad to know that much improvement has been recently inaugurated in this respect. A professor has been appointed, who, as I understand, will devote his whole time to this department. I hope the legislature will not be niggardly in supplying sufficient funds to carry it on successfully. The vast agricultural interests of this state are worthy of being fostered and promoted, and every means which are properly and intelligently adapted to that end ought to be liberally supported.

DISCUSSION.

John S. Dore, Neillsville — This is a new subject to us and of vast importance if even one-half of the seemingly cautious figures that have been presented to us can be realized. I would like to ask a few questions in order to throw some light upon some apparent puzzles in connection with it. How about freezing? Must this fodder be covered up and kept so that it will not freeze?

Mr. Sloan — When taken from the silo and laid on the barn floor it immediately commences to heat and fermentation takes place, so that there is no danger of its freezing even in the coldest day, and its temperature is increased continually until it becomes spoiled.

Mr. Dore — How about mixing the clover and corn fodder together as it is placed in the silo?

Mr. Sloan — That has never been practically done in this country, but it is said by those who have practiced corn fodder ensilage that it can be done, that is to say, you may put in a crop of corn fodder or take the earliest crop of green rye, which is recommended, winter rye, cut the earliest, you may put that in and put your plank and weights on and leave that two or three or more weeks until your crop of corn fodder or some other green crop is ripe, and then take the plank off and put that in and restore the plank and weights, and so you may continue during the season to fill your silo.

Mr. Dore — The object of asking the question was to ascertain whether it would be necessary to construct different silos for different crops.

Mr. Sloan — I understand it is not, but some are doing it. Where they have double silos they are devoting one to green rye and clover and the other to corn.

Mr. Dore — How about covering and uncovering this fodder when you wish to take it out? Isn't that considerable labor? Must it be uncovered and taken out and covered tightly two or three times a day or once, or once in two or three days?

Mr. Sloan — The door which is left in the end of the silo is bricked up with cement and plaster to make it water tight, but

when you come to feed it, after it has settled and become thoroughly compact, you take out the brick, throw the stone off from one or two planks, throw the plank back, take a cutter and cut it down as you would cheese on a cider press, and feed it out.

Mr. Dore — Are not clover and rye to be cut fine, as the cornstalks, before being placed in the silo?

Mr. Sloan — Undoubtedly. The expulsion of the air seems to be necessary, and the finer you get it the more perfectly will the pressing expel the air.

Mr. Dore — Can we as farmers test this process on a small scale, say by putting in tight barrels, or building small silos, four to six feet square?

Mr. Sloan — That has been done. Even with a glass jar you can test it.

Mr. Arnold — The principle is the same as canning fruit.

Prof. Henry — The matter has been tried at Cornell University, in a small way. A small silo was built, and the tops of cabbages and beets from the garden were preserved perfectly, and the cattle ate them greedily during the winter.

Mr. Field — Were they cut up?

Prof. Henry — No, thrown in. I have also seen ensilage from the beet that was not cut up.

There is one point I would like to bring up here. It is a digression, but it is so *apropos* I cannot help but think of it. In the admirable paper which has been read, presenting so carefully all sides of the question, the writer took occasion to refer to the Connecticut experimenters; and I must say it does me good that the farmers of Wisconsin should be going to the little state of Connecticut to get information on agriculture. The state that has raised its wooden nutmegs and wooden hams is to-day educating the state of Wisconsin. I hope the little state will keep on. The little state of Connecticut gives $5,000 to experimental stations, and Prof. Atwater, who is quoted, is the man who is at work there. He has one or two other chemists helping him. How much longer the state of Wisconsin will be willing to get her information in the same way I cannot say, but probably we will wait through the centuries. But we must remember that the

state of Connecticut has got her information largely from Germany, and there they have about three hundred experimental stations and a large corps of experimental farmers. Germany is teaching us rapidly, and the paper quoted comes through Prof. Atwater, from Germany.

I do hope we shall catch up with Connecticut. I do not know as we should emulate her wooden clocks or wooden nutmegs, but on the other question she can instruct us, I think.

James Campbell, Madison — I have been very much instructed, but there are some things I want to ask about. In the first place, I want to know whether green corn cured in a silo (which I have no doubt can be done) will feed any more when it comes out than it would when it went in; whether it has gained any in nutrition. I have my doubts of the statement of losing so much by drying green fodder. We all know very well that an acre of hay will feed longer in the winter months than two acres of grass will in the summer time as pasture. I believe that Mr. Sloan stated that it would take six acres of grass to keep an ordinary animal, say one that will weigh one thousand pounds, through the year. I think the statement a very correct one. I notice that Dr. Wolff, of Rhode Island, who writes a great deal on this subject, states that two pounds of well cured hay to the hundred pounds of animal is good and sufficient food. That would be for a thousand-pound animal twenty pounds a day, or six hundred pounds a month, or three thousand six hundred pounds for six months. That would generally be raised on an acre or an acre and a half. I very much doubt whether the animal could be fed through the other six months on less than three acres of pasture. Of ordinary pasture, I do not think three acres would be too much.

Another thing, I have found that cattle, horses and buffalo on the plains fatten much faster during the months of September, October and November, than during the months of June and July. No better feed is found than those plains are during those months, as green feed; but I worked three hundred horses on the plains one summer, and I found that during those months they fed the grass all night, and were good for a bushel to the span of shelled corn every day afterwards. Probably most of you know what

this buffalo grass is. It is certainly the best feed I ever saw in a green state, and when it dries up it dries as dry as any hay I ever saw; so it will crisp under your feet when you walk on it. That was dry after the first of September, and after it was dry my horses did much better on it, ate less corn. When we were about through I worked my horses two weeks on that kind of grass without any corn, because we would have to go four hundred miles to get corn, and we could finish without it. Of course the horses fell away some working on it, but still they did very well. It satisfies me that dry food feeds any animal better than green food. Whether by putting it into a silo it will feed any more than it otherwise would, is a question we have got to learn. I think not. By cutting corn when it is in that green state you get an immense weight, how much more than when it is dry I cannot say.

Mr. Sloan — Do your horses and cattle, in the winter when you only feed them hay, do better than when they run to pasture in the summer?

Mr. Campbell — They will not do as well as they will in the summer time, because if you give them pasture they will eat so much more of it. There is not such a quantity of water in hay as there is in green corn. When you put up green corn that way, I think that from eighty to eighty-five per cent. of it is water, and whether an animal will do better by being forced to take that much water to get the amount of food he wants is a great question to me. I am very strongly of the opinion that an acre of corn allowed to get ripe and fed, corn and cornstalks, will support an animal just as long and a little better than it will in the raw state it is in when it is first cut. Still it is something I have had no experience in, and I only speak these things as my impression. I know very well that an acre of ordinary corn will feed an animal a year and keep it fat. An acre planted from three and one-half to four feet apart and three or four kernels in the hill. An acre of corn that will raise forty-five bushels an acre will give an animal four quarts of shelled corn every day. What those stalks will weigh in a dry state I cannot say, but they must weigh, I think, twenty to thirty pounds — the stalks that would raise the four

quarts of corn — and my judgment would be that dry stalks, other than the butts, will feed about as much as hay to the ton. I therefore think that corn cut up and preserved in large shocks, where but a small quantity gets to the outside, as it may be preserved, will feed as much as cut the other way, and certainly it is less labor.

Judge Bryant — As remarked by Mr. Sloan, the proof of the pudding is in the eating of it. I have seen the pudding and I have seen it ate; in other words, I have seen a silo. I have seen the stock that a man has kept in his barn this winter, and have examined it thoroughly. I have some of the ensilage in the other room, and I tell you it is a success. I know something about Mr. Campbell's ideas; Mr. Campbell believes in corn. He thinks corn is king. Now this gentleman, Dr. Weeks, of Oconomowoc, whose silo I saw in full operation, has been in the habit of keeping his cows just as Mr. Campbell recommends; that is, raising a large quantity of corn fodder and cutting it up green and preserving it in shocks. Last year he built a silo, and he has kept twice the stock he could keep the other way. He is getting more milk and more cream, and I do not think his stock ever looked better than it does now. He sells cream — sends it every day to some of the hotels in the city. He does not feed all ensilage, from the fact that he has not got it; he did not lay out his crop in the spring so that he got his silos full, but he feeds a basket full, which weighs thirty-two pounds, and gives them a little marsh hay and a little bran.

Mr. Campbell — How many cows does he keep?

Judge Bryant — He had twenty-eight cows. He gives them thirty-two pounds apiece. Twenty-seven to thirty-two pounds is acknowledged to be feed for a week. I saw these silos last week and would advise any man that is going that way to go and see them, and any man who will go and see them while they are in operation will be convinced that silos are a success; that more than twice the cattle can be kept upon the ground. The doctor's corn is a small kind of corn. I will bet a Jersey calf that my friend Matt. Anderson can raise sixty tons of corn feed on his land, cut up when the tassel just begins to drop. I know he can. Dr.

Weeks planted a little Yankee New Hampshire corn. He did that because he thought it was the best in the world to get fodder from to preserve. He got between twenty-three and twenty-four tons to the acre, estimating it by the cubic foot after it was pressed, and weighing a cubic foot of that.

A member — How does he manage to get the stuff out of the silo?

Judge Bryant — He commences at the end. He takes off three feet of plank and the stone, lays them back beside the others or takes them outdoors; then takes the knife and cuts a strip right down the same as you would a stock of your timothy hay. It will not freeze on top of the ground unless the thermometer goes below zero. In the cellar it will never freeze. Nor will it ferment until it is taken up. If any of you used to make cider, when you were boys, with the old-fashioned cider mills, it looks in the silo just as that cheese used to after the cider was pressed out, and it is cold like that. You take it out and carry it up into the warm air, into the barn; in about eight or twelve hours it is warm and then it is time to feed it. Take it and carry it out and put it on the snow. Carry out the best clover, the best timothy, the best corn fodder preserved, and turn out your horses, your cattle, your sheep and your swine, and they will go and eat the last vestige of ensilage before they will touch the other.

Mr. Field — It is like green fodder.

Mr. Babbitt — It is strictly sourkrout without being sour.

Judge Bryant — Dr. Weeks is a very enterprising man to do this, as you will see. He was one of the first men that went into Milwaukee forty-five years ago. He has been experimenting a great many years in butter, ways of preserving it fresh, keeping June butter until the next winter. When he heard of this thing he did not stop to have somebody else do it, but he went at it himself and he has become perfectly convinced. He is going to make it larger. He has only forty-two acres of land, and all but fourteen acres of that is marsh. He is keeping stock and making cream.

Mr. Roberts — What is the expense of the silo of Dr. Weeks?

Judge Bryant — One hundred and seventy dollars besides the

roof, he to'd me. He made the roof a little expensive because he was building for all time, and he shingled it and put fancy things all around, and had it high up above for the purpose of storing bran in the years to come, in the winter season. It would cost just as much to build one as it would to dig a cellar in the ground and cement it up. If I should build one I should build it of building stone.

Mr. Arnold — Has he a door in the end of it?

Judge Bryant — Yes, sir.

Mr. Arnold — That is not necessarily bricked up?

Judge Bryant — He did not brick his up.

Mr. Arnold — When you commence to cut this down, some of this is exposed to the atmosphere, and it seems to me that that might spoil.

Judge Bryant — No, sir, it is pressed so hard that it will not spoil.

Mr. Arnold — If it is in a cellar, with a common board roof, the atmosphere in this climate would be below zero all the time unless the fodder is fermenting. Why will it not ferment?

Judge Bryant — The doctor's silo is exposed more than I would have it. His is built on a side hill and one side is exposed. He said it did not freeze until the thermometer went below zero, and then it froze on one edge two inches. He spread a canvas over that and the frost went out in two hours.

Mr. Arnold — There was a bit of fermentation?

Judge Bryant — Probably in the frozen edge as the frost went out. When he put it in his neighbors said he would have a dung heap. In fact when I was there a gentleman came and wanted to see his "manure heap." The doctor said he got anxious about it after he put it in and put on the weights, and he would go and stand on the top and see if he could smell anything. He would get down and put his face next to the cracks, and he could feel a little gentle zephyr like the breath coming from a person's mouth, but it was sweet, and in a few days that went off. I first became interested in this matter by receiving a letter from George E. Bryant, a son of a cousin of mine, who lives on our old homestead in Massachusetts. I knew what my father used to do. I

knew he kept four cows, a horse, a yoke of oxen, two pigs and half a dozen sheep sometimes. I knew further that when I took my boys to that farm in 1876 they said to me: "Father, how in the world can anybody live on such a farm as this is?" I had a letter from this cousin in which he said he was keeping forty-three cows, six horses, twenty Berkshire swine and twenty sheep. I thought it was funny how he could do it and I wrote to him, and he sent me a plan of where he dug his silo and when he put it in, etc. He was making milk, and he said he kept his cows for five cents a day. That is pretty cheap in a country where hay has been worth from $14 to $20 a ton for twenty years. I do not think there is a bit of danger in any man's going ahead and building a silo.

C. R. Beech, Whitewater — Theoretically, I have no doubt that this silo is the perfection of feed. To illustrate its value I will state that the year that the frost killed corn, five years ago, my corn was just in the milk and I cut it up immediately. It stood in the shock until cold weather came; we then drew it and stacked it. It seemed as though it would entirely rot down. It smoked and steamed and turned black. It looked more like tobacco pressed than anything else. But that crop of corn we estimated to be worth nearly as much in that state as a crop of matured corn for feeding hogs. They would eat every particle of it, leaves and stalks and everything, with a great deal more eagerness than they ever would the best cured corn. That statement goes to affirm the value of silo feed, although in an imperfect state.

Clinton Babbitt, Beloit — From my calling this ensilage "sourkrout," I would not have any one suppose that I do not believe in its merits, for if I live six months longer, I intend to have a silo in successful operation. My nearest neighbor, one of the most successful and the shrewdest business man I know of in our section of the country, a gentleman and a farmer, and a manufacturer besides, is drawing the stone to-day, after having thoroughly investigated this subject, and will build a very large silo. Mr. J. M. Cobb, of Beloit, is the gentleman to whom I refer. I believe a silo is now an absolute necessity in systematic,

economical farming. I have not a question about it. We have got a professor of agriculture, and I believe he is the right kind of material.

He certainly shows he has pluck to appear before the farmers of Wisconsin and compare our state with Connecticut. Now let him take right hold and let us back him up in this matter. Let us stand right by him, and if we do not educate but one man down there let him be the right kind of material and see if that one man will not be a host in himself as far as helping us farmers and agriculturists along. Now we want a large appropriation for that experimental farm. We might just as well have it as to have it all go into fish, for instance. We want to just stand by that man. He is alone among the whole tribe, and he has stood a lot of scanning to-day, and he stood it like a soldier. I am willing to trust him, and I want every other farmer to trust him just this once. We farmers are not disposed to trust any one, unless it is a farmer. He acts like a farmer and I believe he is one. In fact, he told me to-day he had a little farm down there and he is working it about right, as a farmer ought to. Let him have the material for experimenting, and let us stand by him and give him part of this fish money or some other money that the legislature will get anyhow. Let us have a little hand in the pie, even if we lose every cent of it.

M. M. Palmer, Brodhead — I suppose we will have this paper in our reports, but unless we get it a good deal before we are in the habit of getting it, we will not get it before fall; and if it would not be asking too much of Mr. Sloan, I would like to have him furnish a copy for the *Western Rural* or *Prairie Farmer*, to print for our benefit. Most of us take one or the other of those papers.

Mr. Sloan — I would be willing to do that. I want to say a word in corroboration of what Judge Bryant has said. There was so much to be said that I left out a good deal that might have been put in this paper; but here is some evidence that it does not seem as though we had any right to doubt; it is from Dr. Bailey, a man of character and standing in Massachusetts. He owns a farm that he is breeding stock on, where he lives in Berkshire

county, Massachusetts, and he owns another in Virginia. He has been feeding this two years. He says he was experimenting on an old run-down farm which in 1877 could keep but six cows and one horse; that he had in his barn November 19, 1880, sufficient hay to keep six horses, and in his silos material ample for the sustenance of forty head of horned cattle, nearly two hundred sheep and sixty swine, and that during the last three years he had bought no hay or manure. Now he says the increased value of that farm is attributable wholly to the ensilage which he is feeding. There is one thing about it, it is no more expensive to build silos to keep fodder than to build barns. Another thing is certain, no matter how large your corn grows, the larger the better; this system preserves it in such a state that the entire stalk, it may be two or three inches thick and eighteen or nineteen feet high, is eaten by the animals, and the whole nutrition in it is in a succulent, soft state, and all the nutritive elements in it are taken by the animals and used. It is easily masticated. In curing crops of such large corn it would be hard and fibrous, and no animal could masticate them; and besides the claim that they lose, in the water drying out, a good deal of their nutritive element, you would be compelled to cook them and steam them, and add meal to them to get your animals to eat them; while here is a simpler process, and one that is probably cheaper than the ordinary process.

Mr. Babbitt—New light has come in from the legislature. Mr. Barnes presented a bill for the purpose of enabling our experimental farm to experiment on this very subject, and he just informs me that the legislature has very kindly recommended an indefinite postponement. You have been indefinitely postponed for quite a number of years, and I do not know but you will always be; but my opinion is if you all felt as I do, you would indefinitely postpone the appearance of any man in the legislature who dares to raise his voice in opposition to the wishes of the farmers of Wisconsin. That is my opinion of the men we send to represent us. Unless they will carry out the will of the people, and their expressed wishes, they must go to the wall. Now we have a resolution lying on the table which we have proposed

to call up and offer. It has been adopted here and offered to the legislature, expressing our wishes, or at least it is before us. It can be called up, and you can vote entirely as you see fit in this matter, of course. I wish that I was not sometimes obliged to think that the chains of power were about the necks of the farmers of Wisconsin. I wish I could feel that the farmers, even of the best districts of the state, were not almost tenants at will. I wish the facts did not warrant me in thinking that you owe more upon your farms in mortgages and taxes, on the farm on which you live, than you could go out and hire the farm for which you call your home, and the home of your wife and your children. Search the records of the best district in Wisconsin and see how much you owe, and how much interest you have in the loved state of Wisconsin. See whether or not you are independent, or whether you are drifting surely into the band that will not break.

A. A. Arnold, Galesville — I desire to speak upon this ensilage question a little, but Brother Babbitt in giving us the opinion he has, makes me a little ashamed of the farmers in the legislature.

Mr. Field — If the gentleman will allow me to state, it is not the legislature that has indefinitely postponed the bill. The committee has recommended it be postponed.

Mr. Arnold — I was going to say that the farmers of the state are deeply indebted to a banker, for he introduced the bill, but they are not indebted to the committee.

Hon. D. B. Barnes, Delavan — The bill was introduced by John T. Kingston. I was in favor of it, though.

Mr. Arnold — Well, he is a lumberman. I have been a subscriber to the *Country Gentlemen* for about ten years. It is perhaps not the best agricultural paper for the west, but it is one of the best agricultural papers in the country, and they have discussed this question of ensilage from year to year. We do not find anything about it in any other paper but to a very slight extent. The only reason I supposed it was not practical in this country was, that I supposed it would be too expensive to cut it up and weigh it, and get it out again in the winter season with the rate of wages we pay, and especially in the northern part of this state where we live close to the pineries. We pay on an

average from two to five dollars per month more than you do in the southern part of the state. Now in a country where labor is cheap, doubtless this will pay to the extent that a man wants green food for his cattle, but I do not believe that when the mercury goes below zero, that an animal wants green food for his entire consumption. It might do for a desert, but it will not do for a regular meal. Another thing, all good farmers wish to consume their straw, and this should be worked up in some way or other. Doubtless it can be put in silos at a less expense than roots can be.

I have been raising roots, and from my experience I do not believe that a root crop pays for the production as well as corn or hay. It will pay a man better to raise corn, and grind it or not, than to raise roots. There is too much labor for the amount of nourishment. There is too much water. And there is too much water in this ensilage to be a regular, steady diet of animals. It may do for hogs, but I do not believe it is the thing for animals. It may do for milch cows. It will not do for an animal any more than sourkrout will do for Brother Babbitt the year around. He might flourish a while and be just as good a man as he is now, but he could not live on it the year through. I believe this question of practicability is the first thing the farmer should consider, and in this sense it is proper that the state of Wisconsin should have some person or persons who are able to do it experiment on this matter. Doubtless these men that have been spoken of are men of capital, men perhaps who farm it on the same principle that Mr. Sloan does. He has a good farm, but he makes his money in his profession and spends it on his farm. A man that does that can afford to build a silo, and he can afford to put on these weights and take them all off and all these things, for the benefit of himself or to suit his own private fancy, or he may afford to do it for the public, but if we have an agricultural farm we ought to be able to have that farm of some use to us. Is there anything more practical than to have the state build a silo and let us know the result of the experiment? Build it on scientific principles. We know the vast amount that is expended that the university has the benefit of. It goes into other departments. The agricultural department is entitled to that without

an appropriation from the state. Then why appropriate if this department is entitled to the benefit of that money? It is a question that I think has not been answered yet.

Mr. Dore — Because it does not get it without an appropriation.

Mr. Arnold — It has been applied somewhere else because there has been no place to put it. They have been excusable heretofore because there has been no place to put it. Now there is an opportunity to make this available, and why not use it?

Hon. M. Anderson, Cross Plains — I suppose the farmers are generally looked upon as a set of old fogies, and I think there are some good reasons for our being looked upon as such. The truth is, we are very slow to believe anything new, or to investigate anything new. My opinion is that the objection that ensilage has too much water in it is not well taken. I know that I can take swill or cook corn meal and make it into a thin mush, and hogs will fatten on it much faster than on dry corn, even with cold water. I have steamed my feed in that way and I know there was at least eighty per cent. of it water, and those hogs did well and fattened on it much quicker than they will on dry food. Cattle will drink, in eating dry food, a large amount of water. Sheep will drink a large amount of water if eating dry food. I do not think that point is well taken, that there will be too much water in that corn after going through that pressure. As I understand, in making silos, if any sap collects they are fixed so they will drain off in one corner. I saw that work on silos that came from Massachusetts, and there was a place fixed where it would drain off.

Mr. Field — I should think there would be a great loss in that case.

Senator Anderson — There is a place fixed.

Mr. Field — I think it is a mistake to let it run off.

Senator Anderson — No, I think it would sour if it did not. That was in a book that I saw that came from Massachusetts.

Mr. Sloan — Dr. Bailey's book?

Senator Anderson — Yes, sir! It is all planned out, and a place for water to drain off, if any collects. In regard to raising a large quantity of corn to the acre, I think it can be done. I

have no doubt the quantity Mr. Sloan has spoken of can be raised on a good piece of land if you let it grow to its full height. In regard to what Mr. Babbitt said about the legislature, I want to say that last week we had a little discussion in the senate in regard to a bill that I introduced, that I thought was favorable to the farmers. One senator got up and said: "We have had enough of farmers' legislation in this country, and we want no more of it." He made a motion to indefinitely postpone the bill. I said, "There are some senators here that will be indefinitely postponed, and their faces will never be seen here again to disgrace the senate." If you want to send a man to the legislature that will vote in your interest, you had better send one that will vote in his own interest at the same time, and when he votes in his own interest he will vote in yours. But if you send men here to make laws whose interests are opposed to yours, they will vote in their own interest first. They may sometimes be forced to vote seemingly in your interest when it does not hurt them much. I hope this appropriation is not dead yet. I hope the committee's recommendation will not be adopted. This motion in the senate to indefinitely postpone was not adopted, and there was hardly a vote for it. I want to give the senate credit for that. I think there was not a single vote but that one. They could see the point, that it was a blunder by that man's saying they had had enough of farmers' legislation and did not want any more of it.

Now, I hope this thing will be thoroughly investigated. I believe that this ensilage will be a great benefit to the small farmers of the country. I have an idea it will bring up a strong competition against the west. I believe it will enable them to keep double and treble, and perhaps more, animals than they have formerly done. I believe it will be a vast benefit to that New England country. But we have one advantage; we can raise about double the amount of corn to the acre.

Mr. Field — I hope something will benefit them, for unless something does they are going to starve to death very soon.

Senator Anderson — I saw in an agricultural paper some years ago that there were two hundred farms that one firm had advertised as for sale in the state of Connecticut; and those farms were

offered, the editor said, for less than the buildings were worth, and said to be very good farms, convenient to churches and schools, and railroads and market. That is the state that is held up as superior to Wisconsin in agriculture. You need not be afraid of it. Perhaps some of you have heard of Tom Corwin, of Ohio. He went once from Washington to Connecticut, and when he came back a senator said: "Don't you think we have a good state there?" He says, "Yes; I believe you have at least one or two bushels of good corn." We get some good tobacco from there, but there is no danger of their excelling us in raising wheat, or sheep, or swine, or anything that the farmers of the west want. I think Wisconsin is far in advance of Connecticut to-day.

Mr. Arnold — I heard yesterday and to-day several farmers speak very disparagingly of our state legislature. I do not think it is in good taste. I have been in the legislature, and have always when there been a farmer, and I am frank to say that gentlemen there who were not farmers were, as far they understood matters, as willing to do justice to the farmers of the state as the farmers themselves. There is not that penuriousness among other classes that there is among farmers in making appropriations for agricultural purposes.

Mr. Field — Or for any other purposes.

Mr. Arnold — What I mean to say is this: when any bill comes before the legislature relating to agriculture it is something that we are supposed to know something about. A great many of them are chimerical in their character. They are for the purpose of experiment, and practical men do not take a great deal of stock in them. They say perhaps it will be a failure and the money will be fooled away. Therefore the farmer legislators will be willing to put their foot on it the very first thing, while perhaps other men would be willing, if the farmers would take any stock in it, to do something. When a bill for any other than farming purposes comes up, the farmers, as a rule, are not posted. They study it over a little, but cannot see through it. A lobbyist comes along and calls him Honorable So-and-so, and says it is all right, and he is not used to so much attention and gets to thinking that Mr. So-and-So is a splendid man, and he soon gets to

thinking that Mr. So-and-So is right, and he soon gets so he votes just as Mr. So-and-So tells him. Now this is by reason of farmers being sent to the legislature that do not as a rule, perhaps, understand other things as well as they ought to. It is not to be expected that farmers are all lawyers. I want to say this simply to show that it is sheer injustice to make a raid upon legislators simply because they are not farmers. A lawyer is a greater necessity in a legislature than a farmer. If we had only farmers in a legislature they would pass very few laws that would stand the criticism of courts; very few laws would be constitutional. We have more unconstitutional laws passed now than we should have and we must have somebody to refer to. We do not want to be compelled to go outside of the legislature to get legal opinions, and they are necessary — if necessary for no other purpose they are necessary evils. Now I protest against our getting together here, the farmers of Wisconsin, and turning ourselves into a scolding society and backbiting and abusing the legislature.

Judge Bryant — I understand that it has been said that a silo is drained. Silos planted in certain soils are drained from the outside; they drain the outside of it so that the water shall not press inside. With our soil about these lakes you would not have to do it. They are never drained from the inside.

J. C. Ford, Madison — What is the necessity of curbing the bottom if you have a drain?

Judge Bryant — To keep the moisture away.

Mr. Ford — You are not going to have a weight there heavy enough to press the water out?

Judge Bryant — No, sir; that is one of the suppositions, that you can press it as hard as you have a mind to without pressing it out.

Mr. Ford — Then if you have a sand bottom is not that sufficient?

Judge Bryant — I should think it would be.

Mr. Ford — You take thirty-two tons of stone, or whatever you place on it to load it; that would be an expensive item, wouldn't it?

Judge Bryant — I should say, to look at the pile of stone Dr.

Weeks had on his silo — stones from the size of your head to twice the size — such stones as a man could take up and carry, that a man could take it all out and lay it outside of the silo or bring it all in, in a day.

Mr. Ford — Would you dare to feed green corn to your cows as a steady diet? I mean the corn just cut.

Judge Bryant — Yes, sir.

Mr. Ford — You would not be afraid of their stalling?

Judge Bryant — No, sir.

Mr. Ford — I noticed in the last example Mr. Sloan cited that that gentleman alternated and put in a foot of rye. I would like to ask the reason of that.

Judge Bryant — That was because he was afraid green fodder would rot. When they first began to ensilage their green things, almost every man thought he must put in a layer of green feed, and then put in something dry to protect it, absorb the moisture.

Mr. Arnold — This silo you spoke of did not have any more than a quarter of the weight recommended in the *Country Gentleman.*

Judge Bryant — The stones were such stones as he could pick up. I measured the silo. The ensilage had settled two feet four and one-half inches from where the doctor pointed out to me it was when they put on the plank, to where it was when I saw it.

Mr. Arnold — Was that forty-five pounds to the foot?

Judge Bryant — That is what the *Country Gentleman* says.

Mr. Ames — I should suppose jack screws would be better.

Judge Bryant — Jack screws cost money, and stones lie all around the premises.

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THURSDAY, February 3, 1881, 9 o'clock A. M.

Convention called to order, President Fratt in the chair.

Two papers were read upon the apple crop and how to keep it, etc., by J. C. Plumb, Milton, and Chas. Herschinger, of Baraboo, following which was the following

DISCUSSION.

W. W. Field, Madison — Before there is any discussion upon these papers, I desire to make a motion. There has been no com-

mittee on resolutions appointed by this convention. I think it very proper that we should have such a committee, and I therefore move that a committee of three, on resolutions, be appointed by the chair, to which all resolutions shall be referred, whether they have now been or may hereafter be presented.

Motion carried.

The chair appointed Mr. Field, Mr. Roberts and Mr. Arnold as the committee.

J. W. Wood, Baraboo — I would like to say that in this matter of the temperature of cellars, much depends upon it. I myself have had some personal experience in the matter, as I have fruit cellars in which it is important for me to keep what I put in, and I have never succeeded very well until this winter. I would go into the cellar from the warmer atmosphere, and it would feel cool to me, and I would be satisfied without knowing what the exact temperature was. This year I thought I would be more thorough, and I purchased three or four thermometers and hung them around in different parts of my cellar.

I found that the tendency had always been to keep my cellars too warm, and I ventilated them in cold weather until I brought them down to within two or three degrees of freezing. I think one thermometer in my cellar has hung four degrees beyond freezing, without a particle of change that I have been able to notice, for six weeks. I am perfectly satisfied that everything is keeping, and I do not think it is wise in any man who is trying to keep fruit which depends upon the temperature of the cellar, to attempt to get along without a thermometer in it. I am very emphatic upon that point.

B. S. Hoxie, Cookville — That is very good, such weather as we have had this winter. What I want to know is how to keep them all right in such weather as we had last winter, and such as we are about to have. That is the point with me.

Mr. Wood — There is a very simple way, and that is, when the weather is cold outside and you want your cellar cold, open your cellar; when it gets warmer shut your cellar. Go according to the outside weather. If the outside becomes too warm, close your cellar. When it gets colder, as it did last winter — there was plenty of weather that would reduce the temperature of the cellar

if your cellar had been exposed. That would be a universal rule, to go according to the weather.

Geo. J. Kellogg, Janesville — It is easy enough to keep it right this winter. There are some cellars that everything has been freezing in them. It has been the cause of a good deal of anxiety to some to know how to warm them up. Some have resorted to one method and some to another. Some have covered their fruit. Apples will bear a temperature of two to three degrees below the freezing point, with a slight cover. They will bear that temperature for two or three weeks without freezing, and all the better for the preservation of the fruit.

But the question with some who get frost into the cellar is how to raise that temperature. They have no stove or anything that is attached to the cellar. I would like to hear from some who have had some experience with oil stoves. I have been fighting frost some with kettles of coals taken from wood fires. I have kept my cellar at a temperature of two below freezing for the last six weeks.

Charles Herschinger, Baraboo — I would like to answer Mr. Kellogg's question in this way, by saying if you have ventilation to the cellar from the chimney, you can warm your cellar with an ordinary stove to the degree you would like to have it.

J. C. Plumb, Milton — The experience of every farmer is that none of the ordinary means are satisfactory or sufficient. I have been satisfied for years that we must have a different principle or plan of ventilating our cellars in the winter. It must be thorough; what is called sub-earth ventilation or earth ventilation. Have the cold air pass through a tunnel under ground of sufficient length so that it will be tempered, so that it may pass into the cellar sufficient to secure a current of air of the right temperature, and then summer or winter you will have the earth temperature, which ranges from forty-five to fifty degrees. It is a very simple experiment for any one to try. You will find your well water even in shallow wells, if covered from the outside air, to be from forty-four to fifty degrees; hardly any variation; and this plan that I have indicated in my paper I believe to be the ultimate. It is the thing that we must come to in relation to ventilating our cellars in winter time as well as in summer.

A. A. Arnold, Galesville — We have a great many fruit growers here, and I would like to get their opinion on what is going to be the result of this cold winter upon our fruit.

Mr. Plumb — I wish to add just one criticism on Mr. Herschinger's very valuable paper. The point which he makes there, that apples will not keep well in a damp atmosphere. They will not keep well in a dry atmosphere, that is certain. Now I would like to ask him what the condition of the atmosphere is in his barrel of Golden Russets headed up tight, if it is not very damp. Damp air is essential to the well-keeping of fruit, providing it is of a low temperature, but a moist and high temperature is destructive to the apple at once. If it must be high it had better be dry, but the dampness is essential.

Mr. Herschinger — The reason that we give the Golden Russet no ventilation in the barrel is because that variety requires more dampness than a good many other varieties, but with all the ventilation that you have in your cellar, there is still sufficient dampness there to keep other varieties; hence, I simply treat the Golden Russet different from the rest. I had a cellar that had a stream of water running through it, and that, I think, would be about as good a place you could get to keep fruit, if dampness is so essential; but I never could keep fruit in that cellar as I can in the cellar I have now, which is naturally very dry; but when you close your cellar and have no ventilation except from the roof, there is sufficient dampness, or, if anything, more than you need; hence, I should claim that fruit wants to be kept dry, as dry as you can get your cellar; then it will have dampness enough.

B. B. Olds, Clinton — I have nothing to say new on this subject. I have been interested in listening to the discussion of the papers, and of course can indorse the ideas that have been presented, especially upon the different treatment of the different kinds of fruit. That is a point of a good deal of importance. The Golden Russet, for instance, wants a very different condition from many others for keeping its good condition, and the idea advanced by Mr. Plumb, of getting this low state of temperature by an underground operation, is one that looks rational and ought to be considered.

C. L. Thompson, Marshall — I would like to ask Mr. Plumb how far frost would have to go through straw to frost apples.

Mr. Plumb — I have not tried that myself, and it is a difficult question to answer. If any one is apprehensive that an ordinary strawstack is not enough, put a double lining of paper right over it. A single thickness of paper is as good as a foot of straw to keep out frost.

Mr. Kellogg — I rise to answer the question put by Mr. Arnold in reference to the effect of the cold weather of the present winter upon the fruit. It will be next June before we can answer that question. I think we will have some orchard funerals then. I think from the heavy crop of fruit last season, the weak condition in which it went into quarters, and the cold weather last month and the warm weather we must have this and the coming month, I think there will be a heavy loss in the orchard next June. It will not be apparent until about next June. I believe very little damage has been done so far from the excessive cold weather were it not for the warmer weather that is coming. The weather for the past month has been exceedingly steady; very few times it has thawed out a tree, except on the southern portion.

I have a synopsis of the weather for the last twenty-five years, and perhaps if I had time I would read it, but I will furnish it for your transactions if you wish; but the last month has not been as cold as the February of 1875. The aggregate number of degrees below zero, counting up each day it falls below zero, was 325 for the month of February, 1875, while the past month it was 281.

Mr. Arnold — I would like to ask what you would recommend for preserving the trees?

Mr. Kellogg — Set out two new trees for every one that dies.

Wm. Gill, Brooklyn — I wish to get a little further explanation from Mr. Kellogg. He carries the idea that injury is to come from the warm weather we are going to get this month and next. I hope this question is pertinent. I hope he is competent to tell us something that will prevent that injury that is going to result from the warm weather we are going to have.

Mr. Kellogg — Shield on the southwest side is the only remedy

we can apply, either by laths, or boards, or paper, or anything to shield it from the hot weather we are going to have.

A. G. Tuttle, Baraboo — I have watched the winters for a good many years, and I have also watched trees and examined their condition during the winter, for the last twenty-five years. I examined the trees last winter, about this time. I found there was apparently not a particle of injury. I examined them to satisfy myself, though I was about as well satisfied before examining, last Saturday. I found that the injury was no more apparent than last winter up to this time, and that it was less than almost any winter, except last winter, for twenty-five years.

I never have, with the exception of last winter, and perhaps of the winter before, examined trees carefully, at this time of the year, without finding some coloring under the wood. Last winter they were as bright at this time of the year as they were in the fall. They are just about the same now. There is no apparent danger, and I don't believe we are going to get any injury this spring, unless we are going to get some very extreme weather to produce it.

I have found always that our injury comes in a measure from cold. I have never found that the heat does any damage. I have never experienced any injury in the winter from the sun, and I don't believe the trees suffer any from the sun when the thermometer is twenty degrees below zero in the middle of the day.

It is said the very extreme freezing and the sun at the same time coming upon it immediately does the injury. I believe that the sun does the mischief in the summer and the cold in the winter, and they act almost precisely the same upon the trees, and if it is long continued, hot suns and drying of the tree in the summer acts precisely in the same way that the extreme cold does in the winter. I have never known a winter when we have so much cold weather that we had so short a season of extreme cold as there has been this winter. We had in 1864 a winter of very extreme cold, especially for about ten days from the first of January. The morning of the first of January was the most extreme cold day, and probably did more injury to the trees than any other day I have ever known. The mercury stood at my place thirty-

four degrees below zero and there was a very strong wind, and following that day there were several very cold days; some of them the mercury stood at twenty degrees below zero at noon for a day or two. I have always found that the cold which produces the injury is that extreme cold, long continued.

Twenty-five years ago in Baraboo there were peaches exhibited at our county fair grown in the open air, and the mercury reached twenty degrees below zero that winter, but it was a single cold day. It was only down for a few hours. Apparently there was no injury. Now we have had extreme cold weather, not so extreme as we have had some winters, but we have had a large amount of cold, but it has not been long continued. The wind would get in the northwest and come off for a snow storm, and we would have it quite cold for a morning or two, but during the day the mercury would come up. I have seen but one or two days where it was below zero in the middle of the day, so that we have had no long continued cold.

You may take a tree when the thermometer is twenty-five or thirty degrees below zero, and the branches of that tree are just as closely and completely compacted and shriveled up as if it had been dried over a stove for a week. When the cold holds the tree in that condition and there are winds that are carrying off the moisture that is driven out by the cold, and it is held there for a long time, the tree, unless it is extremely hardy, does not recover.

Before examining trees last Saturday, I felt perfectly sure that there was no injury. I examined trees having had large quantities of fruit, and I could not find the least particle of color. Up to this time I don't think we need fear any injury to our orchards. What we have got to get beyond this remains to be seen. If there should be a week or two weeks of cold weather and the thermometer should be held down very low for a length of time, I should look for injury.

A. J. Philips, La Crosse — I should think my brother Kellogg had been in the fruit business long enough to know that a man was fooling away his time borrowing trouble beforehand. The trouble will come fast enough.

Mr. Kellogg — I would say to those who have young fruit trees

that are choice and in good condition at the present time, you can save them by wrapping them with newspapers. I don't think there is any thing else that will save some kinds, between now and spring.

Mr. Plumb — I agree with Mr. Tuttle that if there has been any danger of injury from cold, it has passed. Our examinations have been about weekly all winter up to this time. We have not found the first symptom of injury by winter. I do not believe that cold weather kills a tree if it is ready for it. Trees, if properly grown and well ripened, are all ready for anything that comes in the line of cold weather, but as Mr. Kellogg says, we may have changes — heat and cold — from now on. It is apparent that that may injure the tree.

If any farmer will cut off a few twigs of his trees in the middle of the day when they are not freezing, and let them lay two or three hours in his house, and then finds that they are yellow, the tree is injured; not necessarily dead, but injured.

There is a source of injury that I fear more than all the cold weather.

It is a fact that when our winter came on the ground was exceedingly dry, and it is dry yet. If any of you will dig down six inches or a foot into the ground you will find the ground exceedingly dry, and if this snow should go off and leave it in that condition, and it thaws out and then freezes, thaws as it does in the months of February and March, then the injury to the roots may kill a large number of trees; I have seen it, and others have seen it. That is the only thing that I am apprehensive of.

I advise every farmer to mulch his trees, all that he has any care to save, before the snow and the frost leave the ground. I think the mulching will save the root killing, and that is the most dangerous thing we have before us to-day.

J. A. Taylor, Sun Prairie — I should like to ask Mr. Kellogg a question about covering the trees. I have got a large number of trees; should I cover the branches or merely the bodies?

Mr. Kellogg — The body is sufficient.

Mr. Taylor — The bodies are now wrapped with rags.

Mr. Kellogg — Your trees are all right.

Mr. Taylor — What kind of a paper should I use, democratic or republican, to wrap them up in?

A Member — The New York *Rural* is the best thing I know of.

Isaac Huyck, Sun Prairie — I think it is necessary for some of us who are trying to grow small fruits to know what is best. I would especially ask about blackberries. I am located on a prairie or prairie opening.

Mr. Stone — My experience has proven to me that there are only two kinds of blackberries that we can grow successfully here in Wisconsin. I will name the Snyder as one and Stone's Hardy as the other.

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## SOMETHING ABOUT MANURES.

By J. W. WOOD, Baraboo.

The subject of manures is one of the most important which can challenge the attention of the agriculturist.

In practice we find that our methods of farming are exhaustive, and that we must carefully save and apply all the manure which we can make on the farm or get from any source, and still we are evidently exhausting our land. It is the experience of every one that the continuous growing and sale of crops impoverishes the land, and unless this constant drain can be supplied in some way the human family has in store for it famine and ultimate extinction. With the utmost economy in the use of the fertilizing material available to the farmer, the process is still exhaustive. We send our clover roots deep into the earth to bring fertility to the surface, but we ship the ripened product to foreign lands, or to the large cities in our own country, where extensive sewerage systems are arranged to conduct our lost fertility into the depths of the sea. It may be truly said that there is nothing lost in nature, and that what has gone from us may be upheaved in future continents, but the manure that we are after, as well as this phase of the subject, has slipped into water too deep for us to follow; so we will return.

The elements which we lose are those found in the ashes of our plants, together with the nitrogen liberated by combustion.

The carbonaceous matters, which form about seventy-five to eighty-five per cent. of air-dried vegetable matter, which is lost in burning, simply goes back to where it came from, and continues to be available to us. We need not worry about that. I did for many years suppose that carbonaceous matter in the soil was manure, and that it was important to preserve all of the straw and return it to the soil. I thought that there was agricultural virtue in refusing to let it be hauled away, but if carbon *is manure*, we ought never to rot our straw before applying it, for the process of rotting is a slow combustion, at the expense of the carbon which is thrown off into the air, and in this process may be lost to us forever.

We all know the importance of rotting down our straw, and I now see that the end gained is the liberation of the true fertilizing elements from the mechanical grasp of the carbon so as to render them available for the growing crops. When we first clear up our timbered land, the soil is black and rich. I supposed that the richness lay in the blackness, for they both disappeared together. I am now constrained to see it differently. To illustrate: I have an oak tree on my farm six feet in diameter, with a trunk forty feet or more in length, without a limb, and crowned by an immense top. I presume that it would yield fifteen tons or more of seasoned wood. If this tree should be burned, there might be left four hundred pounds of ashes; the remaining twenty-nine thousand and six hundred pounds would go off in smoke and gas. The result would not be materially different if it should lie on the ground until it had rotted entirely away.

The ground beneath the tree on which the leaves have fallen and rotted for perhaps two hundred years, is black and rich, and its fertility is no doubt increasing every year. The roots of the tree go deeper than clover roots, and bring together the ash elements from far and near. A portion of these elements ascends into the leaves, where they are elaborated and applied according to the laws which govern the tree. The leaves retain a portion greater than the average of the wood, and when they have performed their functions they drop off. Their carbon rots away

leaving their ash material on the surface within reach of the crop which may be planted when the ground is cleared.

If all of this carbon was drawn from the soil, it ought to show exhaustion in the vicinity of the tree, while in fact, the accumulation there is greater than anywhere else in the forest. I now believe that the tree is just an agent through which carbon is taken from the air and fixed for a time, and that when liberated it goes back to whence it came.

I have another tree, a large elm, three feet or more in diameter, which is but a mere shell. A squirrel will run into a hole at the root, and presently appear on one of the remote branches safe from dogs and guns. Rabbits find safe burrows deep down in its leading roots. If the hollow in this tree could be filled with water and frozen solid, and then the wood of the tree be removed, there would stand a magnificent tree of ice, two or more feet in diameter at the butt, forty feet without a limb, and with branches outlining a magnificent top. This would represent the size of the tree which has been entirely removed from the center of another one, and what can have become of it, unless it has escaped as gas?

It is believed that all the carbon of our coal fields has been precipitated from the air through vegetation, and we can see peat beds forming in this way now.

It is said that in Washington Territory, there are thousands of acres where the timber is so thick, that if it were cut and piled, it would cover the whole ground with cord-wood six feet deep. The evidence that carbon is furnished to plants through the air and not through the roots seems irresistible. Science teaches the same thing, for plants have often been grown to perfection, while all carbon has been carefully excluded from the roots.

Now, if carbonaceous matter is not manure, what have we in the immense loads which we haul from our old straw piles that is manure? We derive evident benefit from their use, but the practical question is, might we not get more benefit in some other way? Let us look at the matter a little.

It will take four or five tons of freshly cut clover to dry into a ton of hay. A ton of dry straw tramped down by cattle in

the yard will absorb as much water as the green clover carried, that is, it will weigh as usually hauled four or five tons. By reference to prepared tables we learn that, exclusive of the ashes which it might make, about eighty pounds, it will contain but eight pounds of nitrogen at the very best. This will be held in very crude combination and will not be readily available as plant food. Were there four pounds in available form, it would be worth at the rate at which it might be bought in guano, about $1.08. Now if we should burn our straw and haul out the eighty pounds of ashes that would be left, we would have to add to it $1.08 worth of nitrogen, to have all the fertilizing power contained in the straw.

If we tramp it down in the wet, we must haul out four or five tons of crude material and incur great labor in spreading it, in order to get a very little benefit.

I use my straw in this way, but if I had a market where I could sell it for three dollars per ton, I would certainly sell it and purchase fertilizers. Straw used as bedding to soak up liquid manure, and to make animals comfortable, is always well used, and a man had better buy it than to do without it for these purposes, but it is as poor food for land as it is for stock. In fact I think that, relatively, it ranks higher as food for stock than it does for manure, for the starch sugar and the cellulose, so far as digestible, may be valuable in the animal economy, but is not in the earth.

Now let us look at some statements made by Mr. Lawes, of England, in an address at Haddington, delivered last April, and published in the December number of the *Scientific Farmer:*

### WHAT GIVES MANURE ITS VALUE?

We have now to inquire what are the ingredients in dung which supply food to our crops? Of that mass of dark, strongly-smelling substance called dung, is it possible that its sole property as a manure depends upon the comparatively small quantity of chemical salts which it contains? Is it possible that plants, so far from "feeding upon garbage," very much prefer to have their food supplied to them in the form of pure crystalized salt without

smell? * * * I do not expect you to answer these questions, or even to assent to the conclusions which might be drawn from them; but what I am about to ask your assent to is this: if, from the evidence I am about to place before you, it appears probable that the organic matter which we supply to the land in dung does not act as a manure to our crops, then the connection between the farm manures and artificial manures is much closer than it would otherwise be. The importance of this question must be quite obvious to you. Our crops generally contain from ninety to ninety-five per cent. of organic matter. When we increase a crop by means of a manure, such as salt of ammonia, or nitrate of soda, which contain none, do we merely enable the plant to take up that which had been previously supplied in the yard manure? It is evident that a question of this sort could not be settled by one or two years' experiments. Now, suppose the Haddington Farmers' Club decided to try whether their crops could obtain all the organic matter they required without its being supplied to them in manure, I suppose they would conduct their experiments in the following manner: They would give to one acre of land a good coat of dung every year, which would supply all the organic matter which plants contain, in addition to the other foods; and they would apply to another acre all the chemical salts which the crop would require, but containing no organic matter. They might then try the experiment with one crop, or with several. Now assuming that the crop grown by medium of the chemical salts was the first year and each succeeding year larger than the dunged crop, how many years would the members require the experiment to be repeated, before they arrived at the unanimous conclusion that

PLANTS TAKE THEIR ORGANIC MATTER OUT OF THE ATMOSPHERE,

and not from the soil? Some members would probably be satisfied in two or three years, and some in five or six; but I suppose the most skeptical among the members would be satisfied before the expiration of one of your nineteen-year leases. Our evidence on this point extends further than the longest period I have assumed. In one case we are approaching a period of nearly

twice nineteen years. On a field of fourteen acres, which is devoted to the permanent growth of wheat, the last time that dung was applied to the field, except to the small portion which receives it every year, was thirty-six years ago. The weight of the straw and corn of the last year's crop where dung is always used, and that where no organic matter was used, was as follows:

TOTAL PRODUCE PER ACRE IN STRAW AND CORN, ROOTS OR HAY.

| | Last year when dung was used. | Produce in 1876 with dung each year. | | Produce in 1876 without organic matter in manure. | |
|---|---|---|---|---|---|
| | | *Tons.* | *Cwts.* | *Tons.* | *Cwts.* |
| Wheat | Thirty-six years ago | 1 | 13 | 2 | 12 |
| Barley | Thirty years ago | 2 | 12 | 2 | 7 |
| Mangold | Thirty-four years ago | 19½ | 0 | 25 | 0 |
| Pasture | Twenty-two years ago | 2 | 1 | 3 | 12 |

You see, therefore, the evidence is very strong in favor of organic matter being taken from the atmosphere. In fact, if I wished to grow the largest possible crop, say of grass, without any reference to the cost, I should certainly avoid applying manure containing any organic matter.

Now I do not want to be misunderstood in this matter. I want no man to go home and say that I have advised farmers to burn their straw, or to be careless in the use which they make of it. I want them to become intelligent in its use, and learn to estimate it at its true value. If there was a market opened for it, I believe that it could be as profitably sold as any other farm product. I will not attempt to be exact, but I believe that at three dollars per ton it might always be sold, and the money be spent for other fertilizers, to the advantage of the farmer.

Chemists tell us that there are about fourteen simple elements found in common vegetation. Agricultural plants find some of these in the atmosphere and some of them in the earth. They must be had by all plants which reach maturity and perfect seeds.

When all are found in proper abundance, and in available forms, the land is called rich, and produces abundant crops. What we call exhausted land is simply deficient in certain elements, and we have learned that those which oftenest fail are nitrogen, phosphoric acid and potash. These are the chief ones which have attained commercial importance, and are sold, in general terms, as "fertilizers."

Plants are the agencies through which mineral substances are prepared as food for animals.

There are no animals which live directly upon earth. Plants eliminate the needful elements, concentrate them, and prepare them for animal digestion. The proper combination of three elements, carbon, oxygen and hydrogen, makes food for animals, but not perfect food. Nitrogen must be added, as it is necessary in the construction of muscle and other parts of the animal economy. The phosphates also are needed for bone. These are leading facts. Other things are needful, but it is not within my present scope to mention them.

All of the elements of carbhydrates, as they are called, such as sugar, starch, gum, oils, both vegetable and animal, are derived from the atmosphere.

This supply never fails. It cannot be concentrated to make lands richer, nor can lands be made poor by withholding it. "The wind bloweth where it listeth." If this be true, we cannot exhaust land by raising and shipping these substances. We only exhaust land when we sell the quaternary products. We do not exhaust land by selling the fat of animals, but when we sell their muscle, their bones, their hair, skin and horns. We exhaust land when we sell milk, cheese or eggs, but not when we sell butter.

The difference between No. 1 hard wheat and No. 1 white winter is, that the former contains a larger percentage of nitrogen and yields a greater proportion of patent flour. We exhaust our land faster in raising it, for the sale of the starch in wheat is not exhaustive.

Will not the exhaustion of our soil of nitrogen account for the softening of the wheat, which is so generally complained of by

millers? Minnesota Fife has in a great measure lost its hardness, and the manufacturers of patent flour follow up the new wheat lands of the northwest for their supplies.

If this logic holds good, a natural corollary would be, that it is better economy to buy mature animals and fatten them for the market than it is to raise them on the farm. A mature animal will not remove the phosphates from its food like a growing one. Its weight will be increased by laying on fat, rather than bone and muscle.

There is an immense waste of costly material in the animal economy. We have gathered up in our crops of grain a large amount of everything necessary to promote animal growth and sustain life. In feeding it to ruminates they do not assimilate more than from five to ten per cent.; the remaining ninety or ninety-five per cent. is sent back into its crude form, and is no longer available as food until it has been caught and fixed again through the processes of vegetable life.

A man may sit down to a dinner of roast beef. The pound of flesh which he eats may have been built up at a cost of ninety pounds of the same elements. So far as they were collected from grass there might be economy in the transfer, but so far as made from grain already suitable for food, there was a great loss of life-sustaining elements. The gluten of wheat or corn is almost identical in its composition with the lean of flesh. Corn contains ten per cent. of albuminoids and is a food that will build up the entire animal system. What a fearful waste of human food to give ten pounds of corn for one of pork, for the fat of pork is not complete food for the animal system. It only furnishes heat-giving elements.

I have wandered a long ways from the subject of manures; I will return to consider the subject of nitrogen. Of all the elements of vegetation this is the most difficult to secure. In all of its available forms it is both exceedingly volatile and soluble. While it constitutes about seventy-nine per cent. of the atmosphere and envelops the entire plant continually, yet it does not yield itself to any of the needs of the plant. It is so exceedingly coy that it refuses all union with the oxygen with which it is so

intimately associated. It is a difficult chemical feat to get them to unite.

While it is probable that the leaves of the plant will absorb to some extent the carbonate of ammonia, yet the main supply is doubtless presented to the roots in the form of nitric acid. To secure a supply of nitrogen for the growing crop is one of the greatest achievements in agriculture. Its presence is what gives to Peruvian guano more than one-half of its value, so that it sells for twice as much per ton as an equal amount of wheat, and yet it contains but ten or twelve per cent. of nitrogen. Forty-five or fifty pounds is a sufficient supply for a good rousing crop of wheat. This amount must be available and actually applied by the wheat. Much more than this in some unavailable shape might be strewn on the ground, and the wheat still suffer for want of having it within reach.

It is generally conceded that the farming interests of our state are in a prosperous condition, and it is true, but yet we are raising only moderate crops of anything. How our interests would boom if we were only raising maximum crops of everything. The average yield of wheat for the state is but thirteen bushels per acre. We sometimes raise thirty, and ought never to raise less than twenty-five. It costs not less than seven dollars per acre to raise our wheat. This would call for nine bushels per acre to pay us wages for our work, leaving out the consideration of land and taxes and exhaustion. I do not believe that any man would sow wheat on a guaranty of but thirteen bushels per acre. He hopes for more, but he oftentimes gets less. If four bushels per acre above cost will make a paying crop, then an increase of four bushels per acre will double the profit, and a crop of twenty-five bushels will quadruple it. We want in everything to raise maximum crops. I conceive that one of the best works which can be undertaken at our state experimental farm will be the institution of a series of experiments with commercial fertilizers. All intelligent farmers know the value of their home-made barn manures and the propriety of saving and using them whether they practice wisely or not. Experiments with such manure need not be made on the state farm. We do not care whether the crops

raised there are profitable ones or not. If made profitable by gathering up the refuse of Madison, it would teach us nothing because we could not find the same opportunity for procuring it.

The gardeners are the natural scavengers of our cities. Commercial fertilizers can be purchased by any one. The question is, will it pay to use them? We want to learn their value and we want to be protected from imposition in purchasing them.

If there is anything which can help us to raise twenty-five bushels of wheat to the acre, we want to know what it is. If there is a fertilizer which will do it I conceive it to be some compound of nitrogen. It ought to be tried on land that is somewhat worn, not on land that has been filled annually for years with barn-yard manure.

The most available source of nitrogen, for the common farmer, known at present, is in the cultivation of clover.

It may now be accepted as a well-established fact, that after removing a clover crop amounting to two tons of hay to an acre, and containing all the elements required for a crop of twenty-five bushels of wheat and something over, it still leaves the ground in better condition for wheat than any other crop would leave it, and with a sufficient supply of available nitrogen for an excellent crop.

No system of farming is complete which does not offer a perfect rotation.

This rotation has clover in it, as a matter of necessity. Sometimes we fail to get a stand of clover, and this will break up our whole system. It disarranges things very badly. It is of no use to sow wheat unless we can make ourselves believe that the land has in some way an especial fitness for it. If it was an established fact that any known fertilizer would help us out in our extremity, it would be a very important thing for us to know.

I think that a series of experiments calculated to solve some of these problems, which can only be solved in this way, would be very legitimate work for our experimental farm.

DISCUSSION.

Prof. Henry — I wish to say one word of appreciation for the paper just read.

While I am conversant with what is going on in the different states of the Union, and know how far ahead of us in some ways other states are, I must say that a part of the paper which I have heard is a perfect surprise in the excellence of the material and the clearness with which it is presented.

I do not believe there will be read in any agricultural gathering in the United States this year, a paper which should call out more thought and which is worthy of more attention, than the paper you have just heard. And it seems to me that Wisconsin should be proud to have so much science, so much that is practical and so much that will draw out thought as we have heard to-day. And coming among you as I have, I feel rejoiced to hear such papers as this read. I believe that as we read it in our agricultural reports, although we may differ possibly,— but when we read there of the nitrogen he talks of and phosphates, that it will set us to thinking, and the farmers of Wisconsin will not much longer put up with thirteen bushels of wheat to the acre.

A. A. Arnold, Galesville — As I sat listening to this paper I was wondering what Professor Henry would think of that, and I thought to myself, "if Professor Henry has never heard of Mr. Wood, he will be surprised," and I want to say here that Professor Wood — and he is entitled to the name of Professor — is one of the boys that was educated at the Michigan University of Ann Arbor. Now we want to have lots of those kind of boys in the state of Wisconsin here, and we have got Professor Henry here so that we may have some of our sons like unto him. If we had one such man in every county of this state — even if there were no more than one — what an immense advantage it would be to the state.

I do hope that the regents of the state university will see the importance of this thing and do all they can to advance that part of our university.

Prof. Henry — What can we do when the farmers send their boys here to become lawyers?

J. M. Flint, Sun Prairie — Something has been said about manures. I regard the estimate of the amount of wheat which is on the average produced to the acre in the state of Wisconsin, to be correct as stated in the paper just read — thirteen bushels to the acre. I have noticed this, that the farmers in my section of the country are leaving out wheat largely, and putting corn and other crops in its stead. They are also mixing some other grain or grains with the wheat; for instance, oats; and farmers have succeeded in raising more wheat than they have averaged in sowing the wheat singly and alone.

In the application of salt and plaster to lands, the wheat crop has also been materially enhanced.

I applied to the red and hard variety of winter wheat, which was finally injured by rust and by the chinch bugs also, salt to the amount of one hundred and sixty pounds to the acre, this year. In my opinion that was what saved the thirteen bushels which the land finally yielded.

On the second crop of wheat, mixing three bushels or three and a half of oats in seventeen of wheat, I raised a better crop of wheat than that which is averaged in the state, besides the oats, the whole crop amounting to about thirty bushels per acre, and the wheat was in excess of the average crop; but the saving point, in my judgment in these crops, was the application of salt, from one hundred and sixty to two hundred pounds per acre.

J. N. Ames, Oregon — There has been a great deal said about raising wheat. I can remember when people called me a fool because I said I never saw a farmer in Wisconsin make money by raising wheat. Now I ask the president of this association, and all other gentlemen, if we are not improving faster as farmers since we left off raising wheat as a staple.

B. S. Hoxie, Cookville — In the main, I like the paper the gentleman has just read, first rate. I have given some attention to this subject, but I find there are a great many farmers who do not even know anything about the nature of the clover plant. They think it lives right on from year to year. When I have talked with some of them and told them it was a biennial, they would at once dispute me. Now we want to teach them that one thing, I think, about the clover plant.

In speaking of straw, the gentleman said he would sell it rather than use it. That may be very well, but what will the farmers do who are not in the vicinity of paper mills, where they can sell their straw to good profit? That question was brought out a little yesterday.

Now it seems to me that though we cannot attach really so much value to the straw as some would, yet does not that straw and coarse offal have an office to fill in the land?

All these farmers remember in their first clearing here while the roots were in the ground, the hazel brush root for instance, that they got better crops then. The soil was lighter and in better condition. Now will not this straw, especially on our heavy clay lands, fill some such office as they did? It loosens up the soil and allows the air to permeate it.

It has been set forth by Prof. Wood and others that the plants derive a large amount of their revenue from the atmosphere. Now is there not an office there for this to perform? Is there not a thought here for the farmers to reflect upon, before they destroy their straw or sell it for a dollar or even three or four dollars a ton?

H. Robbins, Platteville — On this question of fertilizers I think that the common farmer knows but very little. I am of that class. I have been fertilizing my ground for forty years. I have raised crops on one piece of ground for thirty years without hauling any manure on it, and without seeding it down. I rotated crops, planting oats and corn and sometimes wheat, but never got much wheat since an early day.

I have raised forty bushels of wheat to the acre on land in Wisconsin. I own the land now on which I raised that amount of winter wheat; that is, it was so said in the early day. Perhaps their bushels were smaller than ours are now. I owned the ground, but I rented it and got my part of the forty bushels to the acre. We thought then that wheat was everything. That was about thirty-five years ago, but I can't raise any wheat there now on my land.

Senator Matt. Anderson, Cross Plains — You had better rent it. You had a good tenant.

Mr. Robbins — I guess he took the grease out of the land. In regard to clover, I had a piece of clover land rented this year that was plowed up last spring after the first of May. I got over seventy bushels of corn to the acre off from that.

In regard to barnyards, I have had first-rate luck in hauling out my manure, and I would not want to give it away, and I would not want to sell it to anybody. I don't think I put any loads of manure on my land but what was worth fifty cents a load.

I have learned the value of clover. I believe that I have made more since I commenced using clover on my land than I made in any other way. I believe my farm to-day is worth twenty per cent. more than it was twenty years ago, because I can raise crops larger by twenty per cent. than I could then when my land was comparatively new.

I. C. Sloan, Madison — I desire to call attention of the farmers present to the experiments which have been tried at the university farm which have interested me.

Now, there was a plat of ground laid out four years ago upon that farm for the purpose of testing the value of fertilizers. It has been planted with corn for four years. This is the fourth season. I find by the late report of their experiments that the two plats which were unmanured, wholly without any fertilizing, have borne through this four years an average crop of corn. There are but two fertilizers, one is wood ashes and the other super-phosphate, that have produced, if I remember the table rightly, a larger crop of corn than the unmanured and unfertilized plats. I have seen, in correspondence in the agricultural papers from the large corn farmers in central Illinois, that corn is the least exhausting of the crops that are raised, and that those prairies adapted to corn can be cropped with corn indefinitely, without exhausting their fertility; keep up a maximum corn crop. They say they are benefited with occasionally an alternate crop of oats, which I understand to be perhaps the most exhausting of all the cereal crops.

Now, the short time that these experiments have been going on, four years upon the university farm, seems to bear out fully

the opinion that corn, as a crop, for some reason, does not exhaust the fertility of land.

Is that in accordance with the experience and opinion of the farmers present in growing that crop?

Mr. Robbins — That is my opinion. Corn does not exhaust the land.

Mr. Broughton, Evansville — In my opinion it does.

Mr. Sloan — In my opinion corn was a poor crop to test the relative value of fertilizers. I would like to know what the fact is.

Senator Matt. Anderson, Cross Plains — I have had some little experience in raising corn in Ohio, where they can raise perhaps as big crops of corn as anywhere in the United States. I think there was a gentleman here from Mazomanie, who was born and raised in Ohio, who recollects a corn field I told him about. There was a gentleman told me he knew that corn field to be in corn continually for fifty-five crops, and I know it bore a heavy crop when I saw it, and I know I saw the last crop of corn which was raised there. I bought the land, and I know I raised a heavy crop of potatoes on it the year after. This was in the Miami Valley, some nine miles from the river. I think those bottom lands are richer than any of our prairie soils.

I have seen another field of corn in Warren county, Ohio. I visited there some years ago and I saw a farmer cultivating a field of corn, and I said to him that that was one of the finest fields of corn I had met on my travels. Says he, "I have had that field in corn for twenty years, and last year I had one hundred and twenty bushels of shelled corn to the acre." That was about twenty-five miles north of Cincinnati.

I don't think corn exhausts the soil, especially if you will husk the corn and return the stalks to the soil. In Illinois they have corn-stalk cutters, that cut the stalks up in pieces from eight to twelve inches in length. They plow them under, and they claim that it not only helps to fertilize the soil, but that it makes it loose and mellow; lets the air permeate the soil. That is one of the secrets of corn growing, to have your land in good mechanical condition. It is not so much in the soil as it is in fine culti-

vation. I can illustrate this. A year ago I had a crop of corn. Part of it was in sod; part of it was in a patch where I had peas on one side; both soils equally rich; had been manured at the same time, but not for that crop. The peas were hauled off, and the ground tramped very hard and solid. One year ago I plowed that ground. It was very dry and it plowed up lumpy. That was sometime in May. The sod alongside of it, which was only one-year-old clover seed, was also plowed, and proved to be mellow. You could see the difference in the corn from the very rows, from the time when it first started until we came to husk it. I think the sod corn had nearly double as much, and there was no difference in the soil, except in the mechanical condition, one being lumpy and hard, and the other loose and mellow. If that soil had been wet when it was plowed, I think it would have done much better. I think corn is one of the least exhaustive crops.

I recollect some years ago I read a paper before the Wisconsin Valley Agricultural Society. That was the first time I ever addressed an agricultural society, and in that I claimed this rotation of crops was best one year in clover, one year in corn, and one year in small grain, and then back to clover again; and I have never changed my opinion upon that rotation of crops. You will hear men talking about the white grub destroying the corn on the sod ground. It never will destroy your corn on new sod short of a year old. After that the June bug will deposit an egg which will become a grub, and that will destroy the corn.

J. N. Ames — Did you manure the ground on the land you speak of?

Senator Anderson — Not at all.

Mr. Ames — There is a great deal said against barnyard manure. The general impression is that barnyard manure is not the cheapest. I have been buying land for eighteen years; I did not own much at that time. I have been under the necessity of buying worn out soils, and the last piece of ground I bought, a man sold it to me because he could not live on it any longer, and I had to go to work and get the stumps and hedgerows and stone out, and then it was in an impoverished condition. I worked a

long time before I could get it seeded, year after year, fall and spring, and it was almost impossible for me to seed that land. And while I was doing this I raised oats that you had to pull to bind. They were dreadful poor, and it was no paying business to me; in fact, I only got a small part of a crop of timothy and clover, because the poor spots grew up to weeds. But I put my sheep on it, and kept them there two or three years. Then I drew my manure on to thirty acres; I questioned the profitableness of drawing manure so far, but the boys ran my teams down; I never worked them harder, because I felt the necessity of drawing it fast. I planted that to corn, and the first crop I got on this ground I got a hundred bushels of ears, which was a good crop of corn for our section of country. But I dared not keep it up any longer, because I thought it had not come back to its proper condition, and I plowed it last year and sowed it to oats, and the oats beat me; it was too rich. This came from the process of sheep and barnyard manuring, and I hold that we can make them pay.

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THURSDAY, 2 o'clock P. M.

By invitation of the honorable the senate of Wisconsin, the convention met in their spacious chamber, Thursday afternoon at two o'clock.

J. M. Smith, president of the State Horticultural Society, in the chair.

The following papers were read:

The paper by Mrs. Colby was read by Miss Ellen Chynoweth, a teacher at the state university. It was read as few do or can read. A little lady, but her articulation was perfect and her voice filled the chamber, which elicited much favorable comment. Mrs. Colby evidently appreciated her friend when she selected the reader.

## FARMERS' WIVES.

By Mrs. CLARA BEWICK COLBY, Beatrice, Nebraska.

We are all the children of a farmer's wife. When the voice of God drove our first parents from Paradise, pioneer life began. Doomed henceforth to sorrow and sweat,

> "They hand in hand, with wandering step and slow,
> Through Eden took their solitary way."

Having reached the frontier they took up a homestead, and then began a life which epitomizes, under changed conditions, the life of farmers' wives from that day to this. Eve was poor. Her education was limited. Her nearest neighbor was far away. Of her numerous children, some turned out very bad; and her husband, no doubt, often told her he should never have gone west if it had not been for her.

Given a certain amount of education, wealth and nearness to a town, and the farmer's wife is envied and enviable. You know her. She comes to your church, and attends your lectures, exhibitions and social gatherings. She is well dressed, and as refined, intelligent and happy as any woman in the land. You visit her and admire the comfort of her home, the sweet shyness of her children, and all the picturesque and charming accessories of her rural life. She is frequently found in the wealthy and populous east, often in the middle west, and occasionally, lacking only the perfection of surroundings, she appears in the pioneer states even to the far frontier. Like the Roman candle which, thrown up at intervals in the Mammoth cave, reveals to travelers the wondrous grandeur of arch and vault, the brightness of her life displays the beautiful possibilities of her position. But she is the exceptional and not the representative of her class.

In the Norse heaven, Thor's house had 540 floors. Quite as many grades are there in the condition of farmers' wives. But, leaving out the extremes, let us consider them generally, first premising that no statement can be made to which there may not be numerous exceptions.

Farmers' wives are as happy on an average as the women of

most other classes. Some, from their favorable surroundings; others, because of a healthful contentment which would make them happy in any state; some, from the fact that their sensibilities have never been awakened and they know not that they are lacking; others again, because of a patient resignation born of experience. They have their joys and sorrows in common with the race. Like every other class, they have their own peculiar discomforts and advantages. Still there prevails an idea both among themselves and others that their life is unfortunate, and certainly it falls far short of possessing that ideal happiness which is both desirable and possible.

The troubles and discomforts of farmers' wives as a class have many causes.

One of these is early marriage. Rural life is favorable to matrimony. Having little study and few enterprises to occupy the mind, the attention of the young is early directed in settling in life. Their conversation and amusement are on a sexual plane. The happy, innocent mingling of the youth which in the town life means good fellowship, in the country, usually has reference to marriage. At an age when the girls of cities and villages are at school, or engaged in some labor marked out for them by a guiding hand, the country girl undertakes the responsibilities of housekeeping, often under the most trying circumstances, and assumes the most important duties of womanhood. The complete physical changes incident to a wife and mother, experienced at her immature age, often break down her health and lay the foundation of nervous disorders which cause her life-long sufferings. Development of mind and body are arrested; the judgment is warped, cheerfulness gives way to complaint, or silent endurance increases the strain on the nerves. Her means will not allow her the rest or attendance necessary for a cure, nor does she know what is the matter, save that for some reason or other life is a burden. She grows old prematurely, or breaking down entirely under the stress of adverse circumstances, her nervous system gives way, and she adds another to the long list of farmers' wives who are found in our insane asylums.

Another cause pregnant with trouble is poverty. In fact, the

want of "money is the root of all evil" to the farmer's wife. Country girls are seldom influenced by worldly considerations in their choice of a husband. The country boy cares little for gold or lands; all he wants is a wife. He is the original hero of the story told of the youth who married with only sixpence in his pocket, and then tried to have his father take the sixpence, as he had got all he should ever want in this world. It is a common custom to give a girl a cow and a feather bed when she marries, and the youth who works for his father until he is twenty-one usually receives a team. With these and little more they begin the labor of housekeeping on a rented farm, one-third of the produce of which comes to them for their toil. It must be an exceptionally good year, or prices must be very high, owing to wars or complete failure of crops in other parts (in which calamities farmers learn to take a ghastly comfort), if the farm affords much more than a bare subsistence. A few buy land on easy terms of their parents. In the East the oldest, and in the West the youngest son generally stays on the old homestead, but he looks with envy on the brothers who were free to choose, and his wife undergoes trials, different indeed, but quite equal to those of the pioneer. Their eyes turn longingly towards that country which their fancy paints as

> "The land of mighty rivers,
> Running over sands of gold."

As a rule, the longer they stay in their native country the poorer they become, until, sooner or later, they pluck up courage, and in a covered wagon, or as they call it, a prairie schooner, they start for the West. The most eastern states for these pioneers are Iowa and Minnesota. The next are Dakota, Nebraska, Kansas and Texas, which are now the chief objective points. After the land is selected, the work of house-building falls on the man, and must be done from such materials as are cheapest. Stone, logs, adobe and sods are used, according to the locality, but in the very states where nature holds out her hand most cordially to the immigrant, the soil and climate render it possible that man may simulate the habits of the lower orders of animals and burrow in

the ground. The dug-out, to be known, must be seen. I remember standing in one just twice the size of an ordinary bed. One end was not dug as low as the rest, and on this earth lay a woman dying of pneumonia. But they are not all like this. As a temporary shelter they may be made comfortable, are frequently plastered, have glass windows in front and ventilation above; and it is no uncommon thing to find books, music and refined people in them. Let me give you an extreme but authentic instance of this. A superintendent of schools had occasion to stop at a Nebraska dug-out. He found to his astonishment a silver bell and plate on the door. In answer to his ring the door was opened by a neatly-dressed lady, and when he entered the room he found there a Chickering piano, elegant furniture and every indication of refinement. She told him that her husband was a merchant from Philadelphia who had come west to retrieve his fortune by farming. He sent for his wife when his home, as he called it, was ready, and she, not knowing what she was coming to, had brought the best of her furniture with her. Some of the most prominent citizens and many of the wealthiest farmers have lived in the dug-outs and sod houses in the first days of their poverty, but as the native gophers and ground squirrels leave their burrows in the budding spring, such people always come up into the free air and sunshine in the earliest dawn of a brightening prosperity. These places, unhealthy and gloomy at the best, are ruinous to mind and body if long inhabited. Yet there are men and women, degenerated into mere animals, who dwell in these holes after they are infested with mice and vermin, and who even learn to like them and to be like them.

One familiar only with the comfortable homesteads of the east can form no conception of what farming is to the western woman. The houses are small, inconvenient, and finished only by degrees. She has few facilities to make easy her care for her household, her cows and poultry. The fuel is not under cover, the water is hard to draw. Her work is heavy through lack of conveniences. The extensive farms of the west are often an injury to the woman in many ways. The farmer is so busy that he has no time to do the needed jobs around the house and yard. To harvest the

large amount of grain, the farmer needs much machinery and help, and to obtain these the stinting is done in the house. Too often the farmer makes household economy so much the more necessary by his carelessness. The farm machinery is not properly housed. An expensive harvester or threshing machine, that will cramp the family long to pay for, is exposed to the weather the year round. Then it wears out quickly, and giving way when most needed, causes delay and expense. This is one of the many avoidable reasons why poverty is so severe and continued in many farmers' homes. When the land is bought and not homesteaded, there are the payments to be met, and until the land is clear, the farmer feels that nothing must be expended for comfort in the house.

Debt and poverty demand many sacrifices. I have known delicately nurtured women to part with their relics of former times, and even their superfluous clothing, to procure the necessaries of life. I have known them, when sickness has laid its hand on the husband, take his place in looking after the stock and outside interests, while caring for him and the little family, alone and unhelped. I have known them endure discomforts aud privations of every sort, and still keep heart under the daily round of toil and self-denial, because it was done for home, the children and the better time coming.

But many have not this courage and strength, and as the years go by, they lose hope and affection. There is an old adage that "When poverty comes in at the door, love flies out at the window," and this is too often the case with the farmer's wife. Sometimes the girlish preference she thought was love fails to stand these trying tests, and separation ensues. Divorces are frightfully common among the farmers of the west.

Another cause of unhappiness is overwork. This ill pertains chiefly to the transition state between poverty and plenty. Given certain stages of prosperity, and the woman's work is largely increased. More stock, more grain and fruit, more help to the farmer; all these mean more work to the farmer's wife. She can seldom procure help, for such as there is, naturally seeks the town. If a girl goes to a country neighbor

she does it for accommodation, and leaves as soon as possible. The daughters of foreigners are employed at home during the busy season as ordinary farm hands. In addition to the house and children, the wife must take care of the poultry, feed the calves, and often assist in chores less picturesque. The husband has no time to "potter" in the garden, and she must plant, hoe and gather such vegetables as she needs for the table. Even the cooking is a task of magnitude, for farm folks are the hungriest in the world, and the meals must be ready at the moment, lest the hands have to be idle. In the busy seasons a morning lunch must be prepared and carried to the fields by the wife, if she has no children large enough to do it. All these varied cares keep her constantly weary and unprepared to endure any extra strain on her system, or to bear the additional burdens which sometimes fall upon her.

Idleness and carelessness, on the other hand, are often the cause of much of the unattractiveness of life on the farm. The farmer has no time for the domestic graces during most of the year, and when his spare time comes, he has learned to think them of no account, and his leisure is spent in gossiping with his neighbor or in going to town. The efforts at personal cleanliness ceased with the wedding or soon after. Anything is good enough for a farmer, or a farmer's wife, and people who do not respect their calling soon cease to be themselves respectable. For lack of appreciation the wife is apt, even if in her girlhood she was neat, to become slovenly and careless as to her appearance. This untidiness in herself reacts in her home, until shiftlessness and disorder prevail. Under such influences the bright and sparkling girls reach an uninteresting maturity, and then repulsive age. They become possessed of the idea, more pernicious than any other that ever entered the heart of woman, that anything will do at home, or is good enough for the family. They live as they tell you, a dog's life of it, but without a thought that they are in any way responsible for their wretchedness.

Another ill grows out of the financial relations of the farmer's wife. As a rule the husband makes the purchases, even to procuring his wife's dresses, while she rarely or never has the control

of a dollar. The butter and eggs by tradition belong to the wife, but as a matter of fact, in almost every instance, the husband makes the sale and receives the money. He buys first what he most feels the need of, and the money is usually spent before the wife's convenience is thought of. Sometimes she frets and worries after things which her husband cannot afford, and which she would gladly do without if she understood that it was circumstances, and not the arbitrary dictum of her husband, which made the economy necessary.

By this system there is developed in the man a narrow-minded tyranny and a petty penuriousness in even the noblest natures. The wife remains a child in finance, and if she is ever entrusted with the shopping, does it awkwardly and unwisely. At times she feels keenly the deprivation, and again she learns to thieve from her husband on a small scale, in order to attain some desired object. It may be said that she cannot steal from her husband, but she regards the money as his, feels she is stealing, having the intent is really guilty, and her children are born with a tendency to become liars and thieves.

Isolation is another detrimental element in the life of the farmer's wife. In thinly settled communities this is one of the worst troubles she has to contend with. The nearest neighbor may be miles away, and the daily routine of farm-house work, so healthful as the back-ground of the picture, becomes gloomy and monotonous when not touched with the colors of external interests, or brightened with the light of intercourse with friends. In families living ten miles distant, the man will go to town about a hundred times a year to sell his grain, to get the mail, and, though he would not like to own it, to learn the news and to talk politics on the street corner. The wife goes perhaps twice a year, takes the children with her to give them a treat, and is too tired and busy to enjoy the change or derive any social benefit therefrom. I know of a woman, and hers is not a solitary case, who does not go to town as often as once in two years, nor can she even visit her neighbors, being unable to walk far, because her husband will not take her. She says she would as soon die as live.

"Man is a social animal," and George Waring adds, "more

especially are his wife and daughters;" and there is no doubt that the loneliness of farm life drives the daughters to town to work or worse, and leaves the mother to still greater loneliness, in which perhaps the spirit chafes until it breaks the bound of reason.

Again, the ignorance of farmers' wives is often a serious ill. Their early marriages keep them from getting much schooling, and their secluded lives prevent them from gaining that varied experience which is the best of knowledge. Ignorant of books, they lose a comfort and companionship which would alleviate many of their troubles. Ignorant of the world, they take no interest in the march of events. Ignorant of hygiene, they allow their families to breathe impure air at night, to neglect personal cleanliness, and to consume the most indigestible kinds of food. Ignorant of domestic science, they perform many of their duties in the most arduous and unsatisfactory ways. Pope, I think it was, said: "Woman is a creature who cannot reason, and who pokes the fire from the top;" and truly some of her methods for arriving at results are well illustrated by the Norse tale as given by Max Müller:

"A man saw a goody hard at work, banging her husband across the head with a beetle, and over his head she had drawn a shirt without any slit for the neck.

"'Why, Goody!' he asked, 'will you beat your husband to death?'

"'No,' said she, 'I am only trying to make a hole in this shirt for his neck to come through.'"

Ignorant of their own physical structure, farmers' wives allow themselves too little time for recovery from their frequent childbirths, and in various ways violate the laws of nature. Nor is the body alone defrauded by their lack of knowledge. Unconsciously they ignore their spiritual relationship, and lose the sweet attractiveness of home life which, despite every want, might still be theirs if they knew how to secure it.

There are also certain habits and customs which are injurious to the farmer's wife. The centralization of all interests at the county seat, as is the case in all sparsely settled communities,

prevents the pleasant intermingling of rural and village life which is so beneficial in older countries. Social intercourse is rare between the families of the farm and the town, for the latter seldom have occasion to go into the country, and the farmer's wife, however cordially pressed, will not visit where her visits are not returned. Country women fear to intrude, fancy they are not welcome and are looked down upon, and with the inconsistency of the inexperienced, they imagine that others are proud and do not wish their acquaintance. They even look with coldness on such of their own number who are more fortunate in wealth or education, and are always ready to pronounce them "stuck up."

No table groans with such variety of food as does that of the farmer's wife when she has company. Dishes suitable only for breakfast and dinner are added to those prepared for tea, and contrariwise. Whatever meal the hostess is serving, she puts on everything that she can think of that she has in the house or has time to make. (I once counted at a country dinner, on an ordinary occasion, fifteen kinds of jellies and preserves.) She thus loses the social benefits of the visit, comes to the table all heated and tired, remembers something else she might have put on, and then she can think of nothing but apologies for serving her guests so poorly. The extra expense for the company necessitates closer economy afterwards. Good manners are rarely taught. The children are told that certain things must not be done when company is present, so when they are alone they are impolite and ungracious. The family meal is usually hurried over much after the fashion of the family in the stye. Eating in such cases ceases to be a fine art, and becomes as Holland says the mere "tucking in grub."

Toilet facilities are proverbially lacking on the farm. In houses of any size there is usually a spare room sacred to company, where are gathered all the little treasures too good for the family. Here is the highest feather bed, the most intricate and startling quilt, a seed wreath, some feather flowers, and cheap lithographs framed in cones or leather work. I mention these not to hold them up to ridicule, but because they are the pathetic expressions

of a yearning after something besides the satisfaction of material wants. In this sacred spot are placed a bowl and pitcher for the use of the guest, but the family must be content to take their turn at the tin basin in the kitchen, or on the block outside the door, with the only alternative of the watering trough.

Too little attention is paid to comfort. Many things which would cost but little if any money, and would yield a large return in zest and nerve force, are neglected, and the little frets and worries make life joyless. Other pernicious home habits and class customs might be mentioned, but these are enough to suggest the rest.

A wise author has said: "Every fact is related on one side to sensation and on the other to morals." What wonder then, if, under all these disadvantages, it often happens that all the sweetness is crushed out of existence; that the father becomes shiftless and surly; the mother querulous and commonplace; life only a thing to be gotten through with, and the sooner over the better.

So unattractive are their homes and so negative their lives, that their daughters leave as early as possible, either to work in the cities, or to marry, thinking it will be better in homes of their own, but alas! under the same conditions working out the same lamentable results.

But the farmer's wife, even if she is not one of the exceptionally favored of her class, has still helpful conditions which may relieve the gloom of her life and do often make it very pleasant. Rural life is healthful. The early and regular hours, the freedom from excesses, the sweet, fresh air of the country, neutralize largely whatever is unhygienic in her way of living. The census of 1870 shows that dividing laborers into four classes, of those engaged in trade and transportation, one in every forty-three lives to be sixty years old. Of manufacturers and miners, one in thirty-one reaches that age. Of those engaged in professional and personal service, one in twenty-five; while of those engaged in agriculture, two in twenty-five reach the age of sixty.

The children of the farmer's wife require much less care, are more helpful, and will grow up stronger and purer than the average children of other women. The mother will find some

recompense for her own discomforts in having her children free from the bad habits of the city, and in knowing that the chances of life and success are all in their favor.

An aged woman, whose sons are now prominent men of the nation, told me, not long since, that she lived on a farm when her boys were small, and that those were the happiest days of her life. Such is the testimony of many.

The very isolation of the farmer's wife makes her duties less arduous, and these are rarely so severe but that, if wisely arranged, she can find time for rest and improvement. A woman, not far from where I live, cheered the loneliness of her first winter west by reading a large number of French and Latin books. I know some women who, with children to take care of, regularly set aside a portion of each day for reading or study, and these women are not the least busy of their class. Even the poorest may now have the best books in these days of cheap literature.

With ordinary health and industry the farmer is sure to have a measure of prosperity. Though all the forces of nature seem to combine against him, he has learned to so plan and vary his plans that he cannot be defeated on every side, and his wife may reasonably comfort herself with the hope of better times, and expect immunity from poverty in age with far more certainty than the wife of a mechanic or day laborer; and such are the vicissitudes of American fortunes, that even the wife of a merchant or banker has hardly a better chance.

Farm life is often picturesque. It furnishes the finest background for painting, poetry and legend. What enchantment in the story, could we linger over it, of the huskings, the quilting bees, the raisings, the sugar boiling, the harvest home merrymakings, the slow succession of the seasons with their varying labors and pleasures, and the long, delightful winter evenings, when

> "All friends shut out, the housemates sit
> Around the radiant fireplace, enclosed
> In a tumultuous privacy of storm."

But leaving the fascinations of the farm to the poet, the question is asked, are there any remedies for these ills which sadden

the lives in so many homes in our land? Swedenborg said: "Hunger is an aggregate of very many little hungers, or losses of blood by the little veins all over the body." How shall these little hungers that drain the vitality from the life of the soul be so satisfied that the whole being shall grow symmetrically until it reaches the "stature of the fulness of a perfect man." The most obvious answer is: by education, first, of a practical kind, and then, as opportunity offers and the desire grows, by a more general culture. As an economic measure of the highest importance, agricultural colleges should be established in every agricultural state, where tuition should be free, and where attendance should be induced by rewards. These colleges should be open to men and women on the same terms, for the census of 1870 showed there were twenty thousand women in the United States engaged in the pursuits of agriculture, besides over five million farmers' wives now described as being employed in no gainful labor. There should also be colleges of domestic economy for girls, similar to that advocated by Sir Henry Cole, at the congress at Manchester, some years ago, where the proper preparation of food, care of the health and dwelling, and household thrift, should be taught. The state should make attendance at these colleges profitable, compel it if necessary, and the money thus expended would return into its coffers ten-fold, from the fruitful fields and well-kept houses.

The better educated the farmer is, the more likely will he be to recognize the rights of his wife; her right to as pleasant a home as his means will afford; her right to social intercourse; to a control over the house and personal expenditures; to an opportunity for improvement; to an understanding of all matters of interest to himself, and to a share of his time and affectionate consideration. The cultured man — the farmer no less than other men — respects himself so highly that he considers nothing too good that is within his means to obtain for the woman he has chosen to rule his home and to be the mother of his children. The educated woman will recognize the physical and spiritual rights of her family. She will manage more economically, govern more wisely and work more advantageously, besides having a better time in doing it. "My mind to me a kingdom is," said William Byrd, and she who has

an elevated mind may be happy under any circumstances, and instead of being degraded by her work, will lift it up to the level of her own intelligent thought.

Once the farmer's wife spun and wove all the house linen and family clothing. The time for this has passed away, and the time for fine quilting, useless and hideous fancy work is rapidly going. Men's clothing is now rarely made by women, and helpful machinery is finding a place in the farmer's home.

And what does this relaxation from the ancient toil mean, save that farmers' wives did their share, when the nation was young, to increase its material resources; and now their old duties are in part falling away to give room for new and more important responsibilities. God and the world are calling on them to aid in bringing the world to wisdom and righteousness; to give birth to nobler sons and stronger daughters; to be themselves in harmony with the onward march of all things, material and spiritual; to be the worthy mothers of the men of the millenium.

In every profession there is progress. Every class of society is looking towards the light, and this is especially noticeable among women. The signs of the times are hopeful in that everywhere in the civilized world women are awakening to a desire for a better knowledge of their duties and capacities. It is the privilege of the more favored to see there are no stragglers. The farmer's wife must not be left behind. She must be helped to help herself. This may perhaps be aided by means of the local woman suffrage societies now forming all over the land. These should work in every cause where principle or the problems of home and society are involved. They should adopt measures for extending industrial knowledge, for encouraging co-operation, and for securing wise county legislation. Such societies might with propriety be headquarters for starting and maintaining rural clubs, and should occasionally send out competent women to lecture to the farmers' wives on hygiene, physiology and domestic science. If proper times and methods were chosen, organization could doubtless be effected, and would be as valuable for farmers' wives as for any class.

Farmers' wives should be stimulated to interest themselves in

the county agricultural societies, getting memberships, and then striving to have such work done by the society as would tend to the uplifting of the social conditions. These, as far as I have observed, are wholly neglected by agricultural societies, and the relative consideration for woman and her work is plainly shown by the prizes given at the annual fairs; as also by the slight touch, if any, which is allowed to woman in the annual address. Enough money is given in prizes to encourage the show of fine stock, and then woman's work is rewarded with diplomas, that there may be a purse made up for the horse-racing. State societies are conducted on the same contracted plan. There should be societies worthy of the name, in which men and women, being equally concerned, should be equal factors. Not only should the results be exhibited at the end of the year, but the ways and means for producing those results should be discussed at times and places suitable for creating interest and disseminating information. The society should be a guild, looking after the welfare of its individual members; it should consider no home or educational interest unworthy of its supervision. The Grange might have been such a guild had it not undertaken to manage the politics and finances of the nation; yet even this has been a great educator to woman in districts where it has been successfully established.

There is no time to consider further means for benefiting this class. The work must be done by women, and plenty of ways will present themselves when it is begun.

Napoleon was once walking with a lady when he met a person carrying a heavy load. The lady ordered the man to get out of the way, but Napoleon turned aside, saying, "respect the burden, madam, respect the burden." Herein lies a moral. Woman must do what she can to elevate womanhood everywhere, and show that she respects it in every calling. Her interests are parallel with those of humanity, and all the forces of nature, science and religion are working towards her development. Nor will the husbands of our farmers' wives be often found to hinder or oppose. Margaret Fuller said, and it is truer now than when she said it: "Man is not willingly ungenerous. He wants faith and love, because he is not yet himself an elevated being. He

cries with sneering skepticism, 'Give us a sign!' but if the sign appears, his eyes glisten, and he offers not merely approval, but homage."

As according to Hindoo mythology, Vishnu follows Maya through all her transformations from the lower orders of animal life to the higher, he always being the male of her species, until she becomes the woman goddess and he the god man; so, woman in her ascent takes man and the race with her, until together they shall stand on the divine heights of immortal purity.

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## SIGNS OF PROSPERITY.

By Mrs. FANNIE B. DENNETT, Milton.

"Where spades grow bright, and idle swords grow dull;
Where jails are empty, and where barns are full;
Where church paths are with frequent footsteps worn;
Law court-yards weedy, silent and forlorn;
Where doctors foot it, and where farmers ride;
Where age abounds and truth is multiplied;
Where these signs are, they clearly indicate
A happy people and well governed state."

Our state has not yet attained to the degree of prosperity here indicated by the poet, yet, as a people, we are prosperous and happy. Peace reigns throughout the land, and our barns and storehouses are filled with an abundant harvest. Industries of all kinds are active and prosperous, and the arts and sciences are every year attaining a higher development. And for these hopeful signs our thankfulness should be unbounded to Him who has thus crowned the year with His goodness.

Upon no class are the signs of prosperity more marked, compared to its former state, than upon the agricultural class, both in business and intelligence; and to-day we meet as a society to discuss the business of our calling, and to devise new ways of promoting the interests of the same.

Talent and science have here lent their aid in discussion and demonstration, and the interchange of ideas here given will no doubt benefit all, as they again take up the work of the year.

The last few years have indeed wrought great changes for the farmer, and the reason is mainly due to the fact that he has at last waked up, and is no longer contented to be a drudge or machine, but has resolved to work intelligently as well as faithfully. He has learned to do his own thinking, and therefore seeks to fit himself to think wisely. He finds that to better his condition he must work for it with his head as well as his hands, and as a means of working more effectually, the farmers have combined their efforts, and to-day, under the name of the "Grange," they are unitedly striving, not only for greater success in business, but for a higher standing in general among their fellow men.

The founders of this institution, unlike those of other orders, believed that women might here work as well as men, and therefore threw open its doors, and admitted them to all of its privileges; and although some good old fathers winced at the thought, and hinted at strong-mindedness, or prophesied cold dinner and cheerless homes, yet they soon found that they had sweeter tempered housekeepers and better cooked dinners, and that the home was all the better kept for the little respite from hard work and the added courage and cheerfulness gained thereby.

The great purpose of the order is to advance farmers and their families to the highest possible attainment in moral, intellectual and social development, and at the same time promote the business interests of their calling. In its meetings, all subjects are discussed pertaining to the farm and the home, and each one is expected to contribute something to the entertainment of the meeting. Consequently its members are led to read, think and talk. The unlearned here find a source of improvement, and the careless ones are here stimulated to more thrift and enterprise. Libraries are founded, and literature and art are encouraged, as well as business and industry. A man cannot long be a member and not be enterprising. The drones are soon driven out by the workers, and he who sits outside, grumbling over the hard lot of the farmer, and will not join hands with his brothers to make that lot better, will soon be left behind in the onward march of progress which the Grange has marked out for its followers.

A misapprehension of Grange principles has caused opposition

to spring up among those who are not in sympathy with the farmer. They seem impressed with the idea that the patron has raised his arm in defiance of every other vocation, but such is not the case. He only asks for equal rights and privileges with every other class in the nation, and these he is entitled to, and seeks to make himself worthy of, and as far as he is worthy, should be treated as the equal of any man in any class.

"The Grange movement," it has been said by another, "is not for this decade or for this generation. It will remain as long as we Americans, or our children after us, till the soil. So far as the material composing our present structure is defective, so far we have to improve. Perhaps it may have to be in a measure rebuilt, strengthened and regenerated, but when the foundation is once established, succeeding growth will rear the monument of our cause that shall stand out boldly in history."

Our real prosperity consists not in the wealth we may attain, but in the intelligence and virtue of our class, and in the influence we may have in the world upon other classes.

In the past the farmer has been so absorbed in "getting a living," that he has often failed to see that the world or society had any claims upon him. But with increased intelligence and business prosperity, he should now seek to widen his capabilities and enlarge his sphere of action. Has he not a work to do in society as a reformer and advocate of the principles of truth and justice? He has too long stood in the back-ground and worked for self alone. Shall he not now take his place by the side of others who are working for the good of humanity? If he would be counted as one of God's noblemen, he must work to help others as well as himself, for —

"God gives no value unto man
Unmatched by meed of labor;
And cost of worth has ever been
The closest neighbor."

"Not unto him who wins by happy chances
Are the bright laurels of the victor given,
But who for right, 'gainst hate and scorn advances,
Weareth, unseen, the coronet of Heaven."

The present seems bright and hopeful, but there is work yet to be done. There are wrongs yet to be righted, and the age still calls for active workers, for deep thinkers and faithful hearts. Our prosperity will not be enduring unless, as a people, we use our best endeavors to foster and promote those things which help to build up and reform society. Each individual has some influence which shall act upon the little circle in which he moves; and this in turn operates upon a wider circle; and so our influence widens, until our state or national life is affected by the degree of morality or intelligence of its private citizen. Then be we never so small a member in society, we have a duty to do in it. Let the farmers not only legislate and work for their business prosperity, but let them work as faithfully for the advancement of their fellow men. The cause of humanity calls for laborers. Temperance, justice and truth need strong defenders. As we widen our farms and enlarge our storehouses, let us also extend our sympathies and increase our charities, and thus leave to our children not only an inheritance of good things, but the memory of beautiful lives. Our work as reformers is only begun, and the bright millenium is yet a great way off; yet our lives will be all the happier, and our final rest the sweeter, if, by noble deeds we have hastened on that glorious day of peace and love.

"A golden age the seers foretold
Who glanced adown the advancing years;
Oh! for the faith they held of old,
To cry, 'The golden future nears.'"

## DISCUSSION.

Mr. Arnold moved that for the instructive and interesting papers read by the ladies, this convention tender its sincere thanks. Carried.

W. W. Field, Madison — I suppose the convention is about to adjourn until evening. I hope it will not adjourn at present. We may have a discussion on the interesting papers which have been read here, and perhaps other topics.

While I am on the floor, I may be allowed to say a word. I have been delighted with the papers which have been read, and a

thought occurred to me in the reading of one of those papers that perhaps we could turn to account in these conventions. Our conventions, as you very well know, are not attended by ladies at all, or rarely. We get one, two or three, or possibly five, at the meetings of the agricultural society. When the ladies read papers here in the senate chamber, they attend, and it is a very interesting gathering.

Now, sir, I wonder if it would not be possible for the Patrons of Husbandry of this state, at least, to send us representative men and women from their orders, so that we might mix them up a little, and have some interesting papers from them, and some ladies might discuss certain questions that might arise. It would certainly be very interesting.

I believe, of all the industrial organizations of the state, the Grange is the only order that admits ladies, or if they are admitted, it is perhaps the only one where they attend, to any extent. They are not excluded of course from the other organizations, from the farmers' clubs and other associations, but in the Grange they do attend. They participate in their meetings, and I wish that they would take occasion in their separate granges and in the State Grange to send us representatives — men and women. And right here allow me to say, that if they will pay their expenses while here, there would be no difficulty in getting some of their best members to attend. Now, I believe the Masonic order, and the Odd Fellows' order, and the United Workmen, and other organizations of the state, meet here for the mutual benefit of themselves and their orders. Now, sir, do they send people here without paying their expenses? No, sir. They always pay their bills, I believe. Here are these great industrial organizations. They have never yet paid the expenses of a delegate to come to one of those conventions.

Now, sir, agriculture is the great interest of the state and the nation. It is an interest which underlies, upholds and sustains all our great industries.

Now I would be glad to see steps taken in the Grange and other organizations to send up intelligent, educated men and women, those who would well represent their respective organiza-

tions, and who could go home to these organizations and tell them all they had seen, and tell what had been done, and get up questions there for discussion.

I believe, sir, it would be more promotive of industrial work in those societies than anything we have yet had done.

H. Robbins, Platteville — I would like to have those papers published in both Transactions. I don't propose to discuss horticulture and agriculture with the same person at the same time. I hope these papers will reach every person as far as possible, and I would like the officers to be so instructed to have these papers published in both Transactions. They will reach a great many persons that can't come here. I believe there is more consolation in those papers than all we have read; consolation that reaches the family circle. Those are the consolations that the household needs.

Judge Bryant — These papers are usually divided. The first paper that was read by Miss Chynoweth, which was written by Mrs. Colby, was procured for the State Agricultural Society. The other papers were procured by the president or secretary of the State Horticultural Society. We usually get them all into one book or the other. I don't know whether we could agree to put them into both books or not. Perhaps the horticultural society would not agree to it.

While I am up I want to say that Mr. Field may be a little off. When I am in the presence of Masons I don't know it; when I am in the presence of Odd Fellows I don't know that, but I will say to Mr. Field that there have been a great many Patrons of Husbandry present at the convention, and most of the officers of the State Grange.

Mr. Field — I don't understand the secretary. Does he mean to say that they are represented in this convention?

Mr. Bryant — I mean to say that they have been attending our convention for the last two days.

Mr. Field — As delegates?

Mr. Bryant — As other men come up.

Mr. Field — Without having their expenses paid?

Mr. Bryant — Without having their expenses paid. The Grang-

ers pay the expenses of delegates to their State Grange. Our State Agricultural Society is not a grange. We admit Masons and Odd Fellows, Catholics and skeptics, and everybody else if they are good farmers.

Mr. Field — I was not aware that there was any delegate that ever attended our convention that ever had his expenses paid. I am glad to hear that is a fact.

A. J. Philips, West Salem — I have been very much entertained by the papers to-day. It has seemed to me for a number of years that every year the papers we had on this occasion grew better.

There are a great many things in those papers that it would be well for us all to remember. And we can learn lessons here that it would be well for us to carry home.

One lady spoke in her paper in reference to bringing up children. The advice received from the gray-haired lady was: "Do as you wish your children to do." I was very strongly reminded of that afterwards — and this will apply to the gentlemen. The paper that followed was in regard to the use of tobacco; what a filthy habit it was,— and by way of a compliment, I don't know whether the ladies have noticed it, I don't know whether the men ever did — but by way of a compliment to the horticulturists of the state — and perhaps the agriculturists of the state too, I have some doubts of it though — I think there are as few of the leading horticulturists of the state that are users of tobacco and strong drink, as any society I ever belonged to. It is very seldom you see one of our leading members take a chew of tobacco. I do not know of any of them. I am satisfied that President Smith does not, or if he does, he is very careful not to do it in the presence of ladies.

The point I was getting at was this: I have been doing business at a railroad station, and gentlemen, we have boys there learning to telegraph. I had a boy there six months; a very nice boy. He is at a station out in Dakota. He proved to be a very worthy young man. After he had been there some time his father called me aside one day and said, "Do you think that Will is using tobacco?" Says I, "I do not think anything about it; I

know he is." Says he, "I wish you would talk to him about it; I don't want that boy to use tobacco." I had hardly ever seen his father at home or in town but what he had a pipe in his mouth. I said, "I don't think it is my business to talk to Will. He is very neat about his tobacco and don't spit on the floor. I guess you had better speak to him yourself." "How can I," he says; "I am never without a chew of tobacco in my mouth except when I am smoking."

That would be a good thing for farmers to remember and everybody else; if you don't want your boys to use tobacco don't use it yourself. That is good instruction, and it is worth all the effort we have made attending here to-day.

Another point came fresh to my memory. I was out on the edge of Dakota a number of years ago, spending a little time hunting, and I strayed away further than where I intended to, and along about noon I became very hungry. I met a man and I asked him where he thought I could get something to eat, and he said, "On the other side of the lake there is a dug-out." This is merely to corroborate a statement that was made in that paper. I went over, and walking around in front, I surveyed the premises off some distance, and it did not look like a very inviting place, but it was the best that I could see, and I went into the house. I was as much surprised as the man was that found the bell on the door. I did not find a door-bell, but I went inside and it was quite commodious. A good roof on the house, although it was built of sod, and the first thing that caught my attention over the door was a large card, evidently worked by one of the ladies of the family, "God bless our home." In the back part of the room was another which said, "Honor thy father and thy mother." I asked the lady if I could get something to eat, and she said they would be very glad to entertain me. She sent her little girl right out, and she went to where her father was at work and he came in, and I found them to be a very intelligent family. They had formerly lived in Richland county, but they had been raided by the grasshoppers a number of years, and had had a pretty hard road, they said.

I found one of the happiest homes there, I think, that I ever

saw. Everything was just as neat and tidy in that house as could be. There were flowers in one of the deep windows, the walls were papered, and when you were once inside, you would not know you were in a sod house.

The woman said she was happy, and the children were happy and comfortable, although the grasshoppers had eaten them out for several years. And when they set the table for dinner, it reminded me of the woman preparing some fifteen kinds of preserves. The bill of fare was equal to most any hotel I ever stopped at in the city of Madison. Everything was comfortable and neat and tidy, and best of all, they seemed to have every appearance of being a happy family, out there on the prairie, living in a dug-out. I tell you it is the preparations in a home, rather than the surroundings, that make home desirable.

Mr. Field spoke of a matter I have thought of a great many times; that is, our conventions here. I have attended Iowa and Minnesota state conventions a number of times. I began attending those meetings about 1874 or 1875. We have never had a paper from a lady there. We have never had the presence of a lady in any of the meetings. He says in our meetings below we seldom have over one, two or half a dozen ladies present. It seems good to have those; I feel thankful to have them. The ladies, in their writings and in their attendance at the meetings of the Wisconsin State Horticultural and Agricultural societies, have shown more interest than any state society I have ever attended, and I have never read in any of their proceedings where they have taken anything like the interest they have taken in this society.

In regard to expenses, I don't know but what people in Minnesota are a little ahead of us. They hold their meetings at different places in the state. It makes no difference where you go from, the state of Wisconsin or the state of Minnesota, after you arrive there, you are entertained free of charge.

Speaking of these gatherings, Mr. Field reminded me of a fact that I will mention:

We have a lodge of United Workmen in our village. They wanted me to come as a delegate to the grand lodge, and have my

expenses and so much per diem paid me, but I chose to attend the meetings of this society and pay my own expenses. If we were ever able — if we could do as they do in these other organizations, the State Grange and all other societies, pay the expenses of those that attend, perhaps it would be a good thing, but if we can't, let us attend and pay our own expenses.

There was another thing in one of the papers that called to my mind pleasant recollections.

I am a great lover of dumb animals of all kinds, and especially of horses; I will have them, and I have always thought too much of them and have always had more of them than was profitable for me.

A lady spoke not only of our little ones that we have, but of our furry and feathered ones that associate with them. I have been reminded of it a great many times at home, and it is so, I presume, in all homes. We have an old family cat in our house that my father and mother, when they moved away, left with us. He is a snarly, disagreeable old fellow. If you put your hand on him he will scratch, and when you put him out at night he is ugly. But you put your little child that can just barely sit alone on the floor, and he can go and rub him and the cat will stay there contentedly as long as the child will play with him. They are associates.

When we are thinking of all these pleasant things there are other things we should think of.

There is on the western frontier a great deal of suffering. I was talking with Mr. Hedges, who was appointed commissioner to go out there and see how much suffering there was.

He told me he found one family that lived in a dug-out twelve feet square. They had no stable for the cow, so they had to take her in with the family. He said there was one child about four months old whose only covering was a sort of a garment made out of a paper flour sack. Another child about three years of age stood beside the cow, with its fingers run up in her hair to keep them warm.

While we are having such good times we want to remember those people, and if there is any opportunity given to help them, we should cheerfully do it.

I heartily indorse all that was said with reference to the vote of thanks that was tendered to the ladies for the papers we have had this afternoon.

J. N. Ames, Oregon—I came to this country thirty-four or thirty-five years ago, and then the schools were in a rude condition. I was a school officer in one of the districts, in company with another neighbor, and he had a family of grown up children just verging into manhood and womanhood. Our teacher that we hired was a man, and he of course would play cards some, and this family of young people were the ringleaders in playing cards. This neighbor of mine, their father, came to me, and said he: "Mr. Ames, I wish you would use your influence to stop this card-playing in school." I had also young children there who were just ready to learn those habits. I felt that it was not my place to undertake any such job. It was enough for me to take care of my own.

Then in regard to the use of tobacco. There was a man at my place two or three years ago, from the state of Illinois. He had a red ribbon tied in his vest, as a memento of his pledge that he had taken. It served to remind him, as I suppose, of the pledge that he had taken not to use tobacco. He had been around and visited my family. I have two daughters and three sons grown up. When we were at the table he says, picking at his memento or pledge: "It surprises me to see such a family as you have around you, of men, and none of them using tobacco." It is just so with my daughters. I have never seen one of them dipping snuff, but I have seen ladies do it.

Now, I hold just as the lady said: do as you would that your children should do. Now, my father was a tobacco user; he always had it in his cellar. He was a tobacco raiser. He never cautioned me not to use it or anything of the kind, but I never learned to use it.

And I want to say another thing. I don't very often come up to this capital, so I was surprised when I came in the other day, and saw that the assembly room was filled with tobacco smoke. Several members were smoking cigars, with ladies entering the room. It seems to me it is hardly in accordance with the age we are living in.

A. A. Arnold, Galesville — This little anecdote illustrates the fact that these influences of parents are above everything else. I went into a home not long ago where some of the children were in the habit of going to Sunday school. There was a motto on the wall, "Jesus reigns." Before I had been in the house five minutes, I heard the old lady swear, and in a few minutes after the old gentleman swore. They used the name of Jesus Christ a great many times in a very short interval of time. Those boys are all tobacco smokers and drinkers, and the girls are all married to drinkers. That is the result of home influence, notwithstanding mottoes.

Another point I would like to have the convention consider; and that is, whether or not it would not be better for us as farmers of the state of Wisconsin to have some kind of an organization whereby we can make our influence felt. No party will ever advance any particular interest or idea until the public sentiment is brought up to a stage where the party feels its power. Public sentiment must become crystallized upon some idea or thought before a party will adopt it; but if a party does, the representatives of that party, or our several representatives in different localities will adopt it, and see it enforced.

Two classes of people are now represented in some way. They have organizations so that they can make their power felt. They concentrate upon some particular line of action.

We come here year after year and have our state convention, and men will advance their ideas pro and con. We never have yet, to my knowledge, agreed upon any definite line of action.

If a party undertakes to make a nomination or to adopt a platform, in the first place they have their caucuses, elect their delegates to the county convention, and from there to the state convention. There they adopt their platform and there they nominate their men. The farmers represent the majority of the party. They furnish most of the products for transportation. There is nothing in these United States that I know of, in which the farmers are not interested more than any other one class. If so, why should we not make our wants known and our power felt. If so, if we have laudable purposes, why not organize upon some reasonable definite idea and we can carry out and enforce it.

Now we have a grange, and we are having now the Farmers' Alliance, that takes in farmers and all other classes of industry; everybody that is in favor of cheap transportation, for instance. Those are good things, but the grange excludes politics. The alliance makes that a specialty.

We as farmers cannot propose any line of action for the republican party or the democratic party, but we can do this. We can say that we want a certain thing, and we will see to it that certain men are elected upon a certain platform, if they will agree to certain things, otherwise not.

Now if we will adopt the same course that the alliance has taken, we may be able to concentrate upon some things, so that we can do what we want. We find fault with lawyers and doctors and ministers, and so on, that represent us in the legislature, because they do not do what we want them to do. They don't know what we want. There is no way by which they can tell, because we are eternally quarreling among ourselves. But if we will agree upon some kind of action, and elect delegates to a convention, and there agree upon what we want, I think we will get it.

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## THE ECONOMY OF PRACTICAL ENTOMOLOGY.

Prof. O. S. WESTCOTT, Racine.

More than forty-three years ago, viz., on the 10th day of June, 1837, agreeably to an order of the general court of Massachusetts, was issued a commission authorizing a zoölogical and botanical survey of that state. His excellency, Gov. Everett, issued to the commissioners the following instructions:

"It is presumed to have been a leading object of the legislature in authorizing this survey, to promote the agricultural benefit of the commonwealth, and you will keep carefully in view the economical relations of every subject of your inquiry. By this, however, it is not intended that scientific order, method or comprehension should be departed from. At the same time, that which is practically useful will receive a proportionally greater share of attention than that which is merely curious; the promo-

tion of comfort and happiness being the great human end of all science."

Here in a nut-shell did the governor of Massachusetts comprise everything to be investigated by the commission, as well as full instructions as to what should properly be disregarded, and the reasons therefor; "the promotion of human happiness," says he, "being the great human end of all science."

On this broad foundation did the commissioners of Massachusetts take their stand, and a part of the outcome of this commission, so far as the science of entomology is concerned, was a work which has since become a household word to all entomologists, and of which even the state of Massachusetts may be justly proud, to wit: The Treatise on some of the Insects injurious to Vegetation, by Thaddeus William Harris.

With regard to his work in conjunction with the other members of this commission, the author of this treatise himself says:

"Believing that the aid of science tends greatly to improve the condition of any people engaged in agriculture and horticulture, and that these pursuits form the basis of our prosperity, and are the safeguards of our liberty and independence, I have felt it to be my duty in treating the subject assigned to me, to endeavor to make it useful and acceptable to those persons whose honorable employment is the cultivation of the soil."

Surely to the labors of Harris are due, in large measure, the thanks of all farmers who can yet succeed in wresting from the rocky soil of New England a subsistence, however meager it be in comparison with the possibilities of the soil of the great west, yet so largely untilled. Harris well knew of the codling moth and the chinch bug, and the cucumber beetle, and the plum curculio, and the Hessian fly and scores and hundreds of other vermin that too often render comparatively futile the toil of the grain or fruit grower, and yet in his day, such scourges as the European cabbage worm, the immigrant from the distant east, or the potato beetle from the west, or the Rocky Mountain grasshopper from the still further northwest, with hundreds and thousands of less notoriety, were yet unknown.

In 1854, when New York was suffering from the ravages of the

wheat midge, the executive committee of the State Agricultural Society asked of the legislature an appropriation for the purpose of instituting and conducting entomological investigations. The legislature granted an appropriation, and this beginning so stimulated inquiry in the state, that the appropriations for this department have been regularly made, and the reports of Dr. Fitch bear witness to the faithful labors of another pioneer in the science of economical entomology. Since his decease, his mantle has fallen upon no unworthy shoulders, as the office is now occupied by Dr. J. A. Lintner, whose work in the same direction has already secured for him a reputation world-wide.

In 1867, Illinois joined the rank of progressive states by appointing a state entomologist. The office has been successively filled by Benjamin D. Walsh, Dr. Wm. Le Baron and Dr. Cyrus Thomas, the two former of whom have passed away, and the latter is with us this evening. Concerning their work it is difficult to speak in the presence of the incumbent of to-day; but it is surely pardonable to state that the reports of the department in Illinois, one by Prof. Walsh, four by Dr. Le Baron, and four by Dr. Thomas, are no whit behind those of New York, Massachusetts or Missouri, and are indispensable to the working entomologists and scientific agriculturists of the world, the promise of the earlier reports being fully kept up by the character of those more recent.

In 1868, Missouri took similar action. Prof. Charles V. Riley was for ten years the state entomologist of Missouri, and though comparatively a young man, he there acquired a reputation as an adept in the science of applied entomology second to none in the country, to which indeed his reputation is not limited.

His numerous and extensive reports have undoubtedly yielded the state of Missouri large returns on the outlay incident to his employment. He has been honored both at home and abroad, being the recipient of a gold medal from the National Academy of France, as a token of its appreciation of his researches with regard to the phylloxera of the grape, and also being honored by our own general government in being appointed chief of the United States Entomological Commission, whose researches have

already been very extensive if not exhaustive with reference to the Rocky Mountain locust and the cotton worm in particular, as being perhaps the most expensive pests that we are still cursed with.

It is perhaps worth while to note furthermore that these states have not been backward in other departments of scientific research. All have had at first their extensive and profitable geological surveys. Illinois in particular has now found it necessary to supplement her entomological investigations by endeavoring to answer such questions as which of our birds are beneficial and which injurious? If certain insects are injurious and certain others beneficial, it should be ascertained whether certain birds feed upon our insect foes or our insect friends, and hence whether the birds themselves are to be befriended or exterminated.

Investigations have also been carried on under the direction of that state in the line of ascertaining something with regard to the food of fishes. If we are overrun with an apparent plague of insects, and these insects serve as the special food for some of our choicest edible fishes, the plague may be but a blessing in disguise. If the market for corn had always been a satisfactory one, many a farmer would never have ascertained that the cheapest manner of getting his corn to market is in the form of pork. Indeed, the Rocky Mountain locust itself, though in some seasons it has devastated such an extensive territory, might nevertheless have been well utilized as food, had the farmers been fully aware of its nutritious properties, and thus its injuriousness might at least have been tolerated, if not actually disregarded, in comparison with its utility as an article of food.

It is worth while to notice that action in this direction in all these states has been initiated and pushed by the state agricultural organizations. They have made it their business to represent to the legislatures of these states that the farmers, as the wealth-producers of the states, are entitled to legislative action, which can so easily and at so slight an outlay be the means of increasing the yield of staple crops.

If troops of foreign invaders were landing upon our soil, there would be no hesitancy on the part of the government to

raise money and means to repel them, at whatever hazard and at whatever cost. Surely when the depredations of vermin are as baleful in result as the incursions of hordes of barbarians, there should be no more hesitancy in availing ourselves of every means in our power to extirpate the one as well as the other. The citizen can, in each case, claim the right of protection which the government guarantees, and should be able to extend to every individual.

It has been estimated by competent authority that three hundred millions of dollars are annually lost to the people of the United States by the depredations of noxious insects. This fact, though stated in a breath, is nevertheless quite beyond the reach of the ordinary conceptions of the mind. No one can fully realize the actual number of single things required to make up the aggregate we call one thousand, unless he has had occasion to handle singly one thousand objects within a certain limited space of time. How then can one instantly form anything like a just appreciation of what is meant by three hundred thousand thousands?

With this fact so salient staring the agriculturists and horticulturists of the country in the face, is it not strange that the man who devotes even a portion of his time to devising plans by means of which to save at least a fraction of this large sum, should be contemptuously styled a bug hunter, as though his labor were utterly in vain? *Cui bono?* is a question oftener and easier asked than answered, but it can be readily shown that every one of us, wittingly or otherwise, is more or less interested in the studies of those who spend a part of their time in investigating the habits of these usually despised creatures. Whether their studies look primarily to the economic or to the scientific aspects of entomology, they are of no trivial importance. It may not be at once apparent how the closet studies of the systematist are destined to benefit the grain or fruit raiser, by providing directly the means of exterminating his insect foes, but a knowledge of the habits of a certain class, family, genus, species, will go far towards suggesting a ready means of destruction for any particular individual. This point was well illustrated several years ago by an

eminent American entomologist, substantially as follows: "Two men go out trapping and hunting to the region of the Rocky Mountains; one of them familiar with the habits and haunts of the bear, the wolf, the fox, the marten, the fisher, the lynx, the beaver, the otter, the deer, the elk, the antelope, the buffalo, etc.; the other totally ignorant of the habits of all these creatures. Which of these two men is the more likely to come home with a good stock of pelts? Two men go out into the field to endeavor to discover some mode of destroying wholesale a particular insect. One of the two has spent half a lifetime in studying the habits and the natural history of the forty or fifty thousand distinct species of insects that are found within the limits of the United States; the other knows nothing whatever of entomology — supposes that bees change into butterflies, butterflies into bugs, and bugs into beetles — and cannot for the life of him tell the difference between a snout beetle and a snout moth. Which of these two men is more likely to succeed in the work which he has undertaken?" Replies to these interrogatories are needless.

The most elementary stock of information for the entomologist, and for the practical agriculturist as well, should embrace some primary distinctions between noxious and beneficial insects. For, he who indiscriminately slaughters all the insects which he meets, will assuredly be working himself much injury by destroying his friends. Nature has usually provided the most efficient means of keeping harmful insects in check, by an abundant supply of parasites of various descriptions. These must be cherished rather than destroyed, for their assistance is invaluable.

To facilitate the transmission of any knowledge of insects, whether noxious or beneficial, an accurate nomenclature is indispensable. It is thought even by those well informed in other departments of science that the use of scientific names for individual insects might well be avoided. But, without the use of special names, no accurate information could possibly be transmitted. The entomologist has no greater difficulty to contend with than the fact that there is too great laxity in the use of terms, not only among those not specially educated in the science, but too often among those who are competent to be technically exact. Potato

bug carries with it no accurate significance to an entomologist. The potato bug might suggest to the professional entomologist any one of the score or more of insects that are known to feed on the potato plant. Bug in America means almost any winged animal smaller than a sparrow, and it seems that in England the word fly has the same, or if possible, a more general significance. Stavely says that the meaning of the word fly "depends very much upon who is speaking. Being a 'popular name' the 'people' have a right to mean what they choose by it, and they avail themselves of this right, some meaning by it one thing, some another, some every flying insect for which they know no other name. Thus 'the fly' of the farmer is usually the little hopping turnip beetle; the 'fly' of the hop grower is an aphis; the 'fly' of the herdsman a gad; while to the citizen almost anything to be seen with wings (except pigeons and sparrows) is a 'fly.'"

"There are some, again, to whom flies are flies — one fly the fly — the common well known little black house-fly. Here at last is something definite. No, not even now; for these will at least claim their young house-fly and their full grown house-fly, and expect you to believe that late in the year their house-fly takes to biting you; little dreaming that the little fly, and the big fly, and the fly which bites you, not only are different species, but even belong to different genera; that the little fly never grows big, that the big fly never was little, and that their house-fly could not bite you if he would."

Evidently, then, it behooves not only the professional scientific entomologist, but also the practical husbandman, be he grain-producer, pomologist, horticulturist, or cattle raiser, to have such a stock of information on hand as to embrace some primary distinctions between beneficial and noxious insects; between man's insect friends and his insect foes. Assuredly he who aimlessly destroys all the insects he meets will be acting most unwisely. As already observed, nature often supplies abundant parasites by whose means certain insects are kept within reasonable limits. If the hosts on whom these parasitic guests subsist are the devourers of our crops, let us cherish the parasites as our best friends,

for they are usually very numerous and at the same time the most inexpensive assistants in our agricultural projects.

Even at the present day it is perhaps not universally known that insects pass through a marvelous series of transformations; and "nothing in their history is more remarkable than the striking changes of form which many of them undergo in the course of their development. Whilst other animals progress from infancy to maturity simply by a process of growth, and only by such gradual and imperceptible changes as their growth necessitates, many insects assume totally different forms in the course of their development, so that they could never be recognized as the same individuals, if this development had not been actually traced from one stage to another. These changes are called the metamorphoses or transformations of insects. All insects, in their growth, pass through four stages, designated as the egg state; the larva, or caterpillar state; the pupa or chrysalis state; and the imago, or perfect and winged state. The metamorphoses of insects are of two principal kinds, complete and incomplete.

In the complete metamorphosis the larva bears no resemblance to the imago, and the insect, in the intermediate or pupa state, is motionless, and takes no food. This kind of metamorphosis presents two principal varieties. In some, the legs and wings are completely enclosed in the pupa case. In others the legs of the pupa, though useless, are free, and the rudimental wings lie loosely upon the sides. Moreover, in some the pupa is enclosed in a separate covering or cocoon, whereas the majority of insects have no such covering. The term chrysalis, from a Greek word meaning golden, is sometimes applied to the pupæ of the diurnal *Lepidoptera*, because the pupæ of some butterflies are ornamented with golden spots.

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Most insects, in changing from the larva to the pupa state, cast off the larval skin, but in many of the two-winged flies, the larval skin becomes contracted and hardened, assumes an oval form and a brown color, and thus forms a compact and closely-fitting case, in which the pupa proper is enclosed, but distinct These cases are analogous to the cocoons above mentioned.

In the incomplete metamorphosis, the insect presents essentially the same form, and is active in all its stages, after leaving the egg. The pupa is distinguished from the larva by the presence of short rudimental wings at the base of the abdomen, and the imago or adult state is distinguished by the fully grown wings and wing-covers. All the *Hemiptera*, or bugs proper, and all the *Orthoptera*, or crickets, grasshoppers and cockroaches, exhibit this imperfect kind of metamorphosis.

In treating of the development of insects, it is necessary to refer to the periodical casting of the larval skin. All the growth of insects takes place in the larval state, consequently no insect increases in size after it has acquired wings. The larval skin seems to be an imperfectly organized membrane, which does not correspond in its growth to that of the body, but yields to this growth, to a certain extent, by virtue of its elasticity. A time comes, therefore, when it can yield no farther. The insect then evidently becomes oppressed, ceases to eat, usually retires to some secluded spot, and if gregarious, huddles together with its companions, and there remains a day or two, almost motionless and without food, and in an apparently torpid and sickly condition. After a time the distended skin bursts open, and the insect throws it off and appears in a new, bright and elastic skin, which, in its turn is capable of a certain degree of distention. This process, which is called moulting, takes place three or four times in the course of the larval growth, and in a few larvæ, which continue more than one year in this state, the moulting is said to occur from five to eight times. In insects of very rapid development, on the other hand, such as the maggots or larvæ of the *Muscidæ*, no moulting takes place, no cocoon is formed, and the pupa case is only the shrunken skin of the larva, as above noted."

Now, this mysterious law of growth and development, only through such transformations as frequently destroy the identity of an individual, multiplies the labor of entomological study very largely. It may thus be readily understood why this field is so extensive, and why it is as yet so imperfectly tilled. The laborers are all too few and the harvest unlimited. Familiarity with

any one insect implies a knowledge of the individual in his four states: as egg, as larva, as pupa, as imago.

The state entomologist of Missouri, in answer to numerous interrogatories in this direction, once instituted a little investigation to indicate the magnitude of such a task with the insects already known. There being in his judgment, based upon well authenticated published data, not less than one million species of insects in the world, in order to be absolutely within the bounds of certainty in his results, he assumed one-half a million of species as the basis of his computation to arrive at an answer to the following questions:

1st. How much space in a library would a work occupy which should describe and figure every insect in the world in each of its four stages; in the egg, in the larva, in the pupa, in the imago?

2d. How much time would it take to write such a work, and how much to execute the requisite drawings?

3d. What would be the cost of issuing an edition of say ten thousand copies of such a work?

Without entering into the minutiæ of the calculation, let me simply state the results, only premising that the methods of arriving at the conclusions are entirely logical, and if the results are not absolutely accurate, the error is that the results are invariably too small.

First. There would be required at least one thousand volumes of large octavo size, six hundred and twenty-five pages to the volume. These with paper of ordinary thickness would occupy at least one hundred and sixty linear feet of shelf room; or supposing the shelves to be one inch thick, and allowing eleven inches of space between the consecutive shelves, the thousand volumes would fill seven book-cases, each six feet high and four feet wide. "Truly," says Prof. Riley, "this would be a snug little entomological work, altogether ahead of the Japanese novel which was commenced forty years ago, and after being continued yearly at the rate of three volumes per annum, has at length been brought to a prosperous conclusion by the simultaneous death of the hero, the heroine and the author."

Second. To write and illustrate these volumes would require

the combined and constant services of eighty-three persons for the entire working period of their natural lives, allowing them to live an average of sixty-five years; devoting the first twenty-five years of life to preparation, and regularly working three hundred days to the year thereafter.

Third. The cost of an edition of say ten thousand copies of our work would amount to the very modest sum of one hundred and twenty-six millions of dollars. In this estimate no allowance is made for the preparation of the scientific material, it being supposed that scientific men would willingly supply this well-nigh inexhaustible amount of "copy" without remuneration. Our grandchildren of the tenth generation in ages to come may perhaps see this consummation, but surely we would be simply wild to expect it.

Here is at least an intelligent intimation of the extent of the field to be cultivated.

Let me call your attention briefly to the history of some of these insects here on exhibition.

Here is the largest of the North American saw-flies, and also the wonderfully constructed Hymenopter, which lives but to destroy him. The Hymenopter belongs to the family *Ichneumonidæ*, a family of insects whose origin was for many years involved in obscurity even after the science of entomology had made great advances. It was found that pupæ and chrysalids that should normally have produced moths or butterflies not infrequently appeared to give birth to curious four-winged flies, which had no real counterpart in flies originating from any other source. It was even gravely stated, and no doubt generally believed by some of the best of our early English entomologists, that, to use their own words, "when from any defect or weakness, nature could not bring caterpillars to butterflies, in order that her aim might not be entirely defeated, she stopped short and formed them into more imperfect animals.

There have been described of the family of *Ichneumonidæ* about five thousand species, varying in size from individuals five or six inches in length, down to a mere speck of animated existence, so small as, if motionless, to be actually unrecognizable by the unassisted vision.

One of the largest of our North American *Ichneumonidæ* is known by the name of *Rhyssa atrata*, another by that of *Rhyssa lunator*. These are the especial foes of the very largest of our North American saw-flies or wood-borers, the so-called *Tremex Columba*."

The special peculiarity of structure of the saw-flies, which indeed gives them their common name, consists in the possession by the female of two saws, which are very deftly attached to the hinder extremity of the insect's body. These saws move side by side, and usually curve upwards, having teeth both on the convex edges and on the sides, so that they are not only saws, but rasps as well. Like a carpenter's fine saw they are provided with a strengthening thicker portion which serves as a back, though unlike the carpenter's saw the edge is not firmly attached to the back, but moves in a slot ingeniously contrived for the purpose.

With this piece of apparatus our friend *Tremex Columba* bores her way through the bark and into the solid wood of some of our forest trees, preferably the elm and the maple. At the farther extremity of this hole the mother *Tremex* deposits an egg, which in due season hatches the grub or larvæ, which if unmolested is destined to be the parent of future generations. But it is more than likely ordained that an unwelcome guest shall call where table, feast and host are all combined in one luckless individual.

*Rhyssa atrata*, the scout, like the early bird in search of the matutinal worm, is making a thorough search of every cranny and crevice wherein its quarry may possibly be lodged. The aperture so skillfully made by *Tremex Columba* is explored even to its remotest depths. The huntress' many-jointed antennæ as well as her wonderfully elongated ovipositor are brought in requisition to determine the exact location of the unfortunate party of the first part, who though having a legal pre-emption of the premises has nevertheless no power to serve a writ of ejectment on the intruder. Having satisfied herself of the exact position of the occupant, as well as of its condition physically, the *Ichneumon* unceremoniously thrusts her ovipositor beneath the skin of the helpless larvæ of the *Tremex*, and without so much as a "by your leave," deposits an egg within its body.

Soon this egg also hatches. The resulting larva preys upon the juices of its host, taking special care to avoid the vitals. It remains within the body of larva number one, undergoing its various moults, until at last being ready for its final transformation, it gnaws its way through to the outside of its host, where it passes its pupa stage of existence. Soon the first larva, exhausted by the immense drain upon its vitality incident to the support of so voracious a guest, sickens and dies, and the party of the second part is the only one which reaches maturity, prepared in its turn to be the means of lingering death to its natural foes.

The eggs of the various species of *Ichneumon* are not always thrust beneath the skin of the victim; sometimes they are deposited on the outside, the larvæ on hatching at once mining into the body of the host.

They are, however, abundantly discriminating in the selection of company for their intimate purposes. Frequently an *Ichneumon* will alight upon a caterpillar which has already been pierced by some predecessor in that vicinity. By means best known to herself, she very shrewdly soon discovers this fact, and flies away leaving Mr. Caterpillar none the worse off for her visit at least.

There seems also to be an intelligence informing each of them how many of its larvæ can get support from any particular caterpillar, since it is by no means uncommon for an individual of certain species to deposit numerous eggs upon the same one, but as above intimated never upon one previously visited.

The larvæ when hatched also have some intelligence of their own which by no means remains latent. They carefully avoid gnawing toward the vitals of their living habitation, but refresh themselves Esquimaux-like, upon what I may call the blubber of the caterpillar until it has maybe wound itself into its cocoon to wait for its final transformation, when the *Ichneumon* larvæ, if not yet full fed, seem no longer to have any conscientious scruples about devouring anything and everything that comes to hand, or rather to mouth. Frequently, however, they are prepared for their own transformation before the material is entirely exhausted. Then they, in some species, come without their abode for the pur-

pose of preparing their little cocoons; in others they undergo their transformations in the pupa case itself. Sometimes, especially in the case of the more delicate and minute *Ichneumons*, they will gnaw through the skin of the caterpillar and spin their cocoons upon its back, while it is still feeding, forming a spectacle more unique and interesting to the observer of the branch *Vertebrata* than agreeable to the active participant of the branch *Articulata*, which had doubtless been so sapped and mined by this peculiar corps of engineers, that it would never have sufficient strength to go through with its final transformation, but must certainly die a lingering death.

As indicating the amount of labor accomplished by these minute farmer's assistants, I may state that in the fall of '79 I took from a fence near a cabbage patch twenty-three chrysalids which had stowed themselves away for the winter, and which, if unmolested, would have produced the following spring the English cabbage butterfly, then a new comer into our state. The chrysalids were living, but had evidently been punctured by some parasite. In fact, the minute carnivore could be seen still at work upon other caterpillars and chrysalids not yet properly inoculated.

From these twenty-three chrysalids were hatched during the ensuing three weeks a vast number of the so-called *Pteromalus pauparum*, an insect of the family *Proctrotrypidæ*, closely allied to the *Ichneumonidæ*, of which we have been speaking. The extreme minuteness of these parasites made it somewhat difficult to handle them or even to retain all that were developed. Suffice it to say, however, that by actual count I obtained one thousand four hundred and thirty-four of these tiny creatures as the product of only twenty-three caterpillars, an average of more than sixty from each. The actual number developed was unquestionably considerably larger.

But we must pause. The subject is verily inexhaustible. Let us hope that these insect friends may be protected and spared to continue their warfare upon our numerous noxious caterpillars. On account of their resemblance to wasps and also on account of the difficulty incident to distinguishing these two families of insects from each other, it may not be amiss to further advise that

even wasps be protected rather than destroyed. This need not be considered injudicious advice if it is further taken into consideration that only the females of the wasp family are provided with stings, and even they are never the first to pick a quarrel but attend strictly to their own affairs, not offering to interfere with us if they are unmolested.

But even in this matter of such vast importance, it is needless to multiply words. The investigation of the insects of our state should be regarded as only one item of a full zoölogical survey of which the geological survey has been in some sort the pioneer. Moreover, entomological information scattered among the farmers of the state with no step-motherly niggardliness will at once give an impulse to investigations in other directions.

The relation of bird-life to insect-life already alluded to as the subject of special legislation and investigation in a neighboring state is a subject of great interest and of vital importance. This and other kindred topics should come within the purview of a state entomologist, while it might further be contemplated as the legitimate outgrowth of an entomological survey that the state university, the normal schools and the high schools of the state, be eventually supplied with properly arranged cabinets which, too, would be in many instances but nuclei of more extensive ones, destined in turn to greatly increase the magnitude and the utility of the one which should be established at the state capitol.

NOTE. — Since writing the above, my attention has been called to a couple of newspaper items which go to show that the subject is pressing itself upon the attention of other states and nations at least. They are as follows:

THE INSECT PLAGUE OF RUSSIA.

The Russian government is becoming seriously concerned for the welfare of the country during the present severe winter, which threatens the greatest privation to the peasantry in consequence of the poverty of last year's crops. It has actually come to be a question of ability on the part of Russia to feed its vast population, and the most serious aspect of this gloomy outlook is, that there is no promise of improvement in future harvests. This condition is owing to the presence of myriads of predatory insects, which it has been found impossible to exterminate, and which at present lie buried under the snow, in a torpid condition, ready to begin their ravages in the spring. It has been estimated that the expenditures during the financial year were

26,000,000 roubles greater than had been calculated upon, and Russia, whose ordinary exports are as much as forty million quarters of wheat, has lately been forced to come into the market to buy of her more fortunate neighbors. — *New York Grocer.*

LEGISLATION TO CONTROL INSECTS INJURIOUS TO VEGETATION.

Prof. C. H. Dwinelle, of the University of California, has been appointed by the California State Horticultural Society as a member of a committee to consider what legislation is desirable to check the spreading of noxious insects, and force land owners to destroy them when practicable.

The committee has in mind a commission, with power to investigate and abate nuisances in the way of neglected breeding grounds of insect pests, codling moth, scale insects, etc. They expect to be met by objections from the free American citizen, standing upon his constitutional right to do as he pleases with his own property, but they question his right to maintain an orchard which is unprofitable to himself and a pest in the neighborhood.

No laws have been passed in this country obliging the destruction of injurious insects, except in the case of the destructive locust of the West. These laws are given in the first report of the U. S. Entomological Commission on this insect. They have passed laws both in France and Germany to oblige the gathering of caterpillars, their eggs, etc., from fruit and shade trees. They also have in those countries many police regulations regarding the destruction of injurious insects and the prevention of injury to agriculture, forestry and horticulture. The local authorities have full power to rigidly enforce these laws and regulations, which, on the whole, do a great deal of good.

The whole population of a district which is invaded by an insect enemy is, in case of emergency, at the command of the authorities, and what can be accomplished by such concerted and well-directed action is shown by the heading off of the threatened invasion of the Colorado potato beetle some years ago. Of course such laws could not be very well enforced in this country; but we see no objection to a committee of surveillance empowered to order the suppression of certain insects at any particular point where such are allowed to multiply unchecked, to the injury of the neighborhood. A penalty might be attached for the non-performance of work ordered by such committee, as in the case of all other laws requiring work for the common good. That intelligent suppression, in this manner, of many insects, such as scale insects, phylloxera, or even of fungus diseases, would be productive of much general good in decreasing insect injury, there can be no question, and we sincerely hope that our California friends will succeed in their efforts to get such a law.— *Farmers' Review.*

DISCUSSION.

Several boxes of insects were exhibited to the audience.

Prof. Westcott — In one of those boxes you will see a large cocoon and a smaller one. The small white moth is the moth from which we get the silk of commerce, from Japan and China and France, and to some extent California. The large moth is a resident of this locality and of the northern part of the United States generally, and the silk of the cocoon is a great deal stronger than the silk of the cocoon of the silk-worm proper, and there is a great deal more of it in a cocoon. There is an everlasting fortune for the Yankee who is shrewd enough to find some way to unwind it. If we could only unwind it and reel it and weave it into cloth, we would have an amount of material there that would be really worth looking after. The caterpillar of the silk-worm proper winds up the cocoon by rolling over and over, and the thread can be unwound as easily as it was wound up, but the large caterpillar has a habit of passing his head back and forth through the thread so that the thread is in a snarl and the difficulty is to unwind it.

The boxes containing specimens of borers, plant lice, curculios, moths, etc., were passed around for examination.

Dr. P. R. Hoy, Racine — If there were an army committing depredations to the extent of a million dollars a month in the state of Wisconsin, the first thing that the general in command of the army would do would be to ascertain exactly the position from which the danger came, and everything pertaining to that army, in order to attack it successfully. Not less should we understand these minute insects that are doing damage to the extent of not less than a million dollars a month to the citizens of the state of Wisconsin. They have a threefold or fourfold life, and we should investigate them in all their conditions and find out where they obtain their subsistence, what insects or animals feed upon them and everything of the kind, in order that we may be able to attack them and destroy them.

W. W. Field, Madison — I wish to ask the Doctor right here if there is not this difficulty, that as soon as we have investigated

an insect fully, and ascertained the harm they do, they are exterminated by their natural enemies, and a new race of bugs have taken their places, and then we have got to investigate them.

Dr. Hoy — Not so. We have new varieties or species of bugs that make their appearance and commit depredations vastly greater than their predecessors in most cases. Another mistake the farmers make: They will often attack their best friends in the very act of attacking noxious insects, and probably at the same time protect the noxious insects. A man came to me, almost in a frenzy, and said the flies were coming and destroying his crops, and wanted to know what he should do. I looked at them and found it was the dragon fly, our particular friend. They catch almost all kinds of insects, and are sure to do you more good than harm. In order to study successfully any species of insect, we must take a comprehensive view of the entire animal; we must be acquainted with the fauna and flora of the whole country; we must know its place in the economy of nature, on what it subsists, and what those animals which surround it subsist upon.

On the 12th day of last June I had occasion to go across a little piece of prairie, and I saw a very large spotted frog. He was very large and hardly able to jump. I captured him and opened him, and to my surprise found eight imago of the May beetle; that is, the beetle that in the larva state cuts off the roots of grain and grass and various crops. Six of them were a very large species and two were a small species. I caught some others, and found from one to four in each frog. Those beetles are called May beetles, but they are June beetles generally. They were coming out of the ground, and these frogs were ready to seize them and thus do good. Now I feel confident that it would be a good work to kill those hawks that hunt these frogs. I have thought we should let them alone, but now I am satisfied they are destroying our friends. I suppose most of the farmers would call those hawks "hen hawks." I have seventeen species of hawks in my collection, and ten or fifteen of them are called hen hawks. Some visit farm yards and destroy fowls, and some do not.

W. D. Hoard, Ft. Atkinson — You will have to include the raccoon in the catalogue of frog destroyers.

Dr. Hoy — He is a very serious frog destroyer. He is sure to see a frog wherever he is, and sure to seize him wherever he sees him. The skunk is an insectivorous animal that is doing a great deal of good. I am sorry his reputation is in such *bad odor.* They plow up and root up the ground and destroy myriads and myriads of these grubs that so frequently cut off our strawberries under the ground, and burrow through the whole sod so you can take it right up. Those are the ones that the frogs will destroy.

Mr. Hoard — I once had eight acres of hops, and I found that this grub you are speaking of was very destructive. I went through the hops one morning when there had been a couple of skunks in the hops in the night, and I found by actual count that they had investigated four hundred hop hills, and I became a very firm friend of the skunk.

Dr. Hoy — I am very glad to have some one sympathize with me in regard to the skunk.

J. W. Wood, Baraboo — While we have up the subject of insects, I thought it might not be amiss to mention the fact that in many parts of our country the coming summer, we are looking for the seventeen-year locust, and, in anticipation of it, I wrote an article for our paper, and I cannot do better, that I know of, in introducing the subject, than to read it. I wish to call public attention to it that observation may be prompted.

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## SEVENTEEN-YEAR LOCUSTS.

By J. W. WOOD, Baraboo.

The coming summer will probably bring with it another brood of the Red-Eyed Cicada, commonly called the seventeen-year locust. They were last seen in these parts in 1864. Their return once in seventeen years is now quite generally admitted, but in different localities they have different years. In the south part of this state, in Walworth county, for instance, they came in 1854, again in 1871, and the next period will be in 1888. How large an area is to be visited by our Sauk county brood I am unable to state. I hope that observations will be made to determine it. Another point in which I feel an interest is, to learn at what

points, if any, the two broods overlap each other, giving swarms at intervals of ten years and seven years respectively.

They are a very strange little insect, coming in such vast numbers, after the lapse of such long periods, and in the intermediate time not a single insect appearing. A child may be born and grow almost to maturity without seeing a solitary one, when all at once the whole country resounds with their shrill music. Every tree and bush is loaded with them. Their countless numbers seem almost alarming; but as suddenly as they came they go away, and half a generation elapses before they are seen again.

What a strange principle of life is projected into that little egg found buried in the limb of a tree, which requires so long a period for its development; and among the millions of eggs deposited under such diverse circumstances of soil, timber and climate, not one varies farther than two or three weeks in the fulfillment of its prophecy. We would think that some falling in a warmer soil, or having a better exposure to the sun than others, or finding better pasture grounds, would be hastened to their development so that ther would be specimens of them on exhibition, in advance of the great army of regulars, but I have never seen one outside of the regular year.

Some fall on southern slopes and some on northern; some where the rock is near the surface and some where they can burrow very deeply; some on dry land and some on marshes; but it seems to make no difference in their development.

There is a Black-Eyed Cicada which comes annually and sings to us from the trees, but they are few in number and difficult to catch.

A word in reference to their habits may not come amiss, for there are doubtless men and women in the community who have never seen one. The eggs, which are deposited in a hole bored into the under side of the twigs, soon hatch into little grubs, which escape to the ground, and entering it, are not heard from again for years. In excavating they are sometimes found, but I have never seen them so plenty as to warrant the idea that they would appear in such great numbers.

At length they emerge, great, fat, ugly-looking fellows, each

one from his own hole, so that the ground in places is literally honey-combed by them. After they are out they crawl a little ways, generally upon some bush or other object, where they remain fixed for a time, when their shell bursts along the back, and the perfect insect emerges, ready in a few hours to fly to some bush or tree, where he sits and sings his few weeks of summer away. I say *he*, for the female is voiceless, and busies herself in depositing the eggs which are to give us the next generation. Old Anaxagoras sang:

> "Happy the Cicadæ's lives,
> Since they all have voiceless wives."

But if a man should talk so nowadays, the women would call a convention and go to passing resolutions at him, so I forbear. The noise which they make is not properly a singing, for it is made by instruments under their wings, and is a stridulous noise, like that made by crickets and katydids.

The females lay their eggs by thrusting their ovipositor into the slender twigs of the trees on the under side, and sometimes weaken them so that they break easily, and leave injurious scars at the best, and this is the full measure of the damage which they do. They are not known to eat anything during their perfected existence.

They emerge from the ground fat and plump, but by the time they die they are but an empty shell. Hogs devour great numbers of them, and hens and turkeys enjoy them hugely. They take no long flights, but generally live and die within sight of the holes from which they emerge.

They seem to prefer the oak bushes to any other timber, but will make use of fruit trees, if they can do no better. They are most abundant in scrub oak lands. What will be the effect of cultivation upon them, it is hard to tell. It will probably reduce their numbers, but can hardly exterminate them.

There have been many ignorant prejudices associated with them in the past. The ominous W on their wings, which forebodes war, s still to be seen, and wars still come periodically.

Their near approach, together with the planetary conjunctions

in the heavens and Mother Shipton's prophecies, may account for the warlike attitude of Greece. But luckily the locusts will soon be gone; before July is over the woods will relapse into their accustomed silence, and let us hope that "wars and rumors of wars" will go with them.

DISCUSSION.

Prof. Westcott — I would like to call attention to one point you seem not to have touched there; namely, that scientific men are now agreed that there are two of these long-lived locusts that come at various periods of time, the seventeen-year-locust and the thirteen-year-locust; and in the overlapping of the provinces of which you spoke, sometimes you will find it a matter of some difficulty, if you are studying a seventeen-year province that overlaps a thirteen-year province, in making the laps come together. If you will refer to a volume of the American Entomologist, published in St. Louis about 1864 or 1865, you will find quite an extensive article giving data over most of the United States with reference to the two varieties. The statement there made is corroborated by Wiley Marsh, that they have been found not only the succeeding year in small numbers, but occasionally the year preceding; so that the very thing you intimated you would expect to happen has really happened historically on both sides of the grand army that is bound to come the present year.

Dr. Hoy — The music that is produced by a cicada is very different from that produced by a katydid or a cricket. It is really a drum that is moved by a muscle under the wing — a very beautiful transparent drum. They fly so you cannot trace the motion. It is a continual hum. When they first march over the ground and are in good condition, they make a noise that can be heard on a calm day a great distance. It is a common prejudice to suppose they are poisonous. That is a great mistake to suppose every lizard one meets or every "horrible worm" is poisonous. They think that the females sting people with that ovipositor, and it is poisonous to them. There is an error in it entirely. When traced to the facts, you cannot find them.

H. Robbins, Platteville — Can you tell us how to get rid of the potato bug; that is the question?

R. F. Roberts, Kenosha — I would like to know to what extent the potato beetle is a destructive pest. I would like to tell my experience. I have found for several years they did not trouble my potatoes to any extent, and in examining the under leaves I find the potato beetle lays its eggs in a small, yellow cluster under the leaf of the potato, and there is a little fly or beetle that I have always been accustomed to call a lady fly — I do not know that that is the correct name, but I find that this lady fly, as I call it, feeds on the eggs, so that I have had no trouble at all. I have left the work of destruction of the potato beetle to that little lady fly, and have not found any occasion to use any Paris green or anything of the kind to kill off the bugs.

With regard to the May or June beetle, I know that a few years ago they were terribly destructive. They destroyed acres of my pasture; they cut off the sod underneath. It is a white grub with a brown head; and when you come to examine that sod you could roll it right up, just the same as if it was cut off. I did not have any corn destroyed, but acres of my cow pasture. There were acres of old pasture sod that you could roll right up, but the next season it seemed to be all right. I did not see that there was any real injury to the pasture. Some of my neighbors had acres of corn destroyed by the same grub, and at their request I wrote to the *Western Rural*. They gave us something of the natural history of the grub, but could not give us any remedy.

Mr. Robbins — What part of the state are you in?

Mr. Roberts — I live in Kenosha county.

Mr. Robbins — I don't believe there are any lady bugs where I live.

Mr. Roberts — I have always been familiar with them. I think a great many times we do not observe. Perhaps if you go and look next summer you will find some of those lady bugs. They are not all of a color. Some have red and some yellow and some black spots on them. They are all about the same size, and all seem to feed on these eggs. I have noticed one thing though, that they do not eat every egg up.

Prof. W. A. Henry, Madison — Gentlemen: I was never a lighting rod agent nor was I ever a book agent, but I am afraid

I shall appear before you to-night as a patent medicine man. I have here in this little can *buhach* or *pyrethrum.*

Pyrethrum is a powder made by grinding up the heads of a plant similar to the sunflower or the rosin weed — a plant of the old world. The plant is taken just in the flowering season and the heads pulled off and dried and ground. In those heads is a volatile oil, which you know is quite prevalent in such plants as the rosin weed, and that volatile oil is death to all creatures that breathe through the side of the body. It is death to all insects as high as the spider. I do not know whether it would kill a crayfish or anything like that, but I am certain it is death to spiders. It is perfectly harmless to such creatures as we ordinarily call animals, and to man. I have eaten it myself, of course not a large quantity, but you can snuff it up your nose and it produces no harm except a slight irritation. I never heard of any person being injured in any way by it. That being the case, if it is an insecticide, it certainly would prove valuable in places where we dare not use Paris green or London purple. When working for Prof. Wiley in Washington in the summer of 1879, he sent me out to investigate with this powder, and I spent some time in the gardens about the city experimenting on different insects. I found a great prejudice among the gardeners there, who, after they had seen me eat the powder, would not allow me to put it on their cabbage plants for fear of poisoning; and in one case I was driven out of the garden by a good German lady who had a bull-dog at her command, and I did not care about disputing the point at that time. I have had letters regarding this powder from points as far distant as Florida since I have been in Madison. I have had letters from St. Louis regarding it, and I have seen a number of articles. The last one was by Prof. Cook, just published in the last American Entomologist. Prof. A. J. Cook, of the Michigan Agricultural College, has been experimenting with it upon cabbage for the destruction of the cabbage worm. It is applied by an insufflator, by which it may be dusted on the leaves in any direction.

This is ordinarily known as the Persian Insect Powder. As brought to this country it is almost always diluted and adulter-

ated to such an extent as to be almost worthless. G. N. Milco brought this plant from the old world, some place in Hungary, I think, to Florida, and worked some years to get it to growing. When he found himself financially ruined, I suppose, he got some men in California with money to go in with him, and they have formed a large stock company, and Mr. Milco wrote me a letter last fall in which he told me they had already spent $60,000, with a return of only $3,000. He sent me the powder and told me to distribute it among those persons whom I thought were interested, and I bring it here to-night, and the president of the Horticultural Society is welcome to take it right along with him. It has proved very valuable for the cabbage worm, as it can be applied directly and will not injure the cabbage. It can be applied to house plants. It can be dusted on the flies on the ceiling, and they will all be on the floor in half an hour. A very diluted solution of it can be put on tomato vines or cabbage plants, and will work successfully. It can be burned in a room, and the fumes will kill mosquitoes or anything of that kind. I have never found a single insect that it will not destroy. Spiders succumb exceedingly soon. Last September, when the lake flies were very abundant here in Madison, I found one night thousands of them on the ceiling of my room, attracted by the light of my lamp, the window of my room being open. I dusted them with the insufflator a moment, compressing it twice, sending the cloud directly up against them. In about twenty minutes I counted the dead and dying flies upon my little study table, and there were three hundred and seventy-five lying there. Of course, the number that had fallen on the floor you can imagine. Probably three or four thousand flies were killed by that amount of powder. I went to Mr. Hollister's pharmacy, here in Madison, and told him I would speak of this, and desired him to correspond with Mr. Milco and keep it in stock, and he said he would do so. I hope you will excuse me from any thought of advertising any company. I do not want to do it. But I cannot keep from saying that I believe this to be an excellent article, and if I say so, I must tell you some place where you can get it. It is only for that reason that I

mentioned that you need not use it pure. You can mix it up with flour or any light stuff, or put it into water. It is sent out pure with the understanding that it can be diluted to a certain extent. A box like this which I have here costs one dollar at retail; at wholesale it would be much less. They have three hundred men at work raising these plants and some hundreds of acres planted, and it will become cheaper and cheaper. Their idea is to put down the price as fast as their production will warrant. The insufflator costs twenty-five cents. If any of you want Mr. Milco's address, it is G. N. Milco, Stockton, California.

Prof. Westcott — One of those boxes passed around the room has nothing in it but lady bugs. It is not uncommon for them to be seen devouring the eggs of the potato beetle, and I suspect the reason some have not seen them is because they have not watched closely enough. There is another reason, that under favorable circumstances in different climates they increase much more rapidly, and if they were much more abundant you would probably notice them, when your attention would not be attracted to them if they were not so abundant. As the potato bug has increased, and by its eggs provided food for the lady bug, the latter has of course increased, because there was plenty of food for it to live upon. I hardly know whether the gentleman was facetious in asking whether to potato beetle was a real pest. I think if he had seen some hundreds of acres thoroughly devoured by them, he would admit that it was a pest. But the lady bug you will find if you look thoroughly.

Mr. Roberts — I did not mean any joke. I wanted to find out to what extent it was.

Mr. Plumb — Is it the beetle or the larva that devours the egg?

Prof. Westcott — Both; but the larva does the most, and if you have them on your plants around the house you might easily in the summer time, by looking for them, catch the larvæ and put them on the plant and they will catch them clean. Take a net made of mosquito bar or some light muslin and sweep the grass in the summer and you will have no difficulty in obtaining enough for any purpose of that kind. The only difficulty is in identifying them.

Mr. Ames — Is the cabbage worm a native of this country or England?

Prof. Westcott — It comes from England. We have not yet retaliated on them by giving them the Colorado potato beetle. The time will come when it will make its way to the other side of the water and no doubt spread, although they have been very successful in keeping it out up to the present. The cabbage worm is a close relative of two others of this country which resemble it very closely, but it happens that their larvæ do not trouble you especially, and so they have not been noticed much. The one that feeds on the cabbage has come in by stages, traveling sixty or seventy miles a year to the West. It has now left fields in the East where it was not so injurious as it is here. I happened to be in Warsaw, Illinois, when the potato beetle first crossed the Mississippi river, and I had an opportunity of noticing how far east it made its ravages from year to year, and it seems as though the cabbage beetle was doing the same from East to West as the potato beetle did from West to East. I know nothing better for it than to kill all the butterflies you find upon the cabbages. If you tie a net to a stick and let the children catch them, unless you have objections to letting your children learn to kill anything, it will be sport for the children and will save your cabbages. Eternal vigilance is the price of cabbages and potatoes.

Mr. Roberts — The common toad eats the potato beetle.

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FRIDAY, February 4, 9 o'clock A. M.

Convention met, President Fratt in the chair.

Clinton Babbitt, Beloit — Mr. President and Gentlemen: I have been requested to speak upon the duties of the state to the state fair, but not having had over half an hour to attend to it, I have been unable to prepare extended minutes or to give the subject such consideration as would enable me to handle it as it should be.

The revised statutes of Wisconsin, chapter 60, section 1457, specifies the objects and power of the State Agricultural Society

in the following words: "The objects of the society are to promote and improve the condition of agriculture, horticulture and the mechanical, manufacturing and household arts, and for such purposes only it may take, hold and convey real and personal estate, the former not to exceed in value ten thousand dollars. Section 1458. The executive committee of said society shall keep an account of the expenditure of all moneys appropriated to it by the state, and of all other receipts and expenses, and shall collect, arrange and collate all the information in their power in relation to the nature and preservation of soils, the cultivation and growth of crops, the breeding and management of stock, the application and character of manures and fertilizers, the introduction of new cereals and other grains and other agricultural subjects, and report the same, together with a statement of their doings and such account of their expenditures, to the governor in January in each year, to be by him laid before the legislature."

The wisdom of this statutory enactment is approved by you and by all right-thinking citizens of this state. Eliminated from the baleful influence of politics, this society stands as a palladium of universal good alike to one and all. To promote and improve the condition of agriculture, horticulture and the mechanical, manufacturing and household arts covers the scope of civilization. As such it should be greeted alike by business men whose code of exchange is honor, and by sacrificing labor, God's banking capital of the poor. Farmers bred to the plow and independent should not be expected to fawn around every annual assemblage of the legislature for paltry appropriations, but should demand the passage of a law appropriating a contingent fund of at least ten thousand dollars each year, for the accomplishment of the object for which this society was organized.

You see by this statute what the Agricultural Society is intended to do and what our law-makers expect us to do. I would like to ask if that body, who are the representatives of all the people of this state, can expect to ask everything for nothing?

The rapid development of the great west, in which Wisconsin has her equal and just cause for congratulation, is another and higher incentive to more thorough work in civilized progress.

Public institutions are encouraged by the state, both educational and reformatory. There is no better means of education than the State Fair offers, if properly conducted.

Now, gentlemen, you may furnish treatises upon agricultural subjects covering many pages; corn-growing, stock-raising, manufacturing, the household arts and everything that comes into the scope of this statutory enactment, and you will understand that it requires a great deal of time and patience to go through and thoroughly read them so that they can be understood; but you present upon the fair ground a fine display of cattle, of sheep, of horses and everything in the shape of manufacturing, and it can be seen and compared; and a young man can gain more information in from three to five days' close observation than he can gain in the study of the best works upon those subjects in three years.

I claim that that is a system of education which is coming right home to the people, and can be thoroughly understood and comprehended.

Suitable buildings erected for the present and future age upon grounds owned by the Society, and to be permanently located, have now become a necessity.

It is, however, a very difficult subject to thoroughly master; there are so many diversified interests, and it seems that our fair does not bring in the whole state but only about perhaps a radius of sixty miles. We ought to have some way so that we could have permanent buildings, and at the same time bring in all the people.

I have thought that perhaps it would be best for the State Fair to be conducted in the way of a circuit, the same as these horsemen run their institutions; that is, for instance, have Madison as the central point, have La Crosse or Portage as the next point, Fond du Lac or Oshkosh the next, Milwaukee perhaps the next, and back again to Madison, with permanent buildings at all those places. That is so far away in the prospect, however, that I have confined myself to the idea of occupying the grounds where we now are. The State Fair on wheels is the other view of the case. The State Fair on wheels is after all, in my opinion, impracticable

for the state, and it is equally undignified for a sovereign state to compel the officers of the Agricultural Society to beg, from a handful of public spirited individuals, subscriptions sufficient to accommodate exhibitors. The annual State Fair should be independent of but auxiliary to the state experimental farm. It is advisable to erect upon that farm more experimental facilities. A silo by all means should be constructed, and on the days of the State Fair, especially, every opportunity should be given to the farmers of the state to examine its working. A silo is now believed essential in economical farming.

At the Inter-State Convention, held at Springfield last month, I had the honor to represent Wisconsin. It was there unanimously agreed that a report of the crops should be furnished by the secretaries of the several state agricultural societies, and by them presented to the farmers as a basis for making judicious sales. Our worthy secretary, Judge Bryant, was appointed, with the secretaries of other states, in perfecting the plan of detail. Hon. N. D. Fratt was elected one of the vice presidents of the organization. Mr. Bryant has informed me that with the addition of one clerk to his office corps, he can furnish a practical report which will thoroughly post the producers of the state; the information to be given before the crop is marketable or sold.

That seems, perhaps, to be a difficult matter, but there are many men here, and there are many men all over the state that can estimate almost exactly the amount of grain sowed and the amount which will be harvested.

Now, gentlemen, we want to give both sides of this transportation question a fair hearing. I may have occasion to say a few words to you on railroads, and perhaps to read a little paper in connection with this, but I desire to say that as far as we as exhibitors of the state fair are concerned, the railroads of the country have done more for us than the state has done.

I can but commend to you and the legislature of our state for favorable consideration the liberal policy extended by the railroads to advance the mutual interests of the roads and the state fair. It has ever been their rule to take all stock and articles intended for exhibition to and from the fair ground free of charge —

the far-seeing managers of these great lines fully comprehending the advantages of munificent liberality in the advancement of agricultural interests; and by so doing they admit that the foundation of all wealth is in the untrammeled development of agriculture and the higher culture of its votaries. They admit that; let us accept it.

Gentlemen, allow me to express my conviction that the laboring classes should, with heroic character and independence, assert their intentions so that they will understand themselves, and so that all the other great interests will understand what we mean. In a republican government it is democratic to be governed by the majority, and as the producers are in the majority, they no longer should countenance partial government under the state, but demand a just government over the state. A motto inscribed upon the archway of every entrance to his home, it will become a warning voice which legislators must heed, and only by a faithful discharge of duty to that class whose industry is the basis of all permanent wealth is there safety to him or them. Legislation must no longer cripple the producer. We want no subservient tools to class legislation, but we will have, and that speedily, faithful servants of the people.

In this connection allow me to say that the value of all property in Wisconsin is $450,000,000, which amount pays in taxes $7,500,000, and it also has $129,000,000 worth of railroad property which pays $418,000. I believe that this is properly figured. This gives a preference of thirteen per cent. in favor of railroads.

Now I want to place this forthcoming article in connection with these remarks on record upon our Transactions, so that every farmer and every railroad man and every other man who loves his state and the land which our fathers have bequeathed to us can read it and dispute it if not true. It is entitled:

## THE RAILROADS AND THE PEOPLE.

In approaching the problem of the relations of the railroads of this country to the people, it must, first of all, be borne in mind that transportation on sea and land has developed under radically

different principles. The ocean being free to all and open to any individual who chooses to place his ship thereon, a vessel could go wherever its owner chose to send it; the laws of competition, and of supply and demand, which have heretofore been found potent to protect the public interest, applied here, as in other branches of trade, and answered their purposes fully. So universal was the operation of this law that it has been relied upon to govern the relations of railroads to the public, and only upon the larger development of the new means of transportation has it become evident to all — what had been foreseen by a few — that the conditions of the two kinds of commerce are essentially different; that a railroad is a natural monopoly, and must be treated as such.

In 1874, the senate of the United States, in response to a general demand, appointed a special committee on transportation, composed of Senators William Windom, of Minnesota; John Sherman, of Ohio; Roscoe Conkling, of New York; H. G. Davis, of West Virginia; T. M. Norwood, of Georgia; J. W. Johnson, of Virginia; John H. Mitchell, of Oregon; and S. B. Conover, of Florida. The committee occupied the entire summer of 1874 in making an exhaustive examination of the subject, and in their report we find the following:

"In the matter of taxation, there are to-day four men representing the four great trunk lines between Chicago and New York, who possess, and who not infrequently exercise, powers which the congress of the United States would not venture to exert. They may at any time and for any reason satisfac tory to themselves, by a single stroke of the pen, reduce the value of property in this country by hundreds of millions of dollars. An additional charge of five cents per bushel on the transportation of cereals would have been equivalent to a tax of forty-five millions of dollars on the crop of 1873. No congress would dare to exercise so vast a power except upon a necessity of the most imperative nature; and yet these gentlemen exercise it whenever it suits their supreme will and pleasure, without explanation or apology. With the rapid and inevitable progress of combination and consolidation, these colossal organizations are daily becoming stronger

and more imperious. The day is not distant, if it has not already arrived, when it will be the duty of the statesman to inquire whether there is less danger in leaving the property and industrial interests of the people thus wholly at the mercy of a few men, who recognize no responsibility but to their stockholders, and no principle of action but personal and corporate aggrandizement, than in adding somewhat to the power and patronage of a government directly responsible to the people and entirely under their control."—*Report of the United States Senate Committee on Transportation Routes, page* 158.

In the state of New York, dissatisfaction regarding railroad management has existed for a long time; a statement of the grievances suffered by the producing and other interests has from time to time been laid before the legislature, and investigation of the same asked; but so many members were controlled by the railroads that for several years even an investigation of grievances — a thing which ought to be the common right of every citizen — was denied. Public sentiment regarding this question has been constantly growing stronger, and last year the assembly appointed an able committee of nine members, Hon. A. B. Hepburn, chairman, which occupied nearly nine months in an investigation of the subject. It found the principal charges "fully proven," and its comment upon the state of things then developed was as follows:

"The mistake was in not providing proper safeguards to protect the public interest, and hold the railroads to a strict accountability for their transactions. Thus through the laxity of our laws and the want of governmental control (measurably excusable, considering the unforeseen possibilities of railroad development at the time of the enactment of those laws, but no longer pardonable in the light of the evidence herewith submitted), have crept in those abuses hereafter mentioned, so glaring in their proportions as to savor of fiction rather than actual history." (Report, page 7.)

Yet this investigation did not touch upon one of the most serious phases of this question — the political corruption directly resulting from the departure from correct principles in railroad management. In order to arrive at a proper understanding of

this question, it is necessary to review briefly these principles and sketch the progress of this greatest invention of the age.

It is generally admitted that railroads, being public highways and common carriers, should treat all shippers with equality under like circumstances, and with relative equality where circumstances differ. The function of the railroad being essentially public in nature, and the vote of the small shipper having had as much to do with conferring the franchises under which railroads are constructed and operated as that of the large shipper, the right of the citizen on the highway here comes in to limit the operation of the law of wholesale and retail, which governs in private transactions. When the capital actually invested in railroads has been fairly compensated, the rest of the advantages accruing from the discovery and application of steam to the purposes of transportation should be enjoyed by the public.

Within the memory of comparatively young men, ordinary dirt roads were the only means of communication except that furnished by our water-ways. These were owned and kept in order by the public. The demand for improved roads resulted in turnpike companies, which were chartered by the state and allowed to charge tolls to reimburse the capital invested in these improved roads. Their charges, however, were required to be publicly posted, and to be the same to all. Next, the railroad was invented; associations of individuals solicited privileges from the state to construct railroads on the same principle which had governed the construction of improved turnpike roads. The first idea was to allow any citizen to put his own vehicle on the new iron roads; but this was found impracticable, and the corporations owning the road became the sole carriers over it. This was the first step toward a monopoly around which have gathered many evils. At that time, however, the danger was not apparent; the principle of the common carrier treating all shippers alike was recognized, and it was not until the many short lines of railroad were consolidated into great systems that the power of monopoly was understood and exercised. The evils, however, soon came, but the advantages of the new roads were so enormous, and so eager were the people to secure them, that the evils remained for a long time

unnoticed. Among the first of these was that of fictitious cost; the railroad law of most of the states was based upon the theory that the capital invested in these steam roads was entitled to a fair return — and the public was entitled to all the rest of the advantages. It was something like the principle of our patent law, which insures to the public the benefit of all inventions after they have yielded certain returns to the inventor. In one sense, it was a partnership — the state, which is the natural owner of all highways, contributing the franchises, while the associations of individuals in a corporate capacity constructed the roads. In the state of New York, it was stipulated that after their charges for transportation yielded more than ten per cent., net, upon the capital actually contributed for the construction of these roads, then the legislature might reduce the charge for transportation to a point which would not yield more than this; or, in other words, that after capital had been thus compensated, the public should come in for its share of the profits of the partnership in the shape of reduced charges for transportation. Thus it was made a primary principle that charges should be based upon cost of service.

How this principle has been evaded by stock-watering, by construction companies and other devices, is well known, but until recently it was not so well known that railroad managers had formulated a new principle upon which to base charges, viz.: "what the traffic will bear," and that in the application of this principle some of the most important evils in our transportation system have developed.

The following, from the "Graphic," illustrates the working of the new principle on the Pacific coast:

"Instead of having rates for freight, they want to make special contracts according to a man's profits. For instance, a man in Arizona has a mine and gets out a quantity of ore, but has no facilities for fluxing and smelting it, and must send it to San Francisco. He says to the railroad:

"'I want to send my ore up to San Francisco. What will you charge me a ton?'

"'How much does it assay?'

"'That is none of your business.'

"'Yes, it is. We want to know how much it assays in order to know what to charge you.'

"'Thirty dollars a ton.'

"'Well, we will charge you ten dollars a ton, and that will leave you twenty dollars.'

"Another man has a mine, and he puts the question:

"'What will you take my ore to San Francisco for?'

"'How much does it assay?'

"'That is none of your business.'

"He, too, must tell, and he says:

"'Well, it yields three hundred dollars a ton.'

"'Then we will charge you one hundred dollars a ton to take the ore to San Francisco. That leaves you two-thirds.'

"The man has no alternative, and pays the money to sell his ore, but he becomes a discouraged miner. Thus the railroad company is forcing the question as to what are the restrictions on a common carrier, and whether the mere carrier can be despotic with the people, arbitrary in its rates, and virtually an owner in every interest on the line."

Again, on page 69 of the Hepburn committee's report, we find:

"Now, as to the necessity for some regulation to protect the public, see testimony of Mr. Rutter, pages 453–4, where he testifies that he serves the stockholders only, and only regards the public interest to make it tributary to the interest of the stockholders.

"Mr. Vilas [testimony, page 415] testifies to the same controlling motives. Mr. Blanchard, after describing a railway officer as subject to three practical tribunals,— first, the president of the road; second, the law as laid down affecting transportation; and third, the unwritten law of commerce,— says: 'It has been our policy in this matter, while keeping within the statute law as far as I knew it, or had occasion to know it, that wherever this public unwritten law came into contact with the interests of the shareholders, I believed it to be my conscientious duty to decide in favor of the shareholder; I knew of no claim that the non-shareholding interests had upon me as a railroad officer so long as I was within the written law, to concede its views in the matter

of rates, and in the management of our traffic.' The marked importance which is here attached to keeping within the law emphasizes the necessity for a law for governmental control."

"What the traffic will bear," is, to some extent, a legitimate consideration in fixing charges, but, left to the uncontrolled discretion of railroad managers, the public interest is not sufficiently considered, and out of the power to make special rates, which railroad companies have conferred upon their freight agents, favoritism, both as between individuals and communities, has resulted. This has prevailed, and still exists in a greater or less degree, throughout the United States. To what extent in the state of New York is indicated by the report of the Hepburn committee; the report says (page 48):

"The charge that the railroads of this state discriminate against the citizens of this state, and in favor of western and foreign producers, is fully proven by the evidence taken. The charge that they discriminate against certain localities in the state, as compared with others, is fully proven. The charge that they discriminate in favor of certain individuals, as compared with others in the same locality, is fully proven."

It is a remarkable fact that not only did the railroads oppose this investigation, but the presidents of the New York Central and Erie roads, in a joint letter to the committee previous to the investigation, generally and specifically denied the existence of the alleged abuses which were afterward proven to exist. The Hepburn committee accompanied their report with a series of seven bills designed to remedy, in the state of New York, the existing abuses. Of these, four of minor importance were not opposed by the railroads, and were allowed to become laws, but the session of the legislature developed the fact that no bill to which the railroads objected could pass; a majority of the senate had been elected in their interest, and bills in themselves just and conservative were defeated.

This tendency on the part of consolidated corporate interests to perpetuate, through the acquirement of political power, abuses which they have found it to their interest to perpetrate, is one of the most serious of the evils which threaten the public welfare. United States Senator David Davis, in a recent letter, says:

"The rapid growth of corporate power, and the malign influence which it exerts by combination on the national and state legislatures, is a well-grounded cause of alarm. A struggle is pending in the near future between this overgrown power, with its vast ramifications all over the Union, and a hard grip on much of the political machinery, on the one hand, and the people in an unorganized condition on the other, for control of the government. It will be watched by every patriot with intense anxiety."

It is an open secret that the railroads furnish a large share of the money required to operate the machinery of our elections, and in all districts where political parties are closely matched, their money on the side of the candidate who will promise to favor their interests generally carries the day. They know no party and consult no interests but their own, and, as a matter of course, the venal and less worthy element in our political life, under such a system as this, usually triumphs, and men who are too honest or too independent to bow to corporate will are so weighted in the race for political preferment that they seldom come to the front. Mr. Jay Gould, in his evidence before the New York legislative committee of 1873, which investigated the affairs of the Erie railroad, openly testified as follows:

"I do not know how much I paid toward helping friendly men. We had four states to look after, and we had to suit our politics to circumstances. In a democratic district I was a democrat; in a republican district I was a republican, and in a doubtful district I was doubtful; but in every district and at all times I have always been an Erie man."

The state of things unearthed by this investigation was officially described in the report of the legislative committee, as follows:

"It is further in evidence that it has been the custom of the managers of the Erie railway, from year to year in the past, to spend large sums to control elections and to influence legislation. In the year 1868 more than one million dollars was disbursed from the treasury for 'extra and legal services.' For interesting items see Mr. Watson's testimony, pages 336 and 337.

"Mr. Gould, when last on the stand, and examined in relation to various vouchers shown him, admitted the payment during the

three years prior to 1872 of large sums to Barber, Tweed and others, and to influence legislation or elections; these amounts were charged in the 'India rubber account.' The memory of this witness was very defective as to details, and he could only remember large transactions; but could distinctly recall that he had been in the habit of sending money into the numerous districts all over the state, either to control nominations or elections for senators and members of assembly. Considered that, as a rule, such investments paid better than to wait till the men got to Albany, and added the significant remark, when asked a question, that it would be as impossible to specify the numerous instances as it would to recall to mind the numerous freight cars sent over the Erie road from day to day." (See testimony, page 556.)

The report of the legislative committee concludes with the following remarkable words:

"It is not reasonable to suppose that the Erie railway has been alone in the corrupt use of money for the purposes named; but the sudden revolution in the direction of this company has laid bare a chapter in the secret history of railroad management, such as has not been permitted before. It exposes the reckless and prodigal use of money, wrung from the people, to purchase the election of the people's representatives and to bribe them when in office. According to Mr. Gould, his operations extended into four different states. It was his custom to contribute money to influence both nominations and elections."

A recent editorial in the New York *Evening Post*, entitled "Wealth in Connecticut Polities," discusses this subject as follows:

"* * * With slow but steady progress the principle has come to be recognized, especially in the congressional districts and by the democratic party, that a man who wants an important nomination must get it by the promise or implication of a liberal contribution after the nomination is secured. The result is the free use of money at Connecticut elections and a corresponding debauchment of the political morals of the state.

"A good illustration of this evil appears in the fourth con-

gressional district, made up of Fairfield and Litchfield counties. This is the district represented in congress for several years by William H. Barnum, afterwards state senator, and now chairman of the democratic national committee. Probably no man ever succeeded so well as did he in organizing corruption. In each town was his band of workers, charged with the dispensation of funds on election day. He knew his men, and his men knew him, and after each election when it was found that 'Bill' Barnum had run ahead of his ticket all over his district, men understood the reason why. Presently the republicans caught up the trick and practiced it in the congressional election of two years ago, when a comparatively obscure candidate for congress ran ahead of Governor Andrews in the governor's own town, where his well-deserved popularity was unquestioned. In every small town of the district it has now come to be the fact that a venal band of from twenty to fifty electors offer their votes to the highest bidder. A secondary result has been that no man of moderate means can afford to run for congress or even for a state senatorship. * * *

"All this, which every intelligent voter in Connecticut knows to be a fact, is a most disreputable and scandalous state of affairs. * * * As it is now, the fact of general and comprehensive bribery at important elections is notorious, and it is no small stigma on the good name of a New England commonwealth that the crime is stimulated by a moral cowardice in communities which prevents alike the prosecution of the briber and bribed. A little wholesome law and some independent voting will go far toward remedying an evil that every good citizen in the state sees, feels and understands, yet too often hesitates to rebuke."— New York *Evening Post*, August 19, 1880.

Mr. Barnum is a type of a ruling class in both political parties, half statesmen, half railroad men, who mix railroad and politics for their own advantage. They differ materially, however, from the John Adams type of statesmen, who, when elected to congress, immediately sold his stock in the United States bank, on the ground that no representative should have a pecuniary interest in any matter likely to come before him in his legislative capacity.

The railroad statesman is found in both parties and in every legislative assembly; while perhaps not numerically in the ascendant, through packing the principal committees, and "retaining" members of the legal profession who happen at the time to be legislators, their ends are usually obtained. This feature is alluded to in one of the speeches of Senator Beck, of Kentucky, as follows:

"It is impossible to have an honest legislature, state or federal, so long as representatives are sent who owe their election to, or are personally interested in, great monied corporations or monopolies. No matter whether they call themselves democrats or republicans, they are not the representatives of the people; they are simply the agents and attorneys of those who seek, by taxing the masses, to enrich themselves, whenever they owe their election to monopolists, or are themselves interested in class legislation."

That the great corporate interests of the country do not stop at electing their own men to shape legislation is shown by a recent revelation in Pennsylvania. The following "associated press" dispatch tells its own story:

"PHILADELPHIA, March 28, 1880.

"A consultation was held here to-night by a number of leading politicians regarding the persons convicted of attempted bribery, in order to devise plans for their pardon. The case is by no means given up by Kemble and his fellow defendants. The bitterness of the fight is sowing seeds of much future trouble. Palmer and Stone, the two members of the board of pardons who are holding out against an amnesty, are the subject of severe comment, and have cut themselves off from all future political preferment as far as it is controlled by the dominant politicians. It is generally believed that, if pardons are not obtained, the sentences will be very light. The cases are the subject of general discussion in this city to-night, and there is much conjecture as to the general result. Many political leaders, including Senator Don Cameron, are here."

In 1877, the great railroad riots took place, and at Pittsburgh a large quantity of railroad and other property was destroyed. The railroad companies refused to indemnify shippers, but at the same time had bills introduced in the Pennsylvania legislature to

make the state responsible to them. They employed lobbyists to buy these bills through the legislature, but their operations were exposed, and William H. Kemble, E. J. Petroff and several others were arrested, tried, and, notwithstanding extraordinary efforts were made to secure their acquittal, were convicted. They immediately applied for pardon, and were pardoned. It shows what politics in the state of Pennsylvania have come to when it is publicly stated that "Palmer and Stone, the two members of the board of pardons who are holding out against an amnesty, are the subject of severe comment and have cut themselves off from all political preferment," and a senator of the United States leaves his seat and returns home to "arrange things." Kemble had been state treasurer of Pennsylvania, and Petroff was at the time a member of the legislature.[1]

In a lecture by James Parton, Esq., we find the following:

"Men who bribe and are bribed nowadays talk about the matter with out a blush. An officer of the New Jersey legislature told me how the bribing was done, and how he did it himself. The railroad man said to him, 'Come to my room at eight o'clock this evening,' and when the farmer legislator got there the railroad man said: 'By the way, Mr. Smith, you did not call upon us to subscribe toward the expenses of your election. I know it must have cost you a great deal, and, better late than never, here is something toward it,' and the railroad man passes over a pile of money, much more than the farmer's election expenses. 'I know,' added the corruptionist, by way of casual remark, 'that you would not vote for any bill that would not be good and honest, but there is a bill of

[1] On the 27th day of January, 1880, Mr. Franklin B. Gowen, President of the Philadelphia and Reading Railroad, in an argument before the committee of commerce of the house of represenatives of the United States, in Washington, stated: "I have heard the counsel of the Pennsylvania Railroad Company, standing in the supreme court of Pennsylvania, threaten that court with the displeasure of his clients if it decided against them, and all the blood in my body tingled with shame at the humiliating spectacle."

In the "associated press" reports this was suppressed; and only when the argument was published by Mr. Gowen was this remarkable statement verified to those who heard it.

ours now before your house that, you will take my word for it, is for the best interests of the community; examine it, and if you conscientiously think so, too, of course you will vote for it.' "

Most Americans will admit that such practices are evil and should be abated, but so conservative are Americans in all their methods, so respectful of property rights, so self-reliant and conscious of their own power to overcome evil when it becomes "worth while" to put forth the effort, that they are tolerant of abuses to an extent that seems absurd to other nations. An illustration of this may be had in the different results accompanying similar action by the governments of the United States and Brazil. The latter country, a few years since, for the purpose of meeting extraordinary expenditures, imposed a tax upon the street railways of Rio de Janeiro, equivalent to about half a cent for every passenger carried. The companies undertook to reimpose this upon the public by adding the exact amount of the tax to the fare; the people rebelled. A riot ensued, tracks were were torn up, cars destroyed, and the companies were compelled to recede from their attempt to make the public pay the tax. During our late war, a tax was imposed upon horse-car companies of half a cent for each passenger carried; the companies paid the tax, added a whole cent to the fare, and the American public acquiesced without a murmur. During the war, our government, under the then existing tax laws, collected from the New York Central railroad about half a million dollars. The railroad company claimed this was unauthorized, raised certain legal points, brought suit to compel the government to refund the amount, employed Senator Conkling as counsel, and was successful. The bearing of political influence upon this case was so obvious that it was commented upon at the time by several newspapers, among others, the Utica *Observer*, as follows:

"Now, when Mr. Conkling went down to Canandaigua to try this railroad case, he carried with him a greater political influence than any other man in our state wields. He appeared before a judge whom he had elevated to the bench only a few months before. He confronted a district attorney who could not hold his office for a day if Mr. Conkling

should demand his removal. He secured a verdict which the jury was forced to render by the rulings of the judge. Under that verdict the railroad recovers a round half million which it might have lost but for its shrewdness in employing the right man to prosecute its claim."

The New York *Tribune*, in an article at that time, entitled "Legislator and Lawyer," alluding to this case, said:

"The appearance of Senator Conkling as attorney in a recent railroad case, in behalf of a railroad corporation and against the government of which he is a sworn official, suggests a question of political expediency, and incidentally of morals, which must sooner or later be very fully and freely discussed before the people. * * * Somewhere there must be a line which separates the profession of an advocate from the functions of the legislator. Would it not be well to have that line authoritatively defined?"

It is not strange that the best legal talent of the country is permanently retained by corporate interests, nor that lawyers should naturally gravitate toward politics. Railroads can afford to compensate professional men better than private clients can, for the reason that their own revenues under the present system are practically unlimited, all production and commerce in the sections through which they run being tributary to them, and extraordinary expenditure for counsel fees, election expenses or bribery funds are simply re-imposed upon the public.

The extent to which this power to tax is exercised is indicated by the following straws: It is little more than fifteen years since Huntington, Hopkins & Co. were hardware merchants of limited means in San Francisco. They built the Central Pacific railroad, and deservedly made fortunes estimated at from three to five millions each. They found the railroad enabled them to tax the production and commerce of the entire Pacific coast. Twelve years have rolled around, and recent estimates, based upon legal proceedings necessary in the estate of Mrs. Hopkins, place the partnership wealth of Mr. Leland Stanford at $34,543,308; that of Mr. Charles Crocker at $34,495,458; that of Mrs. Hopkins at $25,280,972, while Mr. Huntington's wealth is estimated even higher than that of Messrs. Stanford and Crocker.

It is about twenty years since the late Mr. Vanderbilt was graduated from the steamship business into railroad management; his possessions at that time were valued at from $5,000,000 to $10,000,000; at his death, some three years since, they were estimated at $80,000,000.

Mr. Jay Gould "obtained his start" in the management of the Erie Railroad, in connection with the late James Fisk; at the time he gave his now famous testimony before quoted (1873), he was considered worth from $3,000,000 to $5,000,000; to-day no one knows how much he is worth, but in Wall street estimates are made ranging from $30,000,000 to $60,000,000.

Railroad men who have accumulated, within a few years, amounts ranging from $1,000,000 to $5,000,000 are too numerous to mention, as are those also, in branches of trade depending upon and closely identified with railroad transportation—shippers who through the favor of railroad managers have been enabled to outstrip or break down all competition.

These are found in every branch of trade, but in none, perhaps, are they so prominent as in the petroleum business. If a true history of the Standard Oil Company could be written, it would read more like a romance of the middle ages than a statement of commercial facts possible in the nineteenth century. This is the organization to which the Hepburn committee alludes as "this mysterious organization, whose business and transactions are of such a character that its members decline giving a history or description of it, lest their testimony be used to convict them of a crime."

The testimony in the Pennsylvania investigation showed that the trunk lines of railroads paid in rebates to the Standard Oil Company, within the period of eighteen months, $10,151,218, which was contributed by the roads in the following proportions:

| | |
|---|---|
| Total shipments, October 17, 1877, to March 31, 1879 ...bbls. | 18,556,277 |
| Total rebates during that time at 55 cents (average) per barrel | $10,151,218 00 |
| Of which there was paid to Standard by Baltimore & Ohio railroad, 11 per cent., as per contract, October 17, 1877 | $1,116,633 98 |
| Paid by New York Central & Hudson River Railroad, 21 per cent., as per contract, October 17, 1877 | 2,131,755 78 |
| Paid by Erie Railway, 21 per cent., as per contract, October 17, 1877 | 2,131,755 78 |

| | |
|---|---|
| Paid by Pennsylvania Railroad, 47 per cent., as per contract, October 17, 1877 — 17½ months..... | $4,771,072 46 |
| Total rebates, October 17, 1877, to March 31, 1879..... | $10,151,218 00 |

In a report to the New York Chamber of Commerce, the committee on railroad transportation of that body alludes to this subject as follows:

"How oblivious of their obligations as common carriers, and how regardless of public rights are the great trunk lines, is illustrated by their making an agreement with the Standard Oil Company (article 4) to protect them 'against loss or injury from competition.' What has happened in the case of the Standard Oil Company may happen in other lines of business. With the favor of the managers of the trunk lines, what is to prevent commerce in the rest of the great staples from being monopolized in a similar manner? Already, indeed, it is taking this course. One or two firms in Baltimore, Philadelphia, New York and Boston, with their branch houses in the west, are, by the favor of the railroads, fast monopolizing the export trade in wheat, corn, cattle and provisions, driving their competitors to the wall with absolute certainty, breaking down and crushing out the energy and enterprise of the many for the benefit of the favored few."

Railroad managers admit that such things are wrong, that they are opposed to public policy and private morality. Ask a railroad manager the remedy, and he will tell you "a pool," with legislation to enable one railroad company to enforce agreements made with another company. He is certain that any legislation or supervision in the interest of the public would not only be inoperative, but probably unconstitutional, and certainly mischievous. He will point to granger laws which were afterward repealed, but he will forget to state that they were purposely misconstrued by the railroads, and instead of acquiescing in and carrying them out in good faith, railroad managers made them as troublesome as possible to the public, in order that they might create a reaction in public opinion, and, with the liberal use of money in both elections and the lobby, secure their repeal. He will forget to tell you that, wherever this result has been attained, it was accomplished only after the railroads had conceded material reforms for

which the people had contended. He will not mention the fact that the decision of the supreme court of the United States, in the so-called granger cases, established beyond question the principles for which the grangers contended, and swept away the web of sophistries which learned counsel had been spinning upon the Dartmouth College case.

The decision of the supreme court in the granger cases, rendered March 1, 1877, was one of the most important declarations of public rights since the declaration of independence. Regarding the power to regulate, Chief Justice Waite said:

"We find that when private property is affected with a public interest it ceases to be *juris privati* only. This was said by Lord Chief Justice Hale more than two hundred years ago in his treatise '*De Portibus Maris*,' and has been accepted without objection as an essential element in the law of property ever since. Property does become clothed with a public interest when used in a manner to make it of public consequence and affect the community at large. When, therefore, one devotes his property to a use in which the public has an interest, he in effect grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created. He may withdraw his grant by discontinuing the use, but so long as he maintains the use he must submit to the control."

A prominent railroad manager, while recently arguing against governmental supervision and control of rates, and in favor of the pooling system now so much in vogue, stated, in almost the same breath, that "the pooling system would remove the discriminations and other evils of which the public complained," and that "competition would insure reasonable rates"—seemingly forgetting that pooling is expressly designed to prevent competition. Undoubtedly, the pooling system does protect the public interest against much of the personal discrimination which has existed in railroad management; but as regards the more important part of the question, What is a reasonable rate? it leaves the production and commerce of the country (to use the words of the United States senate committee) "wholly at the mercy of a few men who

recognize no responsibility but to their stockholders, and no principle of action but personal and corporate aggrandizement."

A recent report of the New York Board of Trade and Transportation says:

"Honestly and equitably managed railroads are the most beneficent discovery of the century, but perverted by irresponsible and uncontrolled corporate management, in which stock-watering and kindred swindles are tolerated, and favoritism in charges is permitted, they become simply great engines to accomplish unequal taxation, and to arbitrarily redistribute the wealth of the country. When this state of things is sought to be perpetuated by acquiring political power and shaping legislation through corrupt use of money, the situation grows more serious."

The railroad is the invention of the last half century; the tremendous development of corporate life, attended by the abuses of which the public complain, has occurred within this period, and largely within the last twenty-five years. Continue for another half century the present power of corporations to tax the public, and we will have a monied aristocracy in this country such as the world has never seen, and with it all the attendant phenomena of venal legislators and corruption in high places, which has caused the downfall of all the great republics of history.

These are some of the questions which are forcing themselves upon the attention of thoughtful American citizens; individualized, they may be stated:

Can Americans, whose forefathers abolished the law of primogeniture and entail to avoid the evils of vast accumulations of wealth in the hands of individuals, afford to leave unregulated new agencies far more potent to that end than any which were at that time dreamed of?

When corporate life or trade combinations develop into organizations like that of the Standard Oil Company, controlling a staple fourth in magnitude among our nation's exports, and hundreds of legitimate traders are driven out of existence, is it not time to inquire what steps should be taken to protect the interest of the producing, commercial and consuming classes?

When, to perpetuate power already acquired by these organizations, corruption is openly practiced in our elections, and the bribery of legislators goes unpunished, is it not time that American citizens should consider where such practices lead, and insist that the state should resume the sovereignty and control over its creatures which it has inadvertently and temporarily relinquished?

The only answer thus far made by the apologists for these practices has been to denounce those who opposed them as "communists" or "socialists." So bare of facts and so hard pushed for arguments favorable to their case are they, that Messrs. Vanderbilt and Jewett must fain adopt this policy, and conjure up the phantom of socialism to shield their practices! In their joint letter to the Hepburn committee they suggest that the staid and conservative merchants of the New York Chamber of Commerce are fast tending in that direction — their words being:

"The growth of a disregard of property in this country is very marked, and railroad corporations offer favorable forms of attack. The encouragement, by such a body as the Chamber of Commerce, to such ideas, will not stop at railroad corporations, but will reach all kinds of associated capital, and will not stop before it reaches all property. This growing tendency to socialistic principles is one of the dangerous signs of the times, and, if not checked, will produce scenes of disaster that would now appall the country."

Some months after this, when the legislative committee had pronounced the principal charges made by the Chamber of Commerce "fully proven," the committee of that body having the matter in charge alluded to this subject, in their report to the chamber, as follows:

"Your committee beg that the members of the Chamber of Commerce will carefully compare these utterances of Messrs. Vanderbilt and Jewett with the findings of the legislative committee. The assertion that the action of this chamber tends to the encouragement of socialistic or communistic principles is on a parity with much of the other reasoning of the presidents of the great trunk lines. They seem to be entirely oblivious of the fact that

it is their disregard of public rights, and not the efforts which this chamber has made to compel their observation, which is chiefly responsible for the growth of communistic sentiment in this state. If railroads were not public highways, upon which all shippers, as well as passengers, are entitled to equal rights; if the discovery of steam and its application to the purposes of transportation, with all its attendant benefits, could be esteemed alone the private property of these gentlemen, then the argument of Messrs. Vanderbilt and Jewett might be considered valid, and the efforts of your committee seditious, socialistic, and worthy of condemnation.

"It is hardly neccessary to say that your committee have no sympathy with socialists or communists who want something for nothing; this class of persons might perhaps find fault with your committee for being capitalists; but on the other hand, we cannot uphold a system of operating public highways which is honeycombed with abuses, and which is controlled absolutely by a few individuals who tax production and commerce at will, and who practically dictate what reward the producer, manufacturer and merchant shall receive for his labor."

All classes of citizens are interested in having remedies promptly applied to these evils, and especially are those interested who have property; for if ever communistic views make headway in this country it will be in consequence of the toleration of class privileges, and disregard of the spirit of our free institutions. These are the breakers ahead which every true patriot will pray that our ship of state may avoid.

The immediate remedy is:

The creation of an intelligent public opinion, through which reasonable limits may be placed upon the growth and power of corporate life.

It is time enough to take further steps when this has been accomplished. At present, the corporations are masters of the situation, but with an intelligent public opinion thoroughly aroused, it is only a question of time when it will compel a fair adjustment of the relations between the people and the creatures the people have created.

We are perhaps more interested in the transportation of our own state, but we must go outside in order to thoroughly comprehend what these railroads are doing, and hereafter it will be one of the things for us to look after, to see when we do regulate this matter that we don't estimate the railroads at their present value. If they are not worth more than one-quarter of what they are represented to be worth; if we give them a certain percentage on their investment, we are very apt, in legislating, when we think we are legislating for the people, really to legislate for the roads. In that, of course, the statesman, and the farmer as well, have got to keep their eyes open to the facts.

I did not design to blackguard the legislature by reading this article. It is only to have them sharpen up their brains and be ready for business.

Yes, I believe that the farmers of Wisconsin and the Union must understand this matter of railroad transportation, and know no party but that party that is in favor of the protection of one and all alike.

It is apparent that railroads and corporate interests have been fostered by the national government and by some of the states of the Union to an alarming degree. The farmers have sixteen representatives in congress; an equal representation with other industrial classes would give them one hundred and thirty more members. It still remains for the citizen farmer of Wisconsin to control the state, and in that control alone remains freedom to ourselves and to our children. Our influence must not be subservient in the promotion of rival interests. Agriculture must stand at the head; a consolidated power its ultimate destiny; a complete sovereignty with the people, the dignified controller of our own rights. The honorable gentleman from Trempealeau has said he dislikes to see this agricultural society converted into a scolding-school in the abuse of the legislature. Does he question the right or duty of representative farmers, such as are here convened, to insist upon equal justice and fair play?

## SWEETS OF WISCONSIN.

By S. HANSEN, Whitewater.

In our soil lies much of the wealth of our country; its products are purchased by foreign countries, and in return gold by millions are paid back to the people.

Individuals engaged in husbandry study to know what their soil is best adapted to; if to producing cereals, they pursue that branch of industry; if to raising cattle, horses, sheep or hogs, they pursue those branches of business; if to raising cotton, or cane for sugar and syrup, they engage in that as the most profitable. They calculate not only to raise for their own families and home consumption, but for exportation likewise. We would think the man very unwise that could raise his own grain, beef and pork and grow his own wool, and depend upon importing them from some other clime or country.

In the year 1879, there was consumed in the United States, according to the reckoning of the commissioner of agriculture, two billion pounds of sugar; and of this amount one billion seven hundred and forty-three million five hundred and sixty thousand pounds, or more than eighty per cent., besides thirty-eight million three hundred and ninety-five thousand five hundred and seventy-five gallons of molasses (the whole valued at $75,000,000, or duty added, $114,516,745), were imported.

Is it wise to pay such enormous sums to other countries for an article we can produce among ourselves, and thereby save the money among our own people?

The commissioner farther says, from the figures in our possession, it is found that over and above the amount of all sugars produced in the United States since 1849, we have consumed during the same period not less than eighteen hundred millions of dollars worth of foreign sugars and their allied products, or an amount of sugar more than equal in value to all the precious metals mined in the country since the discovery of gold in California, and nearly equal to the public debt at the present time.

It is well known that most of our soil is adapted to raising a

cane that will grow successfully as far north as forty degrees of latitude.

The Chinese cane was introduced into the United States in 1854 or 1855, and following soon after, some thirty varieties, all of which were almost worthless as sugar producing canes, until about the year 1873, a kind called the Early Golden or Early Amber cane (Kenney and Miller of Minnesota claiming its origin), frequently producing one gallon of syrup from five or six gallons of juice, crystalizing readily and yielding from one hundred to two hundred gallons of syrup to the acre on good soil, averaging one hundred and fifty gallons to the acre, and will yield at least five pounds of sugar to the gallon.

Admitting we can raise but one hundred gallons of syrup to the acre, producing five hundred pounds of sugar, Wisconsin with her thirty-four million acres of land, with one-eighth planted to cane, would yield sufficient of sugar and syrup for home consumption; and Illinois with her thirty-five million acres of land, with one-fourth planted to cane, would supply our home demand for consumption, and as much more for export.

In 1856 George Esterly, then of Heart Prairie, Walworth county, procured from the patent office at Washington, a number of small packages of the large, late variety of Chinese cane, planted and cultivated it (all that was not plucked up for pigeon grass when it first came up), and when grown all the season would permit, harvested it and tried to manufacture it with a wooden crusher and sheet iron pan, and made an article, according to a frequent expression, that went a great way in the family, as the last I heard him speak of it, he did not know but he had some of it yet on hand.

The next season, 1857, I sent for some seed, planted it and raised the cane; then up with a wooden crusher with three cylinders eighteen inches in diameter and two feet long, with six-inch journals, keyed up the machine very tight, hitched on the team, put in the cane and started. Then there was all kinds of music within a radius of half a mile — excepting sacred music.

I made an article that sold readily for fifty cents per gallon, and became interested in growing it; believed there was money

in it; have followed manufacturing it since 1857, until the present time, excepting one year, making since 1866 from two to five thousand gallons per year.

I sold my farm on Heart Prairie in 1866, moved to Whitewater and put up one of Clark & Utter's crushers and railroad evaporators. I made a syrup that sold for one dollar per gallon, frequently filling with grape sugar, but little cane sugar; but since I have grown the Early Amber I have no difficulty in making a syrup that will yield at least six pounds of sugar to the gallon of syrup, with heat only as a defecator, and have now not a doubt but there is money in it for the country.

It is a branch of industry that needs encouragement. Men that have been engaged in Cuba and in the Southern States in refining sugars and syrups from the southern cane know no more about the process of making sugar from the northern cane than if they had never been engaged in the business. They have not the acid nor glucose to contend with in the ribbon cane that there is in the northern cane; yet all that have tested it, come to the conclusion that there is as much crystalized sugar in the same quantity of juice of the northern cane as there is in the southern; and while its general manufacture throughout the country is in embryo, men of capital, like McDowall, of Chicago, operating at South Elgin, thus far has spent $15,000 to solve the problem of refining sugar and syrup from sorghum, are bound to succeed.

Upwards of twenty individuals in Wisconsin, Illinois and Minnesota, within a short period, have started out with fixed resolutions to succeed in refining sugar and syrup from sorghum. Some few have done it, while the others have fallen back upon refining syrup alone.

Among the successful ones are Dr. Wilhelm, of Faribault, Minnesota; his works cost some $10,000, and have a capacity of five hundred gallons per day, producing a fine article of coarse crystal yellow sugar, which would grade and sell in any market by the side of New Orleans No. 2 yellow, at the rate of six pounds of sugar to the gallon of syrup.

Thoms, of Crystal Lake, claims to have succeeded; he did well in 1879, but we have learned but little of his doings the past year.

Russell, of Janesville, is making headway in the undertaking, and others whose names are out of my mind.

It cannot be expected that individuals who have been successful in solving the problem at an expense of thousands of dollars will be so philanthropic as to throw open the doors of their establishment and let the people into the secret of their success.

Professor Scovill, of the Illinois Industrial University, has furnished some valuable information in the test of one acre each of the Early Amber and the Early Orange cane in their various stages of development.

He says the Early Amber is the richest in cane sugar and more readily crystalizes, and that the cash value of sugar in one acre of cane, if extracted in good marketable order, is $182.36.

But he says the best results yet attained have never succeeded in saving to exceed forty per cent. of the sugar which the analysis of the stalks shows it contains.

Much of this loss undoubtedly is caused by imperfect machinery. He farther says that with only forty per cent. saved there is a good business in it, and with eighty per cent. saved there is millions in it for the country.

There are some things that have been solved in growing the northern cane, such as the kind of soil adapted to its growth, viz., sandy soil, sand and loam, high loam and light clay soil, the manner of preparing the soil, fertilized sufficient to bear a good crop of corn, the ground plowed soon after harvest, the foul seed then springs up and is killed by the frost in winter, leaving the ground free from weeds, cultivating and harrowing mellow in the spring, planting the first of May either in hills or drills and not more than one inch deep, to be kept free from weeds while small, to hill up well when two and a half feet high, and when the seed is in the dough state out of the milk, then begin to harvest; strip it or not, as you choose; if you have a crusher with power sufficient to express the juice with the leaves on, cut off the panicles with ten inches of the stalk (the seed will probably pay for harvesting as it yields at least twenty-five bushels to the acre and nearly the same amount of aliment in it as there is in the same number of pounds of corn); cut up the cane and bind in bundles for the

crusher. We need no expert to test anything aforenamed, neither to test the cane in all of its various stages of development from the putting out of the panicles to a dead ripeness for its greatest amount of crystalized sugar, as it has already been worked out to a demonstration by different chemists and a matter of record for all that desire the information.

This brings us up through a tested course of growing cane When the cane is at the refinery and the juice expressed therefrom, we want men that are scientifically trained in the knowledge of separating the glucose therefrom, then concentrating the juice and extracting the crystalized sugar from the syrup; and where shall we find such men? Have our legislature appropriate $20,000 to erect suitable buildings, purchase machinery and all necessary material for a sugar refinery, to employ an expert to take charge of it, work out the problem and teach the science to others within the state that shall desire it, so that they are fully qualified to take charge of a refinery, large or small, and run it successfully.

If our legislature would make such an appropriation, I believe it would be but a few years before the farmers in the state of Wisconsin would rise up and call them blessed, in the enjoyment of a new branch of industry of great value to them.

I know that some farmers say that growing cane takes the strength out of the land and weakens it rapidly; but I most emphatically deny it, as I have a piece of land upon which I have grown a crop of cane for the last thirteen years, producing at the rate of two hundred gallons of syrup per acre, excepting one year in which the crop was injured by early frost, and five years in succession of the thirteen there was not a load of manure put on the land, and the crop the last year was better than the first.

Have the necessary appropriation made and men trained as experts in the art, refineries would spring up like magic throughout our state, an hundred fold be returned to the people; our "Wisconsin Sweets" would no longer be "silver drips," "golden drips" or "sugar drips," some of them made of old cast-off rags, sawdust and acids, corroding the vital organs of those who consume them, but pure, unadulterated sweets, as God designed we should use them.

Whether our legislature takes the initiative step or not, our watchword is "Onward," and as sure as the sun shines the problem will be solved and the knowledge gained of making refined sugar and syrup from the once despised sorghum.

DISCUSSION.

A. J. Philips, West Salem — I have the president's address at the last meeting of the Minnesota Amber Cane Association, and there is an extract from that which reads:

"I visited Belcher & Schwartz's factory. It is situated in Edwardsville, Ill., about twenty miles from St. Louis. I visited their factory from the fact Mr. Belcher has formed a partnership with Mr. Schwartz, bringing his skill and long experience with him. I saw a great many things that would interest our Minnesota cane-growers. It is an encouraging thing for us to see capital and skilled labor go hand in hand. Their boilers are of large capacity, with ample room for the pressed stalks, which are used for fuel, this one item alone saving a large amount of money. They have put in for trial some small filters, from which they have made a higher grade of syrup. Their syrups found a ready sale by the car-load lots. I think we may be able to do something with filters. I have no doubt that to make syrup for central refiners is the best solution for large quantities of syrup; but as long as they do not exist we must not wait till they are built; if we do we may never get them. We must first supply the home demand, and I think that a good article of crude will sell for fair prices for years. The more there is produced the greater amount will be used.

"I wish to present a few points for your consideration, which I think will be for the future good of our new industry. Sugar is what we all wish to make. A premium offered by the association for the largest and finest lot of sugar made for 1881 in the limits of the state of Minnesota, and exhibited at our next association, and add a second, third and fourth premium if thought best. If our funds should not prove sufficient, perhaps some interested to see the good work go on would help make up the premiums. Coupled with this there should be a written statement how the juice was treated to produce the results; machinery used. And

as there are many mills and evaporators competing for patronage, a committee from each kind of mill to grind two or three tons of cane and weigh the cane and bagasse. This is the only way I know of to get at actual facts. Thousands of dollars are now lost every year from poorly pressed cane. If I obtain one hundred and forty gallons per acre for a period extending over two months, and the average of the state at large is only eighty-six gallons per acre, this shows a loss to the state of fifty-one gallons per acre, providing the cane averages are good in all parts of the state, and a total loss to the state of four hundred and seventy-four thousand nine hundred and ninety-seven gallons for one season. The banner county for raising cane for 1880 is Le Sueur county, five hundred and eighty acres; second is Blue Earth county, five hundred acres; third is Fillmore county, four hundred and seventy-three acres. Only one-twelfth of the entire crop in the state has found a market at the refiners, showing that the people are using it largely without refining, and probably will continue to do so."

I will read a short letter from Mr. Belcher, one of the proprietors of that refinery, which I think is of some importance, because he is a man that understands business:

"Hon. SETH H. KENNEY — *Dear Sir:* This is the second time that you have honored me with a request for some thoughts on the subject which we all hold to be of such growing importance. I do not know that I can add many facts to those brought forward so abundantly at the late conventions in Springfield and St. Louis, nor that I can better state the vital points then presented.

"If I may be allowed to infringe on your time and patience, I cannot think of any better suggestions than to urge the necessity for developing those features of the new industry which render financial returns and which at present alone makes it a business. It is pretty well settled by last year's experience that the northern canes afford a solid basis for the manufacture and refining of syrup, and that whatever sugar is made without interfering with the economical working of the factory is an additional profit. Turning our attention to the main product, viz.: syrup, it becomes our duty in every way to improve its character and cheapen its cost.

"Syrups are estimated in two ways, by their appearance and by their taste. For each there are three criterions of value. Firstly, in appearance it must be bright, light-colored and heavy; secondly, in taste it must be sweet, free from acidity, and devoid of foreign flavors. In most of these six points the ubiquitous 'corn syrups' excel sorghum product. They are bright, and light-colored, and free from acidity and unflavored. In the matter of density they are no heavier than the better grades of sorghum, and in sweetness they are confessedly inferior.

"Here, then, are the points to be battled for. The new sorghum syrups must be perfectly bright, they must be light-colored and at the same time free from acidity; they must be devoid of the peculiar but well-known 'ginger bread' flavor. Then they can meet their chief competitors upon equal terms and win the market without appealing either to popular prejudices or interested friendship. Results such as I have indicated (now partially attained by imperfect refining) must be brought within the reach of the small manufacturers before we can hope to 'occupy the land.'

"The necessity for cheapening the cost of the sorghum syrup is as obvious as that for improving its character. It must be manufactured so as to be profitably sold in wholesale markets in open competition with corn syrups. Nothing short of this economical result must be allowed to satisfy us, for nothing less can be depended upon for a safe, growing business.

"And now I must ask your kind excuses for offering thoughts which have naturally suggested themselves to you long since, and which can claim no novelty either in substance or in the manner of presentation. I anticipate further encouragement from the coming season. In all probability it will be more favorable than the one which has just passed, and if in the face of climatic embarrassment we have taken a few firm steps forward, we shall certainly not falter if the weather clears. I am, my dear sir, very truly yours, "GEO. C. W. BELCHER.

"ST. LOUIS, January 18, 1881."

Prof. Henry, Madison — I wish to call the attention of the society to some sugar made at the Illinois State Industrial Uni-

versity, which corresponds to our agricultural department here, by Prof. Scoville, the professor of agricultural chemistry.

Remember that at that school they have two or three professors of chemistry, while our university is trying to crawl along with one. This professor has nothing to do but to devote his time to agricultural chemistry. Such a professor we have not in our university, so when I talk of Professor Scoville, do not think that he has done work that Professor Daniells of our school should have done, because they have two or three professors of chemistry while we have only one.

Professor Scoville found by analysis that in the acre of cane from which this specimen of sugar was made, there were two thousand five hundred and fifty-nine pounds of cane sugar. When they came to press the juice, boil it down and get out their sugar, they had seven hundred and ten pounds of sugar. They had lost in the processes the difference between seven hundred and ten pounds and two thousand five hundred and fifty-nine pounds. A portion of this, of course, was in the syrup. The work of the agricultural department has been spoken of by the reader of the paper. I wish now to take the opportunity of speaking to those present of what we want to do. I broached the subject at the Cane Growers' Convention at Fond du Lac, and have perfected my ideas somewhat, and will give them to you here. We hope, if we get the appropriation from the legislature, in the first place to issue a bulletin along in March, telling the people where they can get seed, and we shall not advertise any particular man, but all alike, tell who has seed to sell, what varieties he has and his prices. We will tell regarding cane mills, who has cane mills to sell, where they can be seen, and can be had. We will give directions such as we may gather by corresponding with practical cane growers as to what we consider the best method of planting. That would be our first bulletin issue. It would be sent gratis to every man whom we thought wished to grow cane in the state of Wisconsin, as fast as we could get their names. In the second place I would direct some experiments regarding fertilizing or manure and soils.

I have already got eighteen farmers who agree to help me in

that experiment, each one to take a plat of about ten rods of cane and put barnyard manure on one plat, no manure on the second, and perhaps plaster on the third, or something of that kind. If there are any others that wish to go in I hope they will give me their names here. That experiment I will conduct if the legislature does not give me a cent. It is of no use to try an experiment on a little patch on your farm, because soils differ; but by each one experimenting and bringing in his report and tabulating, we can see whether it pays to put barnyard manure on sandy soil or not, or whether plaster pays on black soil, and so on.

Then again, the appropriation we have asked the legislature for is six thousand dollars. I think that, perhaps, is large. I am willing to get along with less. I can beg the machinery, since I do not get any pay out of it, my pay being provided for from other sources; but what we would have to provide for is a chemist, which would take perhaps a thousand dollars, to investigate the question of fodder and the question of ensilage.

It seems to me if Illinois can have three professors of chemistry we can have one; but remember this professor is not to be employed permanently. He is to be discharged when the money gives out or when his services are at an end.

It has been hinted that I have some personal interest in this matter. I have not. I hope no member of this convention will think that. If I am a young man, and I suppose I am, coming here with a reputation to make, the whole six thousand dollars would not be much of an inducement to me to do anything that would soil my reputation. I cannot afford to do that for six thousand dollars. I will have to make my report to the governor according to the bill, and in that report you will have a chance to see how the money is expended.

I have no ax to grind. I have no friends in the state of Wisconsin except the farmers, as I am acquainted with you. I am in with no machinery men or anything of the kind.

In consulting with members of the legislature I find them very ignorant of this matter. I heard a member of the legislature say in this room the other night: "We are going to sit down on this bill just as hard as we can." A farmer stepped up to him and

said: "Don't you do that." He had thought it was just what the farmers wanted. They have the idea that economy is what they come here for, and if they could sit down on six thousand dollars, they think it is just the thing that is wanted.

The member came to me afterward and said: "I am going to help the bill if the farmers want it." He was perfectly honest in his opinion.

Here we are scattered all over the state. To-morrow will find you all in your homes — every one of you powerless. You cannot do a thing to move the legislature when you go home. As a body you have the power, and if you would make it a personal matter you would succeed. It is lobbying — call it that if you like — but is it not fair for you to tell your members that this is a matter for them to go forward and help us in? Is there anything wrong in that? I do not think there is.

I know of two cases where members of the legislature have been turned in their opinion because men told them, "It will not pay for you to come home if you vote against that bill; you had better stay down here always." If others would go to their members and talk to them and tell them you want them to vote for it, they would do it. If you honestly don't want it, the best thing you can do is to go and tell them you do not, and then they will vote it down most certainly. I think the bill is probably going to be voted down. That is my opinion, that we will not get a cent; and I say in that case, I cannot help you much. Having no chemist I cannot do much; but if I can get forty men to agree on these experiments in regard to manure, I will go through with that anyway. And in regard to planting different varieties and experimenting as much as I can on the farm, I shall do that anyway.

Now, gentlemen, the matter is left with you. Here as a body you have a great deal of power. Do not waste it in passing resolutions. Go to the members of the legislature who are now standing around, as the session is over. Go and talk to them personally, and tell them it is for the interest of your particular district that this matter be pushed or put down, just as you think. But do not go away and then curse the legislature when you get

home, because they vote down every bill you want carried. Let us not make any more tirades against the legislature until we have first made a solid move toward them.

Suppose you were all railroad men here, talking about getting a railroad bill through. Don't you know every one would stay here until that bill was passed, and gladly pay your hotel bills? And yet I doubt if this bill keeps one man here five minutes after the convention is over.

A. A. Arnold, Galesville — I do not know that I can add anything to the interest that the professor's remarks have a tendency to excite in this meeting, but I have long felt the importance of the farmers of Wisconsin becoming lobbyists.

If we are interested in this bill, if we consider it a subject of vital importance, then we ought not to feel so proud, and have such fine ideas of propriety as not to become lobbyists. There is nothing wrong in lobbying, if rightly done. Any good bill is hardly ever passed unless through the combined efforts of individuals. Many bad bills are passed by the combined efforts of individuals. I believe the idea is prevalent among farmers that good measures are passed without effort, whereas bad bills are only passed by means of combined effort. Now, the best bills that have ever been passed in the state of Wisconsin have been passed by means of combined effort, by men that were interested, too; and that is the reason why we farmers of this state have never had any influence in comparison to our representative strength, because we have failed to combine together as lobbyists. We have passed resolutions and worked at a thing far off, at arm's length, and think it beneath us to talk to the members. Where do our legislators get their ideas, except they get them from those they converse with? They do not know anything more of what the people of Wisconsin want, than many of those that are at home. If one of you is capable of instructing your member of the legislature, why should you not do it? If you know more about a subject than he does, why should you not tell him? I believe we should all make a combined effort, and go to our members and talk to them. If we think this bill should pass, let us work for it; if we think it is of no importance, let it go.

Senator M. Anderson, Cross Plains — I want to call the attention of this convention to the fact that the legislature has adjourned until Monday evening, and therefore, if you want to talk to the members, you had better be doing it immediately after our adjournment.

Prof. Henry — I hope now, since you are here from all over the state, that you will make this a personal matter. I know of two members who have changed radically in regard to this. One member of the assembly came to me and told me he had changed his views. He was honest in it. Now if we make this a personal matter we will, for once, have accomplished something on the legislature directly. If you have some measures you want to get through next year you will find it will help you on those, and you will find that the farmers of the state are a power.

Senator Anderson — I want to state that the farmers are by one-half too modest in making their wants known to the members of the legislature. If the farmers through the state of Wisconsin would write to the legislators what they want, and write also to their congressmen to take such measures as they wish to have taken, we would have some effect. The congressmen would obey our orders if they knew we had power to leave them out in the cold if they did not.

Farmers who go home to-day or to-morrow, and do not see those members they wish to, should write to them, because no other class of men are so modest that they will not ask them for what they want.

I tell you a railroad man, if he wants a bill passed, has got brass enough in his face to ask every granger he can get hold of, to vote for it; and the farmers have got brains enough if they only had the cheek that those men have. All you want is a little more cheek and you can have this legislation if you want it, and just legislation, I would say.

A motion to adjourn was then made and carried.

AFTERNOON SESSION.

S. Hansen, Whitewater — Mr. O. P. Dow, of Palmyra, put a resolution in my hands to present to the legislature after passing it by the convention. It reads as follows:

"Believing the cane growing interest of our state to be one of vital importance to all its people, and believing that it is just and proper, as well as the duty of the state to foster and protect its growing interests; therefore

*Resolved*, That this farmer's convention do most earnestly ask that our present legislature make an appropriation of ten thousand dollars, to be used in the discretion of the State Agricultural Society in erecting suitable buildings and in employing experts in developing the manufacture of syrups and sugar from cane, and to diffuse such intelligence among the people of the state.

President Fratt — Under the rule this resolution will go to the committee on resolutions.

Aaron Broughton, Evansville, offered the following resolution:

*Resolved*, That it is the sense of this convention that the time of holding town elections be changed from April to some time in March, and that the legislature be requested to change the law accordingly.

President Fratt — The resolution will take the same reference, to the committee on resolutions.

S. Hansen — Mr. President: Speaking of the legislature appropriating six thousand dollars for the erecting of buildings for the purpose of solving the problem of making refined sugar and syrup from the sorghum cane, it may be better to get a small apple if we cannot get a large one than not any, but it certainly seems to me that that amount would benefit us but very little in erecting buildings for that purpose, for I do not see how you can use the buildings and machinery without having the expert. It seems to me you would be balked as soon as you commenced the undertaking. I think that in Minnesota not less than twenty-five thousand dollars would satisfy them there. However, we had better take a small piece of bread than none, perhaps, and probably some will fight very hard against appropriating even six thousand dollars.

President Fratt — It is thought that the bill appropriating six thousand dollars will be defeated.

Mr. Hansen — It is a very small sum. I certainly think we need no experts in testing the kind of ground to raise cane. I would not give a penny for it, but those who have never raised it would perhaps want some criterion by which to be governed. I know the soil it will grow on and the kind it will not grow on. I know the kind of manure to use and the kind not to use. I have had men bring cane to my establishment and I have crushed it and put it into the defecator, and it smelled so I could hardly stay in the yard; come to inquire into it they had raised it in a hog yard, and I know that hog manure is not suitable for that, and you would not find me using it. I know by experience that it wants well rotted manure, put on the year before if you wish the syrup to crystallize readily. And all this I have learned by experience, so I would not give a penny for experts to figure that out. And the time of cutting it too, that I have tested to my satisfaction. It must be cut in a dough state; you must commence to cut it then, and finish cutting it, if you can, by the time it is dead ripe. Then there is the greatest amount of crystallized sugar in it of any period, and if it stands any time after that, it will deteriorate and the glucose will form and the sucrose will leave.

Mr. Ellis, Evansville — What do you think about stripping it and letting it stand a while before it is cut?

Mr. Hansen — I do not like to have it stripped before it is cut.

Mr. Ellis — If you go into the field and strip a piece and let it stand a few days, will it injure it?

Mr. Hansen — It would not injure it materially, but if you destroy the lungs you would destroy the life.

J. A. Taylor, Sun Prairie — What would you do with it after you got it stripped and cut up, if it could not be worked immediately?

Mr. Hansen — The only way is to put down some rails and pile it on them. Put on a tier of bundles and another across, pile it up and keep it away from the sun and storm, and if it don't come on warm it will keep until cold weather; but if it

comes on warm weather it will not keep three days. I have known a change of forty or fifty or sixty degrees in twenty-four hours, so it would not crystallize after that warm spell. There is more acid forms in it.

Nicholas Haight, Madison — Without going into any details of my experience on this subject, which I think would be improper, probably, at this time, I would like to say a word in regard to this appropriation. Now, I am not in the sorghum business; I have no ax to grind; no personal interest in the matter. I believe there are a great many farmers here that have no direct interest in it. A wool-grower or a dairyman or a stock-grower would have no direct interest in sorghum. There are a few men scattered about the state that have continued to cultivate sorghum and manufacture it for the last twenty years. They have learned some things, and they have got about as far as they can get. As the gentleman says, he would not give a penny for anybody to tell him how to raise cane, how to manure the land, how to plant and how to harvest. That probably is the experience of most men that have cultivated it for any length of time, but after he has got the juice from the cane, there is where he wants help; there is where the necessity for help commences.

Mr. Hansen — That is it.

Mr. Haight — At Washington, last year, they have been experimenting considerably in this direction, and some one was kind enough to send me a pamphlet.

It is known beyond a doubt, at least the chemists say so, that the sucrose or cane sugar exists in the northern cane to as great an extent as in the southern cane. They find it in the juice; that is, before it is boiled. They find some varieties of corn that contain nearly as much, under certain circumstances. Now what we want to know is how to retain that or save it. We find in boiling it in the ordinary processes that sometimes it will not granulate at all. At other times it will granulate without any particular effort. We know some of the circumstances that will assist in the granulation, but we do not work with any certainty towards making sugar. Certainly, if an appropriation from the state would lead to the knowledge that we could go to work with cer-

tainty; that people throughout the state could go to work with certainty; put up buildings and invest their money to a profit, and should ultimately produce sweets sufficient for the state of Wisconsin, the people at large of the whole state would be greatly benefited thereby. If we can save our money at home, it is much better to produce the products for our own consumption than to send abroad to buy them.

H. Robbins, Platteville — I desire to speak upon the first paper as well as upon sweets — that is, before I get through. The first paper connects the state with the agricultural society. I understand the agricultural society is a state institution, and that the legislature have by law made it such.

Now, sir, I am opposed to that bill. I am going to give my reasons now, why I am opposed to it. Were I in the legislature I would be willing to vote for twenty thousand dollars, if it would go into the hands of farmers — if it would go into the hands of the president and secretary of the agricultural society in connection with another, who might be one of the state officers, or might be the president of the State University, or Professor Henry. I would be satisfied with that; and were I in the legislature I would vote for a large appropriation for that purpose; not that the county that I represent is interested in the growth of sorghum; I do not think we are. I do not think we could raise enough for our molasses, let alone sugar, because it is not our forte there. We can do better at something else. We have an experimental farm. We have stewards upon that farm; we have managers on that farm. They have been weighed in the balance and are found wanting. Now, I am going to show you why they have been weighed in the balance and found wanting. They are probably satisfied with their own report without any question.

"Agricultural College Fund. This fund consists of the proceeds of the sale of two hundred and forty thousand acres of land granted by congress, approved July 2d, 1862, to the state, for the support of an institution of learning, where shall be taught the principles of agriculture and the mechanic arts."

There they stopped. That was the object of the Agricultural College here. Now we will go on and see something about that fund.

The income last year was $15,321.84. That is the agricultural college fund. Congress thought it would throw a sop to the farmers, and they gave two hundred and forty thousand acres of land, to be dedicated to certain purposes. What are those purposes? Agriculture first, and then the mechanic arts.

Now the income of the university fund was $13,881.28. I was in the legislature when that college was established here. They came from the north in large force for the purpose of having it come up there. The donated lands were up north, and they claimed that the soil was different up there. They claimed the experiments here would do them no good up in the timber, and they desired to have the college located up there. I was chairman of an important committee, not a committee upon education, but a very important committee, and the committee that I was chairman of agreed that if Dane county would give forty thousand dollars, so that the land could be had without any expense to the state, that we would establish this agricultural college at Madison. And you will find if you look over the records that the suggestion came from that committee.

Dane county was here with a lobby. They wanted the college here, but they did not really stomach the forty thousand dollars. There was no lobby here at the start for the purpose of getting forty thousand dollars out of Dane county; but the college could not have been located here had it not been for Madison agreeing to furnish the ground. They issued their bonds for forty thousand dollars for that purpose. They bought, as I understand, about two hundred acres of land. Now there is an agricultural farm in the state of Wisconsin. I understand that there is, and I suppose there is, according to this report. While I am here, I will say, that the year this was established here, in order to bridge them over their trouble — we knew we were creating a burden for the State University, a greater burden than they could sustain, from the fact that the land had not been sold at that time,— therefore we passed a bill agreeing to give them seven thousand dollars. You will find that the legislature, in addition to giving them this, voted seven thousand dollars out of the tax payers of the state to go to the State University to bridge them over.

That was all very well, but they came in 1876 and said that they had got an elephant on their hands. Instead of being a benefit to the State University we had given them an elephant that they could not control. Then they came to the legislature: "Now, gentlemen, you see what you have done for us; you have ruined us. Now we want a tax of over forty thousand dollars." That year I think it only amounted to thirty-seven or thirty-eight thousand, but last year it amounted to $43,807.18; that is direct tax and goes to the State University. It does not go to the agricultural college. They have got this law because they had an agricultural college established here, but they have really got it in the interest of science; in the interest of the State University, and not in the interest of agriculture, nor in the interest of the farmers of the state of Wisconsin. This year they say it will amount to over forty-four thousand dollars. That is the estimate made by the secretary of state. If I should make any mistake in any of my figures, I want to be called to order at once; I do not intend to. This is a matter of history and I want it to come to the country all right. I am the only farmer from Grant county present at this convention, and I have been here all the time. Now I am going to show you how this munificent income is expended they turn over to their faculty. You see that tremendous list. That amounts to $49,502.40. Out of that there is $250 appropriated for the professor of the agricultural college. The reason that I am so particular about this is that a year ago last September there was twenty thousand dollars in the treasury, so the treasurer's report showed, that they had not used up. That they could not stand. You will find that last September there was only about three thousand dollars in the treasury. Now have any of those expenses been created for the benefit of the experimental farm? I do not see that they have. Here is the experimental farm report: Its expenses are $3,464.94. That is the expense of the experimental farm, and its income, I think, was $750. Something like that. That is what the report shows. Here is for pay roll of superintendent and employees, $2,512.89, and you will see that the income from the experimental farm by the sale of products, etc., is $751.41. That is the income as I

take it from their report. I merely want to show this: There are a good many farmers who will go home and suppose that that university is a gift from the United States, and supported by an income out of funds given for that purpose. What I want to show is, that the farmers do not receive any benefit to speak of from the agricultural college being established here.

They come now to ask for a six thousand dollar appropriation, to employ a scientific man to analyze our soils, and to analyze sorghum and our silos. I would have wanted to have that increased, but that is not the purpose. It is going to be controlled by the very men who have controlled this large appropriation, and what benefit are we going to get from it? I have no doubt that Professor Henry will do his duty if he says he will, but he gets a salary of a thousand dollars from the board of regents. I want to know if he is not their employee? I want to know if his head would not go off in a minute if he did not conduct experiments to suit them?

The objection I make to that appropriation is this: Let the legislature provide that they shall give six thousand dollars from that fund each year, and then they will get in favor with the farmer.

I am coming now to the experiments. I was asked the question whether corn exhausts the soil or not. I am going to take the reports here, and there are only four of them; four plats numbered 1, 2, 3 and 4, last year. Plat number 1, two loads of well rotted stable manure, 650 ears, 536 stalks; plat number 2, nitrate of soda equal to 32 pounds of nitrogen per acre, 570 ears, 394 stalks; plat number 3, Peruvian guano equal to 35 pounds of ammonia, 54 pounds of phosphoric acid and 7 3-10 pounds of potash per acre, 623 ears, 380 stalks; number 4, nothing at all, 656 ears, 440 stalks. Now recollect this experiment has been tried for four years. This is the fourth year, and those plats have been treated exactly the same for the last four years. Now you have the result. That will go to the farmers and they can see the experiments tried here at the farm; they can see as far as corn is concerned. The question came up whether corn really exhausted the land. I remarked that I did not see as it did very much.

You will find that stable manure is the best; 650 ears and 536 stalks. It is a little better than these phosphates, although we were given to understand that stable manure was not worth very much to the farmer; that is, I got that idea from discussions here, and that stable manure is not anything like these phosphates; but there is an experiment that has been tried.

I am of the opinion that the time will come when this state will have to do something for agriculture. I am not a member of the Agricultural Society, consequently I can speak as a farmer. I am in favor of this Agricultural Society trying experiments themselves. I am in favor of having the appropriations made directly to them, so that they may make their report to the governor directly, and then the farmers will have their friends handle the money as well as try the experiments. That is the position I take. I believe, in regard to entomology, if the state is to do anything at all, that the Agricultural Society should have control of the money that is to be expended. They have control of money enough at the university — about a hundred thousand. Look over and you will find that they expended pretty near a hundred thousand dollars last year. Now thirteen thousand dollars for science hall only has been expended this year. Why can they not take six thousand dollars now and try experiments that will be of some advantage to the farmer? Then they will be in favor with the farmer. And the farmers will not all the time be coming up and asking: "What are you doing for agriculture?" They have made a failure as far as agriculture is concerned. If they got my farm or my horse in the same way that they got this agricultural college, I say that under our law they would be sent to Waupun. You might ask me why. Because they got it under false pretenses. If they had not given me any more for my horse or farm than they have given to the farmers for this agricultural college, I say they could have been indicted for getting money under false pretenses, and my charge is that they have not been true to that agricultural fund — they have not been true to the farming interests of this state. I know they calculate to do a little better now. Let them take a little of their own money and do better with that, before they ask us to give them some more

money. That is my position. I do not want to be misunderstood. I know that if I had said nothing to-day it would have been said, "Robbins wants to destroy the State University." I do not want to destroy the State University, but I want to have them conduct themselves in such a manner that you can see that they are honest and show that they intend to be honest.

Now, I do not believe that that agricultural college should be controlled by lawyers. I believe that the law class should be controlled by lawyers. Look over that board and see if the lawyers have not had the controlling interest right along. The great pre-eminence is given there to science. Science is an excellent thing, but the average farmer of the state of Wisconsin cannot appreciate it when he cannot get two meals a day. A hungry man cannot appreciate science. A man that has not a quarter of a dollar in his pocket and wants his dinner cannot appreciate science. What we want is to teach the average farmer so that he can have three meals a day, and so that he will not have to work any harder than any other man. I know what I am speaking of. I borrowed the money to pay my taxes last year. I did not sell my cattle because stock was down, and I borrowed the money, and paid ten per cent., and this year when I sold my cattle, that was the first note that I took up; a note of three hundred dollars drawing ten per cent. interest; and you say, "Robbins is rich; what does he care about taxes?" I wish some of you knew how he lives and works on his farm; and I am not sent up here by any lobby or anybody else. I came here on my own hook, and I have been highly educated since I have been here, and highly entertained, and have enjoyed the meetings as well as I ever did at any time when I have been here. I was not here last year on account of sickness in my family, but I think those Transactions are great educators, and if the Transactions went out with what I said yesterday, alone, you would suppose I did not know anything about the institution at all; but I tell you I know all about it. That report was put in my hands about an hour before we met yesterday, and I had just time to look over it and analyze it. After I have slept over it, I feel a great deal better about it than I did yesterday, because I believe the time will come when we

will get some benefit from the agricultural fund of the state of Wisconsin, but I do not believe we are going to this year.

J. A. Taylor, Sun Prairie — I have been in the sugar business three years. I can raise my own sugar and my own molasses. I can make my own vinegar (or my wife can), and my own pickles, and furnish all the sweets that molasses can furnish in the family, and I can do it for just a gallon of sweet for every rod of land, and I can cultivate it nights and mornings, and I can cultivate it also when my neighbors are talking politics, and I will get it free. As a poor man that lives by the sweat of his brow, though I do not very often sweat and I do not work very hard, it is my opinion that every farmer that can have an hour or two every day or every few days can raise all the sweetening that he needs in his family. And now what we want is, a little to make into sugar. Molasses does not make good apple pies, neither does it make some kinds of cake, but for ginger-bread it is right down good — that you cannot make with sugar as good; it beats it. And for mince pies it beats it; and for vinegar and pickles it beats anything, and another thing, it is pure.

W. W. Brown, Merton — I would like to make a remark or two. I did not intend to say anything when I came here, but as Mr. Robbins has been giving the agricultural college fits, and I have been directly interested in that college, and know something about it,— probably more than any one man here,— I think I can say a little something about it and about the experimental farm also. In order that you may know who I am, I will tell you that I am the *lone one* who took the sheep-skin from the agricultural college, and now I will pass on.

Why is it that the farmers of this state receive no benefit from the agricultural college? I say it is their own fault. There is the experimental farm, with a superintendent under the direction of the professor of agriculture. He has his laborers there. They perform their work as nearly as they know how on scientific as well as practical principles. They plant the ground and sow the best seed they can find. They experiment for the benefit of the whole state. Every year there is a report sent out. The state gives that to the people. Of course the expense of it is raised by

the tax, but it is free. If a man wants that, if he feels that it is of any use to him, let him send to the secretary and he can get it. Because he does not receive any benefit, is that any reason why the agricultural college or the experimental farm should be condemned? I say it is the farmers' own fault. They have the thing there for them to try, for them to accept of. If a company build a railroad through a place and the citizens are not there, any or all of them might say: "We do not get any benefit from that railroad, what is the use of it? Let us not have anything more to do with it."

Why do they not get any benefit from it? We all acknowledge that railroads are great conveniences for us at any rate, but if we do not accept of that convenience, whose fault is it?

When the farmers come up here and begin grumbling and growling about the State University and about the experimental farm and the agricultural college and all of it, I say that it is themselves who are to blame. I am in favor of this bill passing the legislature, though Professor Henry says that he would accept and could probably get along with less than the amount asked for of the legislature. If he thinks he could, it would probably be a good plan to take a little less and see. Professor Henry is a new man here, as I understand. I know I never saw him until I came here to attend the convention. He was not in the institution when I was there. Let him try it awhile. If he proves himself to be a capable man, and able to conduct the experiments on a mechanical as well as a scientific plan, next year give him more and let him experiment. It is for the benefit of the farmers that these experiments are carried on; if they will accept the benefits that are theirs for the asking only.

Judge Bryant — There is one thing that Mr. Robbins said that I think he put pretty strongly. He carried the impression that the regents of the university come asking for this bill. I do not understand it so at all. The regents of the university do not ask for it. I expect they do not want it. I do not know as they do.

Mr. Robbins — I speak of the time the agricultural college was established; not this bill.

Judge Bryant — I happen to know something about this bill. It was solid agricultural people that got it up and introduced it; men who are our representatives in the legislature. It was not through any contrivance of the regents. Mr. Kingston was the father of this bill; the supporters of it are Mr. Blakeslee and a large number of the representatives in the house above who come from what we call the sandy lands, on either side of the Wisconsin. They say they believe that better molasses and sugar can be made; and that an industry should be worked up of that kind in this state. They were the ones who urged the introduction of this bill, and they believe that the proper place to try it is at the State University. They want to know the best and proper time of cutting the cane, how to manage it and control it. You have got to have, aside from a farmer, a professor, and you have got to have a scientific man, and a chemist who can tell you by his examinations and assays how it is; hence they provided in the bill that that chemist, while he was not engaged in this sorghum business, should be engaged in other business; that he should assay crops of clover and corn, and such things, and it would be a practical thing, and in practical places, that we farmers could go there and see the experiments being tried.

Mr. Robbins — I said it was done at their request, at that time when it was established here.

Mr. Bryant — So far as that was concerned I happened to be a farmer then in Dane county and paid taxes. I know I have paid my share of that forty thousand dollars that Dane county gave to get the farm.

Aaron Broughton, Evansville — We do not propose to meddle with lawyers' business. It would be preposterous, and why should not we be just as jealous of our prerogative as they are of theirs. We do not want them to manage our farming. They are undertaking to manage our politics. We want to manage our own business in our own way and take our chances. We want this fund, if there is any raised by the farmers, to be controlled by the farmers — that is, the Agricultural Society or a similar body of farmers — to be under their direction and supervision. The trouble is, money raised for certain purposes has been diverted to

other uses. We do not want that condition to exist any longer. That seems to be the gist of the whole matter.

Judge Bryant — That is all right in theory, but it takes practice aside from theory. I remember that about the same kind of remarks as have just been made by Mr. Broughton were made two years ago. I do not know but he made them. I was requested then to get the Blue Book and see who composed the regents of the university. I did get it and read it to the convention, and it was discovered that there was no farmer among all the regents of the university. Thereupon this convention passed a resolution requesting the governor, at such a time as he could, to appoint a farmer as one of the regents. That resolution I carried, under the instructions of a convention similar to this, to the governor. He looked at it and said it was right. He had but one chance then to appoint, as these things are regulated by the laws; so many regents go out every year, so many come in. It is all fixed by statute; that is, their terms, and you cannot remodel the board in a minute. The regents are located in particular districts. There are eight districts and so many are appointed from each district. He had an opportunity then of appointing one. He appointed Mr. Hiram Smith the next year. Nothing was said about it, but there came to be a vacancy, and Governor Smith came to me himself, because as secretary of the State Agricultural Society I represented the farming interest of the state, and he asked me to name a farmer living in a certain district — I have forgotten the number, but it is the one in which St. Croix county is — for a regent, and he gave me three or four days to think of it. That is a good way off, but I knew a good many people, and I considered the matter and recommended him to appoint ex-Governor Charles D. Parker, and he appointed him. These regents can only be got out gradually — these lawyer regents — that is, if you ever get them out.

Mr. Broughton — Who got them in?

Judge Bryant — The governor puts every one of them in, and the men you send to the senate of Wisconsin confirm every one of them.

H. A. Lewis, Madison — They do not have to confirm the university regents.

Mr. Bryant — That is so; the law in that respect has been amended; they used to be confirmed. But the governor appoints them, and he is limited to so many to each district and so many to each year. They hold three years; some years he appoints three and some years four, so you see you cannot turn this thing all over in a minute. You have got to creep before you run. You have got two regents that are farmers, good farmers, good regents; if you can go on and get more it is all right. I will not object.

Mr. Broughton — But if we lose the two we have got we must stand it.

Judge Bryant — We must not lose them.

Mr. Robbins — In regard to the regents, I see there is one for life. That of course cannot be changed. Suppose they had put that $1,800 that they paid for a person to take care of that observatory to agriculture. Besides paying that professor $2,500, they gave him $1,800 for what purpose? To take charge of an observatory. Is it a Wisconsin observatory? Is it a university observatory? No; it is a Washburn observatory.

Mr. Lewis — A university observatory.

Mr. Robbins — The report says the Washburn observatory.

Mr. Lewis — It belongs to the university.

Mr. Robbins — I take the words of the report.

Mr. Lewis — That is the name of it. That is all. The name is a monument of the generosity of Governor Washburn.

Mr. Robbins — It is a monument, I admit, and we are taxed to build a monument. That is what I object to. If we are going to build any monument let it be an agricultural monument in the shape of an endowment. All the endowments they have in such a magnificent university are five thousand dollars and five hundred and twenty-four dollars. Now, I want some man to make an endowment to establish a monument of agriculture and chemistry, or anything of that kind, and I will bow to his name; and not merely establish something that requires a tax to keep it up.

Judge Bryant — I beg leave to correct the gentleman a little. Of course Wisconsin is not full of rich men yet, but there are certain liberal men who have begun to establish funds,— for instance,

there is our fellow-citizen, John A. Johnson, who has given $5,000 for a Johnson fund, and ex-Governor Lewis has given $524.

Mr. Robbins — I know about them.

Judge Bryant — Perhaps some day the university will have a Robbins fund.

Prof. Henry — It is a strange fact that we have a farmer regent or two on the board, but it is not a strange fact to put by the side of that, that we have one farmer boy studying agriculture. Now compare the two. If we want more rights the way to have rights is to get them, and the only way we can act consistently in this matter is for each man, as he goes home, to see if it is not possible to send his own son or to help some poor neighbor's son to come here to study agriculture. I will guaranty that by the time there are twenty-five boys in the university, in the agricultural class, this legislature, or the board of regents, or whoever may have the authority, will see that we have ample funds to educate those boys and give them the very best training that the State University can provide.

I do not think we had better talk about more regents and more rights until we get some boys there. Why, I was appointed professor without a student in the university. Apparently there was nobody calling for an education, and I come to you now begging for students. Let all your energy boil over in the direction of helping me get some students. If you will turn your energies in that direction, I will guaranty as soon as the boys come you will get your rights.

Now I will say here, to any person who will give me his name, I will send the catalogue with the parts that relate to agriculture marked so that any young man may see what it is necessary to study in order to pass. We have lowered the standard so as to let boys in who are not able to reach the ordinary standard. We have made a concession. The president came to me and said, "We had better do it; we had better lower the course so as to let in students off the farm." And I agreed with him at once, and we allow your boys to come off the farm at a lower grade than they can come into any other grade in the university.

There are boys who can board here for a year for one hundred and forty dollars.

Mr. Taylor — I know a man who has two boys boarding here at ten cents a meal.

Prof. Henry — I am very anxious about this. I have felt that I ought to say something on the subject before you scattered to your homes. If some of you farmers want to imitate Governor Washburn, do the same as he did. Why cannot some of you say, "I will offer this as a premium to the young man who will pass the best examination in his studies for the first year. I will give a premium of five or ten or twenty dollars." Why cannot some of you imitate him or Mr. Johnson?

Mr. Robbins — Why did not Governor Washburn do that?

Professor Henry — I cannot tell you. Governor Washburn is not a farmer. Let some farmer be interested in the farmer's side of the question. It seems to me if we will turn our energies in the right direction we can accomplish a great deal of good, and get at the bottom of the matter. We cannot expect the regents to respect the farmers of the state even, if the farmers will not send their boys to be educated.

If the farmers are bound to turn all their boys into lawyers, as they are doing to-day,— fifty young men off from the farm are studying for the law at the State University,— if they are bound to keep up that course, let them do it.

They are providing education for farmers' sons; all we want to do is to turn our attention to the matter, and see if after all the trouble does not lie with us.

C. E. Warner, Windsor — I have occupied but little time in the convention purposely.

I have heard various papers read containing more or less wisdom from farmer lawyers and lawyer farmers, and political farmers and farmer politicians, but I would like to hear a few remarks from practical farmers, and I desire to bring to the attention of the convention one experiment which has been tried in our county during the last two years. We have a large amount of prairie land which has depreciated in value. It has been used for the production of small grains until they cannot be produced with profit. It has been mortgaged and much of it is being sold under mortgages. The question with us heretofore has been, how

shall we reclaim our worn out lands? I think a practical answer has been made to that in the experiment that I refer to, and I desire to make a statement to the convention.

Mr. Campbell, who has been a railroad man and a merchant, and I do not know what else, has finally in his old age got back to his old love and is farming among us. Two years ago he bought a farm of this character of land, worn out land. He last year planted it to corn, had one hundred and fifty acres. He bought fifteen hundred sheep and fed this corn, and at the end of the year his balance sheet shows he has realized over twenty-five per cent. of his entire investment, as I understand it, and with three years of that kind of work he can not only pay for this farm, but have it in his possession in much better condition than it was when he took it. That is the kind of farming I like to get up by the side of and know about; and I apprehend that there are many farmers here who know that if our boys understand that they can make some money on the farm and improve the quality of the land and hand it to posterity in better condition than it is now, they will stay there fast enough. I would like to hear from Mr. Campbell in relation to this experiment.

James Campbell, Madison — I did not come here expecting to be called upon to relate my experience by any means. My experience has been very varied. I have followed a good many occupations, though I was brought up as a boy as a farmer. I learned a mechanical trade and worked at that; I farmed some; I have been a lumberman; I have been a merchant, too; have been a produce dealer, and I have been a railroad director and a railroad president; and I have been a farmer more or less the most of the time.

Two years ago I attended these meetings here and I found a great many of my friends as I have seen them now, complaining of the hard times of farmers; the trouble with them was that they could make no money farming. Finally one man came to me and said, I want to sell you my farm, and sell it cheap. I talked with him a little about it. My friends here told me I had fooled away my money. They said, "you could get ten per cent. for your money, and you will never see it again." Well,

says I, I do not think I know enough to loan money, but I believe I do know enough to do some farming. So I bought the farm and paid or agreed to pay for it. It had then a mortgage on it and has got it yet, a ten per cent. mortgage too. I assumed the mortgage and agreed to pay $6,000 for the farm, three hundred and twenty acres. I found a man down in Green county that had bought a farm some time before, and he had managed it in such a way that he could not pay for it, and he had given it up. He had some teams and a pretty good set of tools to work a farm with. I made a bargain with him to go onto my farm and go to work, and whatever was made off of it he should have half. I told him that I would furnish the money to buy what stock was needed, and he should pay interest on that until the stock was sold, and then I would have my pay. He went on there, and he and I talked the matter over and concluded the best thing would be to raise what corn we could and feed sheep. There was about two hundred and thirty acres of plowed land on the place. I said to him, "Put in two hundred acres of that to corn if you think you can attend to it." Said he, "If I cannot attend to it you must. Let me have a little more money and I will hire somebody to help." He did so; put in two hundred acres to corn and sowed the rest to oats; and he hired two men, one with a team and another to drive his team,— he had two teams of his own — and he took one himself, and he worked that corn. He called on me for sixty dollars to pay for the extra help he had in putting in the corn, but from the time the corn was planted until it was ready to husk he had no extra help, except that he kept the man; the team he discharged. He had three men on the place, and when he came to harvest he wanted about seventy-five dollars more to pay for his harvesting besides what he did with his regular men, and he got it. I bought fifteen hundred and forty odd sheep, and brought them home and turned them in that cornfield, and they husked and he husked, and when they got through we turned them into the yard. They ran in the corn and did their own husking until the rest of it was husked, and we fed those sheep on corn until April; then I took them through to New York and sold them. I have cast up the

expenses on the whole, and I find that it cost something over eight thousand dollars to buy the sheep and carry on the work. I had about eight thousand dollars charged to it, but I sold the sheep and brought home very nearly eleven thousand dollars, and there was some eight hundred dollars left on the place; some sheep that I did not take that had lambs, and then there was corn and hay and so on, oats and feed for next year, amounting to about eight hundred dollars.

Mr. Robbins — Where did you sell your sheep?

Mr. Campbell — In New York. This price that I got for them was net price after taking out expenses from home. The sheep sold in New York for $7.80 a hundred; they netted me $7.37 apiece. I have figured that up, figured the cost of the work. My bargain with him was that he should have half. We divided something over $4,000 between us after paying all the expenses and paying interest on the money that was advanced to him, too. That farm paid about $3,290 for the year 1879.

Last year we increased it, got more land, and planted three hundred acres of corn. He tended that with five teams and five men besides himself. He did not work in the fields last year, but attended to the chores and things of that kind that needed to be done. He kept the men in the cornfield until it was past working. They and the five teams did the work. We raised a very good crop of corn. I have now over three thousand sheep feeding. He told me the other day he thought the corn we raised would last until about the middle of March to feed them. I confidently expect as good a result this year as we had last.

Mr. Field — I desire to ask you if the sheep are all wethers?

Mr. Campbell — They are not. Last year I attempted to buy all wethers, but I did not; I found some had lambs when spring came, and this year I bought about half of them all wethers, and the rest I bought flocks right through.

Mr. Field — What do you estimate that the fertilizers are worth left upon the ground where your sheep run?

Mr. Campbell — There have been no fertilizers put on to the ground for the crop so far, except what the sheep dropped while they ran in the corn. Last fall we drew out a large amount of manure that we will have the use of next year.

Mr. Field — How many weeks did your sheep run in the cornfield?

Mr. Campbell — They ran in the cornfield from the middle of September until about Christmas; about the middle of September we began to gather them in; we did not get them all in until some time in October.

Mr. Field — The land must have been increased in value very materially by their running there?

Mr. Campbell — I found the crop was very much better this year than it was last, where they had run. I think the land is growing better all the while.

Now I have a few words to say: I heard an article read to-day — a blow upon railroads, and a good deal of complaint appeared to be going out of their watering stock. For my part I think they are not the only ones that water stock. Nor do I think it wrong in any shape. The fact is, the stock for a corporate company is only the representative of what money is in there, and I do not know that it makes any difference if a dozen of us go into partnership, whether we represent $100 that we put in by one dollar, or by $1,000. We each hold just so much in the stock, and if railroads have got to be brought down to the iron law that they shall receive only a certain amount of percentage on the money they have actually expended, I know no reason why farmers should not be treated the same way. I believe in seeing the world fairly divided, and letting each one take his chance at it. Now my farm, before I bought it, the stock had been watered sixteen times. That is to say, it was bought at a dollar and a quarter an acre in the first place from the United States, and it was sold to me at $20. Therefore I say it is sixteen times watered; and I went to farming it for the first year. I don't know what it will do hereafter; it may do better and may do worse, but the first year it paid fifty per cent. on that watered stock. I doubt whether there is a railroad in the state or in the United States that has paid that, and I know no reason why railroads should be called upon or even bankers or money-lenders should be, to limit their incomes to a certain amount, any more than any other men. I am for myself, opposed to any restriction

on the interest law, although the laws of trade have brought the interest a good deal lower than the law of the state now.

President Fratt — The law of supply and demand.

Mr. Campbell — Yes, the law of supply and demand. I cannot see that the railroads are any more to blame about it, though I am not a railroad man now. I am not in it. I have no money in it and never expect to have, but I have this to say, that if farmers will take hold of their own business and attend to it as closely as the railroads do, and give up the idea of grumbling about every man that has a little more money than they have or we have, I think it will be very much better for them and better for the world at large. (Applause.)

A Member — Did the sheep live upon the corn and stalks? Was that their whole feed, or did you provide them some hay?

Mr. Campbell — I fed them hay all the while.

A Member — Where did you get your hay?

Mr. Campbell — I bought it from a neighbor.

Clinton Babbitt, Beloit — I would like to ask you whether you own the teams and the tools of the farm, or whether the party that runs it does?

Mr. Campbell — The farmer owns the teams and the tools. He furnished the teams, the tools and the work.

Mr. Babbitt — Probably worth a $1,000.

Mr. Campbell — Yes, if the teams had been $200 perhaps, but they were not worth it.

Mr. Babbitt — He owned the wagons and harness. How much are they worth?

Mr. Campbell — I could hardly say what they cost. The teams he had had for some time. The whole of them I think would not have sold for more than $500 or $600.

Mr. Babbitt — He employed three men, including himself.

Mr. Campbell — Three men that he kept the most of the time.

Mr. Babbitt — Their time would be worth how much?

Mr. Campbell — Sixteen dollars a month, I think, is what he paid.

Mr. Babbitt — The board of those men, whom did that come out of?

Mr. Campbell — When I estimated, I estimated two dollars a week. He paid that. I had nothing to pay about it. The wear and tear of teams and tools I estimated at ten per cent., and the interest, I think, at eight per cent.

Mr. Babbitt — And the amount of money made was about $3,000 on the farm?

Mr. Campbell — Yes; after paying all the wages. The amount we divided was over four thousand, but that did not include any of the wages, or the use of his teams, or anything that he furnished. All that had to come out of his half.

Mr. Babbitt — Then there would be to him an expense of $2,500?

Mr. Campbell — No; not far from a thousand.

Mr. Babbitt — I find five teams, valued at $1,000.

Mr. Campbell — The five teams was this year; three teams was the amount last year. I only know what his expenses were by the amounts that I have loaned him. I have furnished him all the money he wanted all the way through. He drew last year less than $1,000.

Mr. Babbitt — Gentlemen, just think this thing over. I don't blame any railroad man — and I am really in the interest of railroads. I am trying to figure for railroads. If they will only help us, we will help them.

Mr. Campbell — I think they are helping us very much. I have no doubt but that there are some abuses that if they could be corrected it would be a good thing, but I do not believe the course we are now taking is correcting abuses at all.

Mr. Babbitt — I want to say that, in that paper that I read, I had no desire whatever to find fault with the railroads. I do say that the railroads have done more for us here, as far as farming is concerned, than the state of Wisconsin.

Mr. Campbell — I was very much pleased with that paper. It is something I have heard very much said upon, and have read something upon, and it reminds me of a talk I once had, some twenty years ago, with William B. Ogden, when we were speaking about these things. I was speaking to him about watering the stock of the old Galena road. Said he, "I knew very well

that when we got that road through, as cheap as it was built, that the legislature would be after us immediately if it was reported that that stock was paying so much on the dollar." Said he, "For that reason we divided around among the stockholders; to each one that had a hundred dollars we gave a hundred and fifty more for his stock; that is, we increased the stock so much." And said he, "So far, the railroad companies have never been under the necessity of going into politics; they have kept out of it; but the day is coming when for their own defense they have got to go into politics and become the most aetive politicians we have." I found, before he died, he was one of the most active politicians.

Mr. Babbitt — We as farmers of the state are inclined to think that as the railroads make fifty per cent. that they should not cripple us, but allow us to do the same thing. We do not find any fault with railroads when they do a legitimate business. I am not an anti-railroad man by any means. That paper, in my opinion, is not an anti-railroad paper, but it is a paper which is calculated, in my opinion, to set the railroad men thinking.

Mr. Campbell — I hope it may.

Mr. Babbitt — And also the farmers of this country.

Mr. L. Shively, Evansville — Mr. Campbell is an old acquaintance of mine. He and I took horses down to help fight the rebels in the beginning of the war. We have been quite interested in each other's welfare ever since. I fed two hundred sheep last year. I am a small farmer and do but little business, and I had ten acres of smut-nosed Yankee corn that I fed them. They cost me a trifle over three dollars a head — and I fed them some shelled corn at noon. I bought two hundred bushels of shelled corn for that purpose. I had also one hundred and fifty stock sheep. I fed them a trifle of that, and I calculated, to say nothing about my trouble nor expense at home feeding, that I cleared $652.75 on the two hundred sheep.

Talking about railroads, I have a little complaint against them, still I think they will do what is right about it. We feed sheep and pasture sheep and sheep is our principal crop, and the railroads have built a fence right along the railroad that runs through

my farm; a four barbed wire fence. The top wire is four and a half feet above the ground; the under wire is sixteen inches, and with that fence I cannot pasture.

Now we have got a bill here in the house to provide means to have the railroad make a fence that is sheep tight, and I hope our neighbor farmers will assist us a little in getting that bill through so that we can keep sheep. I know that it is a benefit, and I know that it is what makes good land and good corn.

Mr. Robbins — When did you buy those sheep?

Mr. Shively — I bought them a year ago last fall.

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A paper was read by Geo. P. Peffer of Pewaukee, subject, "Rust in 1880; its effect upon fruit and grain," followed by a

DISCUSSION.

Prof. Arthur, Madison — I have discovered since reading my paper that there seems to be some misapprehension among you as to just the nature of the fungus. Now, the fungus plant is just as much a real, genuine plant as any other. There is just as much individuality about it as about a tree or a potato plant, or any other plant or any animal, for that matter. It is just as much an individual, that is, it is autonomous, as we say.

Now, the plant kingdom has various methods of getting its food. All animals, you know, take organized food of some sort; that is, they take organic matter. Plants, on the contrary, live partly upon organic matter and partly upon inorganic matter. Most green plants live upon inorganic matter. They get their food from the soil; but other plants which are not green live upon organized matter. The most of them live upon vegetable matter, but some of them live upon animal matter. Now, some fungi, when they live upon vegetable food, disorganize vegetable matter just as fast as it is taken into the fungus and used up, and consequently there is nothing that corresponds to rotting. When a fungus, living upon a living plant or upon a dead one, takes its food up as fast as it disorganizes the plant on which it is living, it does not rot as we say; but if it is not taken up into the fungus

plant as fast as it is disorganized, we have one of two kinds of rot; either dry rot or the ordinary putrefaction, which is generally accompanied with a very disagreeable odor. When it is dry rot, the fungus is always accompanied by some other fungus that lives upon the extra matter that is disorganized; but in the ordinary putrefaction the fungus is accompanied by bacteria, and possibly other fungi. There may be several of them, you see, with the fungus, living upon a living plant or a dead one, it makes no difference; it disorganizes that plant for its own food and absorbs it. If it disorganizes an extra quantity we have rotting; the plant rots. This may be dry rot or it may be the ordinary wet rot. In both cases there is an accompaniment of some other kinds of fungi of various sorts. There are a good many kinds.

In a wheat plant when we have rust we have a kind of fungus growing that only disorganizes as fast as it uses the material, and the plant lives on and grows and flourishes, unless there is so much of the fungus growing in the plant that it absorbs the nourishment of the plant to such an extent that it cannot supply enough for its own use, and then it dies a natural death from exhaustion. It does not rot away, but dies, because it has not food enough to supply its own life; and so it is with a great many other kinds.

The growth of bacteria is very different. There the disorganization is very rapid indeed, and the bacteria themselves do not begin to use up the amount of matter that is disorganized.

J. C. Plumb, Milton — I do not wish to discuss this question, because it is too wide a question — too intricate for this meeting; but I do wish to express my thanks and gratification for the paper which Mr. Arthur presented to us the other morning. Subsequent conversation with him has led me to think that he has a familiarity with this whole subject, which if it could be properly understood or explained or set forth to the farmers, would be of very great value to this state. I wish that we might provide that the illustrations which he gave us here might be inserted in the forthcoming volume of this society. He gave us simply the first principles, the A B C's of this question, but it is the A B C's we want.

The trouble is in the discussion of this whole question, we have jumped the A B C's and therefore we are all at sea. We neither understand one another nor do we understand a truly practical paper when it is presented to us, for the want of this intelligent understanding of the A B C's of this question. I therefore hope if any action is needed that this matter may be provided for, not only to have his paper as he has presented it to us, but also to have his illustrations.

Hon. M. Anderson, Cross Plains — I would like to ask Mr. Peffer what time he sowed the salt?

Mr. Peffer — Sow the salt before you cultivate.

Senator Anderson — I frequently do not cultivate; I just plant in the spring and follow the plow around with a roller, and then drill in the grain.

Mr. Peffer — It wants to be spread as evenly as possible, and it does not make any difference how it is supplied if it is only well spread.

Senator Anderson — Have you ever tried spreading it with a broadcast sower?

Mr. Peffer — No; I have always gone along with a wagon and sowed it out of a barrel. I have only tried it for the last two years on grain.

James M. Smith, Green Bay — Have you tried it on any other crops except grain?

Mr. Peffer — No.

Senator Anderson — How much per acre did you say?

Mr. Peffer — Two bushels.

A. A. Arnold, Galesville — I have inquired in the southern part of the state, and it seems the general sentiment is that salt has done good where it is used. We have shipped several car loads to our county. All wanted salt and all got salt, and we did not receive any benefit whatever.

Now I would like to have some man that knows something about this thing explain why it does good in some places and why it does not in others. We could not see where we sowed it, and you cannot see this year where we sowed salt last year.

D. T. Pilgrim, West Granville — On the question of salt, I

would say that on our clay soils in Milwaukee county, we can see a more speedy benefit from sowing salt than from sowing plaster. It will change the color. The time of sowing that I have practiced in the last three years has been after the grain was from four to six inches high. If there are any spots in the field that look a little yellow, in three days after sowing salt they will be a dark color all over. The benefit we derive from it in one sense is the stiffening of the straw. It will prevent the lodging. We have great trouble in highly cultivated lands on account of our grain falling down; hard work to get it up; but if we sow salt we do not have nearly as much trouble about harvesting grain. We have proved there that sowing salt and not sowing will make one-third difference in the bushels when we thresh, and make No. 1 in the place of No. 3.

H. A. Lewis, Madison — I would like to inquire what you would do with winter grain; whether it would be of any use to use it now for this coming spring on fields of winter grain?

Mr. Pilgrim — Sow salt in the spring after the winter grain starts, and it will have the same effect it would on spring grain.

Mr. Smith — Have you tried it on other crops?

Mr. Pilgrim — Not extensively, but I will say we had better keep it off our green vegetables in the garden. They will not bear salt.

Mr. Smith — Have you ever tried it on potatoes?

Mr. Pilgrim — No.

W. W. Brown, Merton — Perhaps a great many of you know Mr. Johnson, a breeder of Ayrshire cattle. He has brought the salt into our part of the country. He was an advocate of it. Where he came from in England was a salt country, and they used salt there, he says, at the rate of a ton to the acre. He knew the effect of it there and the very great benefits derived from it, so he brought it to us a number of years ago, and he has been experimenting on his own garden with the salt, besides using it on his farm. He has used more every year in the last five years on his farm, probably, than has been used on the whole of some counties. He has experimented this year. He had a plat in his garden, I don't believe it is as large as this room, and he sowed a bushel of salt on it — refuse salt. He planted it with the various kinds of

vegetables that are usually grown in the garden, and he says he had plenty of vegetables there for his family, and he never had a worm on it. That shows, according to his experiment on his ground, that the salt does not kill the vegetables.

Another thing about the benefits of salt. Three years ago we got some salt through his representation, and sowed on a field of wheat; and after sowing that, we had a little left, and there were some gravel knolls on our farm, where sometimes the chinch bugs troubled us, and we took the salt and sowed what we had left on those knolls. Everyone who knows anything about gravel knolls knows, when you come to harvest, the bundles are very light that are grown on those knolls. When we came to harvest those knolls the straw was standing as straight as a die, the grain was No. 1, and there was not a chinch bug found there. That I know, because I helped to harvest it all. And this season I sowed salt. I did not have time to sow it on the whole of my ground, or I would have done it. I sowed on a piece of wheat, and at harvest time I did not have the same help that I had when I was sowing the salt in the spring, and I said to the boys who were harvesting, "Do you see any difference in that grain?" When they came around to that particular spot in the field where the salt sowing was stopped, they said, "Why, look here! There is a great difference here." On one side I had good heavy grain, that averaged me over twenty bushels to the acre; on the other side, No. 3 wheat, probably at a rate of eight or ten bushels to the acre. That was my experience, this year, in salt. I would recommend every one to try it, just to see whether it does any good on his own soil. I do not claim it will do good on all soils, but on our soil it does. Waukesha county needs salt, and we can raise larger crops and have better returns for our labor and capital if we use salt, and use it extensively.

G. J. Kellogg, Janesville — I do not know but this agricultural society will get to be as bad as the horticultural after a little. We can prove anything on either side of any question. I do not know that our friend Arnold takes the *Western Rural*. Perhaps he got poor salt.

I. N. Stone, Fort Atkinson — I have used salt on strawberries

at the rate of two or three bushels to the acre, and it would not either kill the worms or the plants.

Mr. Smith — Did it do them any good?

Mr. Stone — I could not say that it did. I used the salt for the purpose of killing the grub worm, but I do not suppose we can reach that with salt by putting it on the surface. We read in our agricultural papers that salt will kill the grub worm when sown on the strawberry ground or plowed in, but I have tried it both ways and never have succeeded.

Mr. Pilgrim — You can sow salt on wheat and it does good there, but sow on green vegetables and it will kill them. It will act the same as Paris green on potato vines; dry them up.

Mr. Arnold — I would like to hear Prof. Henry try to account for the fact that that will not do any good on the Mississippi river.

Mr. Plumb — Will Mr. Arnold describe the land?

Mr. Arnold — The land in Trempealeau county is diversified. This salt was used on all kinds of land.

Prof. Henry — Laws & Gilbert have experimented very carefully, and they have found that in some cases salt was beneficial on their land; in several instances it showed nothing either way. In one instance it showed that it was slightly harmful to the crop. Remember, when we say Laws & Gilbert, we have something classical. We have experiments that are satisfactory upon their land; they are not like ordinary experiments. Why it should be beneficial upon one piece of ground and not upon another is very difficult to explain, but possibly we can get a hint of it in this: In the first place, remember that salt of itself is in very few cases a plant food. Now, when you put phosphate upon the ground, the plant takes the phosphate and uses it. When you put nitrogen upon the ground, the plant takes that and uses it. So when you talk of nitrogen and phosphate, you have a real food for the plant. When you give the plant salt the chance is that there is plenty of chlorine and sodium in the ground for the plant. Some plants may grow without needing either one, although it is found that chlorine is necessary in some particular cases, but if the salt works its way into the ground, being made up of chlorine and so-

dium in equal parts, it may be possible that the chlorine and the sodium break apart. You remember that they come together with a great deal of force, and they hold each other just as tight as they can; but it may be that the chlorine, finding an affinity for some other substance in the ground, leaves the sodium and unites with some other mineral matters. Possibly it unites with certain mineral matter and liberates something that that matter was united with which the plant then uses. The idea is that salt of itself is probably not a plant food; that is, if the plant needs it there is plenty there already, but the chances are that the chloride of sodium breaks apart, and those unite with other elements and set free something else that the plant needs.

Mr. Pilgrim — I would like to introduce to this meeting Mr. Putnam, ex-secretary of the Waukesha Reform School, to say a word on the salt question.

Mr. Putnam — I do not really consider myself a farmer, although I was brought up on the farm and remained on the farm until I was sixteen or seventeen years of age. In the year 1877 I had charge of the Industrial School at Waukesha. The farm connected with that institution contains about two hundred and thirty acres. For several years they had not attempted to grow any wheat, for the reason that they regarded it as utterly a failure. Not desiring to sow oats I concluded to sow wheat. The previous season the ground had been planted with potatoes. The potatoes had been dug in the fall, but the ground was not plowed, nor was it plowed in the spring. As early as possible I put a cultivator on it and gave it a good thorough cultivating, sowed down my wheat and marked on the fence a little strip of ground that I left without sowing any salt. The balance of the ground was covered by sowing salt broadcast after the wheat was three or four inches high. The wheat produced twenty-three and one-fourth bushels to the acre of very fine wheat; but you could see the difference forty rods off where the salt was not sown. It was a strip about a rod wide running across the field, a little over four acres. There were more chinch bugs on that little strip than on all the rest of the field put together. Now I attribute that success to the cooling influence of the salt upon the root. I discov-

cred this fact, that where the salt was sown a bushel and a half to the acre, that it did not ripen as readily as where the salt was not sown. The leaves were quite green, and the stalk showed a considerable juice and sap after the other stalks had become considerably dry and begun to crinkle under the effects of the chinch bug, but where salt was sown there was no indication of the chinch bug, and where they appeared a very little they did not seem to do any harm to the wheat. I did not take measurements, but I I do not think that I had over one-half as much wheat on the little strip where the salt was not sown. That was in Waukesha county, dark prairie soil, with clay subsoil. Then we have a sort of gravel hard pan. And from that experiment, that I cannot be mistaken in, I have no doubt but that the farmers of Waukesha county will increase their spring wheat crop at least one-third every season by the use of salt.

Mr. Peffer — Salt contains potash, lime and oxide of iron, so it is stated. Now Waukesha county, you are all aware, is on the line with limestone. It is limestone pebbles. Now I was going to ask the Professor if this oxide of iron, that is in the salt, will not dissolve, as he was stating, the two parts that are in the lime. I know you can see it twenty rods off where the salt is sowed. The straw stands straight and is taller than where it is not sowed. I am sure it has an effect on the straw, and from what he was explaining I am convinced that it must have an effect on the lime that is in the soil, that gives it that tendency of growth.

Mr. Pilgrim — I would like to say that, as friend Peffer says, it is easy to see its effect at twenty or forty rods distance. I for one have practiced the use of salt for three years, and I fail yet to have seen a piece of straw of either wheat, oats or barley that was affected with rust where salt was used. Now if it affects nothing but the straw alone, we have the benefit of more than the cost of the salt in the straw.

H. A. Lewis — What is this salt? Did you use ordinary barrel salt or did you get a cheaper article.

Mr. Pilgrim — I have never used anything but the ordinary barrel salt. That is what I buy. It is convenient to load up, and I do not go to the packing houses. They charge you so

much and it is quite an accommodation, they think, to let you have it.

Mr. Peffer — Our folks buy it by the car load at four and a half and five dollars delivered at the city.

Prof. Henry — In regard to the use of refuse salt or the cheap salts that are sent out, the chances are altogether in their favor, as being better than the pure salt. Table salt would contain, if pure, only chloride of sodium. It is usually from ninety-seven to ninety-nine per cent. of pure chloride of sodium, and the remaining part is a little lime and a trace of potash and so on, while very often impure salts, such as they throw away in the factories, contain a considerable per cent. of lime and potassium. It is a great deal to your advantage to buy refuse salt. Then you are getting your potash very cheap.

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The committee on Resolutions here presented the following resolutions:

*Resolved*, That it is the sense of this convention that the time of holding town elections be changed from April to the same time in March, and that the legislature be requested to change the law accordingly.

*Resolved*, That it is the sense of this convention that the present tax of four per cent. on gross receipts of railroads is not a fair proportion of the taxes to be paid on property of our state; therefore we recommend a careful consideration of the same by our legislators, and the passage of a law increasing the rate or a further restriction of the rates of tariff for freights and passengers.

*Resolved*, That our secretary is hereby instructed to deliver a copy of these resolutions to the president of the senate and speaker of the assembly, with the request that it be read by the clerks and spread on the journals.

Believing the cane growing interest of our state to be of vital importance, and believing it to be a duty of our state to foster its growing interests, therefore

*Resolved*, That this convention asks that a suitable appropriation be made for the procurement of proper buildings, fixtures

and experts under the direction of regents of State University, to be used by them in the manufacture of sugar, and in the distribution of the results of such experiments among the people.

President Fratt — We will now take up the resolutions as reported by the committee.

The resolution recommending a change of the time of holding town elections was then read and adopted by the convention.

The resolution concerning taxation of railroads was then read and submitted to the convention.

A. A. Arnold, Galesville — In regard to that resolution, I do not know that I will give you any information, but I will ask your indulgence a few minutes, while I give you some figures which you could all get as I did, by consulting the reports. The total amount of railroad property in this state, according to the Railroad Commissioner's report, is $121,250,258.04, and the total amount paid by them for taxes, as stated in that report, is $785,216.30; but the Secretary of State's report shows that they have actually paid a tax of $418,000. They pay this by paying four per cent. on their gross receipts, which is considered the best way of paying their taxes, and I have no doubt that is the best form in which they can pay their taxes. Their receipts for the past year were $31,779,355.65, and their operating expenses $15,252,766.88, showing that they make, you may say, forty per cent. Now the total value of the property of this state, as shown by the town assessors, is some $406,000,000. Estimated by some, the actual valuation is $450,000,000. That is perhaps nearer the correct amount. We must recollect that this is a low valuation, whereas this railroad property is at a high valuation; it is according to their estimates; but they are making, on their valuation, forty per cent. The farmers and business men of the state are making perhaps from one to ten per cent.

Now, the average amount of tax paid by the individuals of this state is seventeen mills and a trifle over. This includes all kinds of taxes; state, county, school and everything. I believe the road tax in some cases is left out. Now, this amounts to $7,577,767.27 that the people of this state pay. Now, if the railroads paid, on their estimate of the value of the roads, the

same tax that the people pay, that is, seventeen mills on the dollar, they would pay into the state treasury $3,251,254.38, whereas they actually pay $418,000. We pay seventeen mills on the dollar; they pay three and twenty-five one-hundredths mills. That is the way I have figured it from the report. Now, the question is, are they paying their right proportion of the taxes. I do not want the railroads to pay a cent more in proportion to the value of their property than anyone else. I would be willing to give them the same advantage I would give a mill owner. A mill owner should not be assessed as high as a farmer, because his property is not of such permanent value; liable to flood and fire; and so I would give the railroads an advantage to a certain extent, but the discrepancy is too great. According to this estimate, the people of the state are paying in taxes five times as much as the railroads are. The resolution is that the legislature should increase the percentage they pay on their gross income, or if we do not do that, it ought to investigate the matter and see whether or not we should not restrict them in their rates for carrying passengers and freight. One of the two things should be done; it makes no difference to the people which.

The resolution was unanimously adopted by the convention.

The resolution on encouragement of cane growing was read and submitted to the convention.

J. C. Plumb, Milton — I would like to inquire whether this appropriation is to be used under the direction of the board of regents. There may be reasons why it should not be used in that direction.

Prof. Henry — I believe if this money is placed in the hands of the board of regents it is the safest way. My confidence in the board of regents is perfect. I believe they are just as willing to keep our agricultural department as any men in the state of Wisconsin. We have two farmers on the board and they form the farm committee, and the money could be put in such a shape that the farm committee could control it. It would then be under my control as much as it ought to be.

Mr. Arnold — I move to amend by substituting "the board of regents" for "Prof. Henry."

The amendment was carried and the resolution as amended was adopted by the convention.

G. J. Kellogg, Janesville — There has been a lack of time for the discussion of some topics that I should like to have heard discussed. This forenoon we placed on the table some eight or ten varieties of apples, and would have liked to have discussed their merits if there had been time. There was the Wealthy, Pewaukee, Fameuse, Ben Davis, Seek-no-Further, Willow Twig and Gloria Mundi. We would have liked especially to have presented the merits of the Western Seek-no-Furthers. They were grown here in Madison. There are two of them, one very prominent in Minnesota, and one in our own state whose merits we would have liked to present in connection with Mr. Philips' paper, which I believe is the best horticultural paper we have had during the convention.

J. C. Plumb — This life is too short to finish everything in one convention. I think most of the members present are pretty well surfeited and willing to keep quiet and sit still. I simply want to remark that I hope we all have received some important thought that we will carry home and digest at our leisure. I hope we will not let ourselves drop into the old rut of chore-doing and the sleepy condition the majority of farmers pass their days in, and especially their winter days, reading the political paper and chopping a little wood and going through the chores, and so day after day would pass without any substantial progress. This may seem a little hard; but it is mild language as applied to the majority of us who till the farm. I want to recommend to you farmers to get a good agricultural paper in your homes, not a monthly but a weekly, or, if you must have a monthly have four of them, and as you read and thoughts arise, take a pencil and jot them down. If you do so, as you read agricultural and other papers you will find your thoughts extending, and your desire for information increasing, and you will want to go to the libraries and procure good books, and your children will be interested, and you will find a taste for a higher grade of literature springing up in your families; and when you come to these meetings you will find

you have made progress, and are able to ask and answer questions that were dark to you before. I believe the farmers' lives will be very much improved by a little thought. Farmers come here and are encouraged to give more care to their live stock. That is all right, but the care that our families, our households and our neighbors require in the way of culture and thought is beyond all comparison, beyond the value of stock growing. I simply ask farmers to adopt some new modes of action, and of recording your thoughts and putting down your questions, so that when you come here to the next annual meeting you may feel that you have come with a new interest.

Mr. Babbitt — I believe that the whole crowd who attend these conventions take, on an average, five agricultural papers. I do not think we need that part of the advice.

Mr. Plumb — Then see that your neighbors have them. To-day I met, casually, the editor of the only purely agricultural paper published in the state of Wisconsin. I refer to the editor of the *Wisconsin Farmer*, published at Fond du Lac; a very modest little paper, but one that has the making of something in it if it has the proper amount of aid. I asked Mr. Lockin why he did not come up here and tell his story to the farmers and ask them for help. He was too modest for that. Not a single agricultural editor has lifted his voice here in his own behalf. I hope you will not forget that we have in the state a paper entirely devoted to the interests of farmers. It is not in the interest of any corporation whatever. It is to be removed to Milwaukee in order to have a wider field. The editor says that so long as he can receive a cordial support from the farmers of the state it shall remain a purely agricultural paper, and if he cannot get it he shall have to succumb and become the property of some corporation.

Professor Henry — I wish to say that so far as I could I have made the *Wisconsin Farmer* the organ of the agricultural department of the university. I felt that I must have a Wisconsin agricultural paper if I wished to reach the farmers of Wisconsin. The results of the experiments on the university farm, and all sorts of references to my work and the work of those who are

helping in the sorghum experiments, I shall publish in that paper. I did not know anything about the editor of the paper, but I wrote to him and told him I was going to help him. So if you take two papers make one of those the *Wisconsin Farmer*, until we help the editor of that paper to make it what it ought to be. You drove out of the state of Wisconsin one of the best editors that was ever in it, by bringing him to a state of poverty. Now we have another who may go the same way unless we give him a good support.

Judge Bryant — I beg to correct the gentleman a little. I do not think we ever drove any editor out of the state. I think he went off on his own responsibility. If he had thought a little further and a little longer and had not been quite so old fogyish about some things he would have been here now. I say this without any disrespect to him, for if there was ever any gentleman I admired it was he; but he set himself up against the farmers to a considerable extent, and the result of it was he lost his patronage.

Mr. Babbitt — I believe if we take that paper we shall do ourselves good and him too. He is a splendid looking man, and if he is not the right kind of a man I am mistaken. I waited around and hinted around and wanted to have him ask me to take his paper, but he never said a word. I think he is the right material, and so I think is Prof. Henry.

G. H. Durrie, Madison — I have lived here more or less for twenty-five years, and if Mr. Morrow is the gentleman referred to I know he was literally starved out from the lack of support. A better man and an abler man in his department there never was in the state of Wisconsin.

Mr. Plumb — Mr. Morrow was placed in a very peculiar position which few understand. I think he needs no apology. It was his modesty and his personal feelings that prompted him to, retire from the state. Mr. Morrow has done well. We all congratulate him. Let him go, and now if we can get another man that we can tie to, that will do for us the work Mr. Morrow might have done if he had stayed with us, let us hold on to him, whether it be Professor Henry or Mr. Lockin, of the *Farmer*, or both.

On motion of Hon. M. Anderson the convention tendered a

vote of thanks to President Fratt for the courtesy with which he had presided over the convention.

The convention then adjourned.

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## ADDRESS

**Delivered by CHAS. R. BEACH, Esq., of Whitewater, at the Walworth County Fair, at Elkhorn, on Wednesday, September 22, 1880.**

I am here, to-day, at the earnest request of your president. I did not want to come, for I am neither a public speaker nor a model farmer. There are weeds in my garden and in my corn field, and there is nothing about my place quite as it should be.

But the Judge says that it is just so about his place, and that it is always so about the place of any one who attempts to make agricultural speeches. And more than that, nobody cares anything for the address at a county fair, or the speaker either, and that it will save the society twenty-five and perhaps fifty dollars, rather than to get a noted military man or a high-toned politician. With these considerations before me, I have consented to address you.

The wise man has told us that in all labor there is profit, but that the talk of the lip tendeth only to penury. I will not make you poor with many words. Words when arranged in their most attractive form, when spoken with all the grace that eloquence can command, are but the dim and shadowy representations of things tangible and real, or of the ideas and principles those living and material things embody.

To-day I see on every hand things living and real, things tangible and composed of material substance, things of utility and of beauty, not one of them but is here as the representative, the embodiment of some principle, some plan or purpose, more clearly set forth, more forcibly expressed than could be by the lips of any living speaker.

These glossy trotters, these ponderous draft horses, these broad-backed Durhams and Holsteins, these delicate Jerseys, these beautiful Merino sheep, the fiber of whose wool rivals the silk in

softness, these square and compactly built porkers so gracefully rounded that we in our admiration almost forget that they are *hogs*, these threshers and reapers and mowers, these countless appliances which genius has designed to lighten labor, this butter and cheese, these vegetables and grains, these fruits and flowers so artistically arranged, these matchless productions of the needle and the pencil, these, each and all of them, are the speakers here to-day. Not one of them but is the worked out result of the wisdom and knowledge and skill of their exhibitors. Many of us farmers make the coming to these fairs merely a holiday, but if we do not gather some of the wisdom here set forth, if we do not learn some of the lessons here taught, we are but dull and inapt scholars.

The people of Walworth county are justly proud of their fairs, and we point exultingly to them in proof of our improvement and progress in farming; and judging from what we see on every hand about us, we may without arrogance and without the fear of contradiction, claim that we, as a county, rank second to none in the state.

I had therefore thought it not inappropriate to dwell for a few moments upon our progress and improvements in farming as indicated by this exhibition, and then to consider how we shall farther improve and elevate our business.

In looking over this exhibition, the most casual observer cannot fail to be impressed with the great number of mechanical contrivances designed to lessen labor, and at the same time to increase production. But to those of us whose memory goes back to the farm as it was fifty years ago, the improvement in this direction is still more apparent. Then the chief motive power relied upon was human muscle, and the tools by which that power was applied were of the rudest kind. To be sure, horses and oxen were used in plowing and harrowing, but the best plows of that day would hardly compare with the poorest of ours, and the harrows were but a letter A with from nine to twelve teeth. A hoe, sometimes (though not often) a small corn plow, a scythe, a pitchfork, a grain cradle and a hand rake (all of them so clumsy and heavy that no laborers of to-day could be induced to use them), a thresh-

ing flail and fanning mill, comprised the invoice. This outfit had one thing to recommend it — it cost but little.

To-day I see here on exhibition the sulky plow, the wheel harrow, the sulky corn cultivator, the sulky horse rake, the mowing machine, the reaper and the self binder. Upon any one or all of them we may ride and work with as little expense of muscle as he of fifty years ago in taking a pleasure trip in the best vehicle he could afford, yet at the same time doing four-fold more work than he could accomplish with all his muscles strained to their utmost capacity.

I cannot better illustrate this increase of production resulting from the use of improved machinery than by a few statistics:

Within the last twenty years our whole population has increased about sixty per cent., while the farming population has not increased over thirty per cent., yet within that time we have increased our exports of wheat from four millions in 1860 to one hundred and seventy-five millions in 1879, and corn from three and one-half millions to one hundred millions. We pack five times as many hogs, export six times as much butter, and eight times as much cheese.

We as farmers often point exultingly to this increased production in proportion to population as proof of our progress.

But does not the presence of this machinery here to-day go to prove how much we are indebted for the prosperity to the mechanic, the inventor and the man of science, whose labors are purely intellectual?

The self-binder which reaps our fields with automatic precision, and with more than human skill, which seems alive with human intelligence, devoid of human passion, for it never gets mad and threatens to quit unless we raise its wages, from whence does it derive its power but from the principles of science, as taught by the scholar and applied by the inventor and the mechanic? It is thought combined with the iron and the wood that compose it.

To how many days' work of harvest labor is that invention equal? How many men with flails are equal to a single steam thresher? The very commonness of these wonderful proofs of intellectual power and mechanical skill make us forget their value

and our indebtedness. We daily use them without a single thought of their marvelous adaptation to the performance of their work, or a single emotion of gratitude for the benefit we receive in our lessened labor.

We farmers sometimes even claim superiority over the man who puts forth only intellectual effort, and point to our stronger muscle in proof of our greater ability, at least, to perform physical labor. And yet at the same time that very man may be doing our hardest work, and that, too, without as much as soiling the tips of his lady-like fingers.

Many years ago a young man fresh from a New England college went south and was the guest of a cotton planter. While witnessing and conversing upon the separating the seed from the cotton, an operation at that time performed solely by hand, he was asked if he could not invent a machine to facilitate the work. With a mind full of the activity of thought, he sat himself to work and invented the cotton gin, by which the cost of producing this great staple was reduced nearly one-half. Here was a man by the simple efforts of his mind doing as much at cotton raising, when measured by results, as the whole race of negroes engaged in the business, not for a single year, but for all the years in which Whitney's cotton gin shall be used. And do we not believe that the man of science, the inventor and the mechanic are really doing more than half the farm work in Walworth county to-day?

It is not to be supposed that the time will ever come when we can farm successfully without the use of our muscles, and it is not desirable that we ever should. Muscle labor has its use in the world's economy aside from its simple power to lift and to carry. But do we not believe that we, all of us, would succeed better if we would oftener unite to the labor of our hands the labor of our brains; not in attempting to discover new principles in science, or inventing new machinery, but in seeking to reduce to practice what is known. By so doing we may lift our every-day life out of the sphere of mere mechanical drudgery, and thus elevate and ennoble it.

But, aside from these exhibitions of mechanical skill, there are

other departments equally indicative of improvement and progress, to which the farmer is entitled to the sole credit. Within the last thirty years our whole system of farming has greatly changed. Instead of depending chiefly upon grain, we have many of us "gone to grass;" thus diversifying our business, improving our farms, and at the same time improving our finances. We are keeping more stock, and the great number of representative animals of all classes and breeds here to-day show the progress we are making.

To-day the fine wool sheep of Walworth county, Wis., are as well known and as highly prized throughout all the great west and northwest as were those of Addison county, Vt., twenty years ago. As to hogs, the best on exhibition twenty-five years ago could hardly be ranked as belonging to the same species with those shown here to-day. Indeed, it would seem that in this department we had almost reached the limit of perfection.

Horses and cattle are of slower growth and require more time and more capital to improve them, but the great number of thoroughbred animals of superior quality in all the departments, show that we are breeding both horses and cattle for specific purposes, and that we are thoroughly awake to our interests and that we are making progress. We have added to the other branches of our business that of sorghum raising, which if it half fulfill the hopes entertained for it, will add many thousands to the wealth of our country.

Walworth county has never put forth many claims as a fruit-growing section, but the display here to-day would seem to indicate that we are doing better than we have ever dared to hope. And from the number of vinegar barrels I have seen standing around wells, I am inclined to the opinion that if some of us old graybeards don't get mellow on cider before spring we will have to thank the temperance women for their restraining influence.

But in no branch of farming is improvement more apparent than in the rapid growth of our dairy interest. Fifteen years ago the export of butter and cheese from this county was merely nominal; to-day it will exceed rather than fall below a million of dollars annually. Wisconsin butter has taken the prize when all

the world competed. Wisconsin cheese is favorably known and highly prized wherever American products find a market. And Walworth county has done her full share in establishing and maintaining this reputation. And the liberal premiums which this society offers both for butter and cheese, and the fine display of dairy products here to-day, show how vital to the prosperity of the county has become this great interest.

Added to all these indications of progress, we have developed the trotting horse. Mr. President, perhaps I ought to beg pardon of this audience for questioning whether this development is a proof of our progress or an outcropping of barbarism, from out of which we all acknowledge that we have sprung. Would it be anything wonderful if we at times showed some faint indications of our origin?

The hog, after being domesticated from time immemorial, when a drove is attacked form themselves into a circle for defense, with as much military precision as did the wild boars in the woods of northern Germany a thousand years ago.

The dog, before he settles himself on your hearth rug, turns round and round, because his ancestor the wolf did so to trample down the herbage for a bed, in the jungle where he lay concealed.

Our rude progenitors found savage delight in clannish war and in torturing their victims. In the age of chivalry this same fierce passion showed itself in the love for the tourney field. The degenerate Roman found inexpressible pleasure in seeing the gladiator fight to the death. The Spaniard in the bull fight, the slums of our cities in the pugilistic ring and cock pit,—and we, with all our boasted enlightenment, show the same passion, weaker it may be, more faded out from being strained through the thicker folds of our civilization, yet unmistakably the same, by our excessive love for the exhibitions of the trotting course. Were you to ask me, "don't you love to see a horse trot," I should unhesitatingly answer 'Yes," for to deny it would be to deny my origin and my kinship. But were you to ask me if this passion ought to be strengthened by public exhibitions, I should say "No." That smooth-limbed trotter, the poetry of whose motion thrills us like rarest music, or I might more justly say excites us like the

intoxicating cup, does his presence here to-day tell of improvement in farming, or of pecuniary benefit to his owner or to this society? Would not this society live and flourish pecuniarily if there was never a trotter shown on these grounds? Have we so little faith in the interest that the farmers of Walworth county take in their business that we fear this society will fail unless we encourage his presence? If so I greatly misjudge them. Would not this county be better both financially and morally if there was not a single trotting course within her limits? Perhaps the real truth after all is that we are not half civilized. At least don't let us claim that we are so long as we offer a higher premium for speed in the horse than for any product of our business.

With regard to this business of trotting, perhaps we ought not to be over critical; surrounded as we are by such a marvelous growth of development, such a wonderful fruitage of improvement, we should not complain if there be found now and then a barren stalk or a noxious weed. Trotting horses for money may not be morally wrong, but it is cousin german to many things we call vices.

There have been many causes combined which have had their influence in this rapid improvement in farming, and these same causes have acted with equal force upon all departments of human industry. But, as a medium through which such improvements have been introduced, our county fairs have been a great benefit. There is no way by which a man can be thoroughly convinced of the value of an improved animal or an improved implement, as by seeing it. And there is no way by which he can so quickly and so correctly judge of its merits, as by seeing it in competition with others of the same kind; and even the breeder of an improved animal, or the maker of an improved implement, may honestly think he has the best until he has shown in competition with others and thus found his mistake. And so these fairs become schools in which we all alike may learn valuable lessons. "May we expect as rapid improvement in the future as we have seen in the past?" I asked of one who for the last forty years has labored to improve our farming machinery. He answered,

'No." That was the prophecy of the age. He forgot that though the world may be growing old, it is forever renewing its youth. All the improvements thus far made are the result of causes which are still acting with undiminished if not with increasing force, and the momentum already acquired will hasten our progress.

Europe needs and will continue to need our surplus products, new markets are everywhere opening up, our means of rapid and cheap transit will continue to improve, new methods of carrying perishable articles are continually being devised; at home, our cities and towns increase much more rapidly than the rural districts, thus causing a corresponding demand for home consumption. Our gold and silver mines will still continue to pour their wealth into all channels of trade, and thus stimulate all branches of business, so that the demand upon the farmer is more likely to increase than to diminish, and I can but believe that we are entering upon an era of prosperity unparalleled in the history of our country. How shall we as farmers further improve our business so as to meet this increased demand that is likely to be made upon us?

I answer, first by acquiring a more thorough financial knowledge of our business. Were you to ask the makers of these plows, or wagons, or threshers, what each of them cost, they would tell you without the least hesitation. Were you still to question them as to what part of that cost was interest on capital, what part was the price of material, and what part was the price of labor, they would tell you to the fraction of a penny. Were you to ask the secretary of any railroad company what it cost to move a ton of freight a mile, he would answer you in pennies and mills, and hundredths of a mill. And were you still further to question him as to what part of that cost was due to interest on capital, what for wear of road, what for fuel and what for labor, he would give you the cost with such accuracy that the aggregate sum would exactly equal the whole. The poorest shoe maker in the county will tell you the exact cost of a pair of boots. There is not a manufacturer, not a miller, not a merchant, not a keeper of a corner grocery, not a dealer in any commodity, that does

not have his day book, his ledger, his invoices and his balance sheets. To pursue any other course would be to court failure, to insure financial ruin.

But how is it with the farmer? How many of us can tell the amount of our capital? How much in land, how much in stock and how much in tools? What is our gross income and what part of it is due to interest on capital, what part the price of labor and what part for incidental expenses and what for taxes? How many of us can tell the actual or relative cost of a pound of beef or pork or butter or wool; what it has cost us to produce our wheat, our corn, our oats or our hay? How many can tell what it costs to keep a farm team for a year, a cow, a steer, a sheep or a hog? And if some of us at times have attempted a rough estimate of the profits of our farms, how much credit have we given it for the use of our homes, how much for fuel, for vegetables and fruit, for bread and butter and pork? How much for keeping those horses we have used more for pleasure than for work? The answer to these and a hundred like questions would be exactly the same—"I don't know, I guess it is about so and so." But were you still further to ask, "Don't you keep a book account?" the most of us would answer, "Oh, yes," and we would produce out of the pocket of some cast-off coat a soiled and greasy book, smaller than a cigar case, covered all over inside with names and dates and figures and scratches and marks in promiscuous confusion, which to any one but the owner would be as unintelligible as the hieroglyphics on a Chinese tea chest.

My friends, I am not preaching. I am only speaking in meeting; I am telling tales out of school; I am making personal confession. The lessons I am trying to teach are the lessons I most feel the need of learning. It must be obvious to the dullest of us that the same accurate financial knowledge, deemed so indispensable to the success of the manufacturer, the merchant and the railroad manager, would be of equal benefit to the farmer. Our business is equally important as theirs. We employ more men and more capital than any one, if not more than all combined. Such knowledge would enable us farmers to understand our exact financial condition; to determine the amount of our income, and

the sources from which it is derived; to know what part of our business was paying a profit, and what we were doing at a loss, and thus we would be better able to shape our course. It would show us where our money went, and it might enable us to do more at less expense; to lessen our outgoes without decreasing our comfort. And is there any reason why farmers may not have as thorough financial knowledge of their business as do other men of theirs? It would no doubt cost some effort to keep such accounts as I have indicated, but the keeping of them would alone be worth more than the cost, simply as an educator, to say nothing of the knowledge acquired by them. It would teach us to be more methodical and systematic. Our perceptions would be clearer, and we should be able to lay our plans with more precision, and with more reasonable assurance of success. It would do more for us than has thus far been done by all the agricultural colleges in the country. There is in the minds of some of us a strong prejudice against book farming, but if we wrote our own books, perhaps we should study them more and prize them better.

Another way in which we can do much to improve and elevate our business is to make some particular branch of farming a specialty. Not that we should confine ourselves exclusively to it, but that we should make it a leading business, to which all our other farm operations are subservient and secondary. No two farmers are situated so exactly alike as to be able to pursue the same methods in farming with equal success. Let every one of us therefore study our surroundings, the character of our farms, the amount of our capital, our own capacity and tastes, and then in the carrying out of a thoroughly matured, well designed plan, in some one branch of our business strive to excel. Let us make this particular branch a special study, so that we shall not only know more about it, but also be able to do it better than anybody else. By pursuing such a course we shall not only be more pecuniarily successful, but we shall exert an influence in favor of the business of our choice and thus improve and elevate it. The sun may shine so faintly that there may be a chill in the air, yet with a sun glass we may so condense its rays, so bring them to a focus, that we can set a house on fire. So the weakest of us by

concentrating our energies upon a single branch of our business may awaken an interest, may kindle an enthusiasm that shall wake up a whole neighborhood, and be felt throughout the town. It is in this way that most of our improvements in farming have been effected. Fowler and Warner with their hogs, Cook and Paul and Clark with their sheep, Doubleday with his trotters, Cobb with his cattle feeding, and every dairyman worthy the name, throughout the country, are living examples of this principle I am trying to enforce.

If, in connection with this special attention to some one branch of our business, we should fix in our minds some definite standard of excellence toward which we would strive, it would still further aid us in making progress. There is not an owner of a trotter in the whole county who is not doing his best to make his horse beat 2:11¼ minutes, and in so doing he acts wisely. But how many of our dairymen are trying to beat Jersey Bell's seven hundred and five pounds in one year? We certainly shall not unless we try.

Thus far, every American farmer, if he had any Yankee blood in his veins, has combined in his own person the business of farming with that of land speculator. Whether this peculiarity is inherited, or is the result of his internal convictions that he is a sovereign and therefore ought to own a kingdom, I am unable to say. One thing is certain, that if by chance the rise of his land has made him a richer man, he has with unvarying certainty become a poorer farmer, and a slave to his land. We go this way but once. Why should we burden ourselves with more than we have strength or means to carry?

All capital invested in farming may be comprised under two heads, fixed capital, or that invested in lands and buildings, and working capital, represented by labor, by stock, and tools and seed. Fixed capital is always unproductive unless combined with a just proportion of working capital, and as a rule the more working capital we use in proportion to our fixed capital, the greater the profits. When we have thoroughly mastered this truth, we shall have taken a long step toward developing the resources of our farms, and increased prosperity in our business.

Our improvements thus far have been mainly in the direction of increased productions by the aid of mechanical appliances. We shall in the future have more need to study how best to convert the products of our fields into beef and pork, into butter and wool. The science of feeding for a specific end has thus far received but little attention. I can but believe that a knowledge and application of the chemical forces of nature will yet do as much, if not more, to advance our business than has been effected by a knowledge and application of mechanical forces, illustrated by the labor saving machinery on exhibition here to-day. Chemical knowlege has taught the railroads to convert their iron into steel. It will yet teach us to convert our straw stacks into valuable feed, and it will teach us at the same time so to combine our more valuable products as greatly to increase their value.

But I need not enumerate methods of improvement. There is not a farmer in Walworth county who does not know how to farm better than he does. If we did as well as we knew we should do better than we ever have. We, any of us, know better than to house our tools for winter in the field where we last used them, or in our barnyards. And I sometimes think that the benefit we have received by the use of farm machinery has in many cases been more than neutralized by recklessness in using and carelessness in caring for them.

What we farmers most need is to be more thoroughly in love with our business, more enthusiastic in pursuing it, a firmer belief in its innate nobleness. All branches of business are alike honorable that are alike useful, but we rank those highest that require the greatest executive ability, the most learning, the highest intellectual and moral qualities. Measured by these two standards, its usefulness and as a field in which to put forth both physical and intellectual effort, farming ought to outrank all professions and all trades. Some of these may furnish greater scope to certain talents in a given direction, but our business, if pursued as it ought, will lead to the perfect development of the whole man, physically, intellectually, morally, which after all is the final legitimate end of all human endeavor.

Farmers of Walworth county, ours is a calling worthy of the

highest ambition, and our county is an inviting field in which we may labor successfully for its highest development. The lines have fallen to us in pleasant places We have a goodly heritage. Let us not despise or undervalue it, but let us use it wisely, that we may transuit it not only unimpaired, but made better to those who may come after us. A heritage not alone of houses and of lands, of flocks and of herds, of bank stock and of bonds, but of public benefactions built up and sustained by our efforts, of institutions preserved and perpetuated by our labors, of a government under whose administration the rights of labor shall be as sacred as the rights of capital, whose broad and benignant shield shall insure equal rights and equal privileges to all, be they men or be they women, white or black, home bred or foreign born, under which a wrong done to the humblest individual shall be a wrong done to the state — a heritage of homes made of double worth by all the hallowed memories, that our lives have caused to cluster around them.

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## WEATHER NOTES.

The following weather statistics were furnished by Mr. George J. Kellogg, the Janesville nurseryman, for the Transactions:

During the month of January, 1881, the thermometer registered degrees as follows:

| | | | |
|---|---|---|---|
| Jan. 1 | 17 below. | Jan. 17 | 23 below. |
| Jan. 2 | 5 below. | Jan. 18 | 9 below. |
| Jan. 3 | 7 below. | Jan. 19 | 11 below. |
| Jan. 4 | 8 below. | Jan. 20 | 9 below. |
| Jan. 5 | 7 above. | Jan. 21 | 20 above. |
| Jan. 6 | 17 above. | Jan. 22 | 17 above. |
| Jan. 7 | 16 below. | Jan. 23 | 14 above. |
| Jan. 8 | 19 below. | Jan. 24 | 10 below. |
| Jan. 9 | 5 below. | Jan. 25 | 6 above. |
| Jan. 10 | 35 below. | Jan. 26 | 8 below. |
| Jan. 11 | 5 below. | Jan. 27 | 17 below. |
| Jan. 12 | 1 above. | Jan. 28 | 24 below. |
| Jan. 13 | 12 below. | Jan. 29 | 0 |
| Jan. 14 | 33 below. | Jan. 30 | 16 above. |
| Jan. 15 | 3 below. | Jan. 31 | 18 above. |
| Jan. 16 | 5 below. | | |

NOTE.— Twenty-two days at zero and below, aggregating 281 degrees below.

The coldest month in the last twenty-five years was February, 1875, during which the mercury was below zero for twenty days, aggregating three hundred and twenty-four degrees below. January, 1881, ranks next with twenty-two days below, aggregating

two hundred and eighty-one degrees below. January, 1864, had eleven days below zero, aggregating two hundred and twenty-three degrees below; December, 1872, had seventeen days below zero, aggregating two hundred and twenty-one degrees below; January, 1856, thirteen days below zero, aggregating two hundred and nineteen degrees below; January, 1875, eighteen days below zero, aggregating two hundred and twelve degrees below; January 1 to 7, 1864, three observations taken each day gave a mean of nearly eighteen degrees below. The aggregate for the week, taking the coldest point, one observation daily for seven days, one hundred and sixty degrees below. The coldest two consecutive months in the twenty-five years were January and February, 1875, thirty-eight days giving an aggregate of five hundred and thirty-six degrees below; the next two coldest months consecutively taken were January and February, 1856, twenty-five days, aggregating four hundred and fifteen degrees below; January, 1857, may have been colder than this last month, as I have not preserved the extremes. The mean of that month, four observations daily at 8, 10, 12 and 2 o'clock, was one and one-quarter degrees below.

I ought to state that the coldest record of the past month has been taken by a mercury thermometer hanging away from the house on an apple tree, and probably was no colder than either the months mentioned, except February, 1875.

The coldest days for each year from 1855:

| | | | |
|---|---|---|---|
| Dec. 24, 1855 | 28 below. | Dec. 23, 1870 | 18 below. |
| Jan. 9, 1856 | 32 below. | Feb. 10, 1871 | 12 below. |
| Jan 1, 1857 | 32 below. | Dec. 5, 1871 | 21 below. |
| Feb. 10, 1858 | 24 below. | Jan. 29 and 30, 1872 | 21 below. |
| Jan. 22, 1859 | 16 below. | Dec. 24, 1872 | 35 below. |
| Dec. 31, 1859 | 20 below. | Feb. 3, 1873 | 20 below. |
| Jan. 2, 1860 | 22 below. | Jan. 15, 1874 | 14 below. |
| Jan. 31, 1861 | 25 below. | Dec. 29, 1874 | 12 below. |
| Jan. 12, 1862 | 28 below. | Jan. 9, 1875 | 28 below. |
| Feb. 3, 1863 | 16 below. | Feb. 2. 1876 | 15 below. |
| Dec. 31, 1863 | 25 below. | Dec. 9, 1876 | 24 below. |
| Jan. 1, 1864 | 35 below. | Jan. 23, 1877 | 25 below. |
| Dec. 8, 1864 | 25 below. | Jan. 7, 1878 | 15 below. |
| Jan. 18, 1865 | 16 below. | Dec. 28, 1878 | 19 below. |
| Dec. 23, 1865 | 19 below. | Jan. 2, 1879 | 30 below. |
| Feb. 16, 1866 | 23 below. | Dec. 18, 1879 | 24 below. |
| Jan. 17, 1867 | 21 below. | Feb. 1, 4, 6, 1880 | 2 below. |
| Feb. 10, 1868 | 28 below. | Nov. 21, 23, 1880 | 11 below. |
| Dec. 12, 1868 | 21 below. | Dec. 28, 29, 1880 | 26 below. |
| Mar. 6, 1869 | 8 below. | Jan. 10, 1881 | 35 below. |
| Feb. 20, 1870 | 16 below. | Jan. 14, 1881 | 33 below. |

# USES AND ABUSES OF RAILWAYS.

BY A. V. H. CARPENTER, Milwaukee.

*Ladies and Gentlemen:*—It is said of Carlyle, that "he surprised us into greatness by disclosing the significance of the apparent trifles which crowd our lives." The author who would not feel proud of such commendation deserves no epitaph. Your humble servant will feel that his time is well spent, if he shall succeed in causing the significance of a very few of the points concerning the "uses and abuses of railways" to be appreciated.

Although some two hundred years have elapsed since the hint of a railway had a genesis,—even the nomenclature of the thing is still in controversy,— but any man can employ his time more profitably in sharpening shoe pegs with a jack-knife than in discussing this point. Its orthography or etymology will influence the value of the property, or determine the proprieties of its various uses, about as much as the discovery or non-discovery of either pole of the earth will affect the current price of real estate at "the Hub."

In fact it would be rather out of line with the column of events to have a settlement of the question as to whether railway or railroad is orthodox. With this preface the work of development will begin.

Two simple words tell the story of its physical use. "Common carrier" expresses the size of it in that respect, as suggestive of the mule and pack saddle as of the railway, and no one finds any thing startling about it until "railway monopoly" is shouted at him, when, *presto*, it is as terrible as the ghost of the "blood-boltered Banquo." It is consoling, however, that there are not enough such timorous souls to cause an earthquake by their shaking; men of strong minds, great hearts, true faith and skillful hands; men who can stand before a demagogue and damn his nonsensical twaddle or treacherous blarney without winking, don't grow pale at such stuff. There are many honest, well meaning people who think it "the regular thing" to tremble at the word monopoly, as a "shibboleth" of terrible significance; but

the "man of sense, he looks and laughs at a' that;" the superficial fellows, however, keep up as much chattering as a lot of magpies; the eagle will go to sleep in spite of the hubbub; men of "opinions and a will, who live above the fog in public duty and private thinking," are not disturbed at anything relating to this factor of the unparalleled growth of this nation in all the physical, mental, ethical and potential attributes for which it is distinguished. That portion of the Massachusetts boy's speech, "Great oaks from small acorns grow; large streams from little fountains flow," had several stories added to its significance — to the thoughtful mind — when the railway came.

To the mind of Watt the apparent trifle of the tilting of the lid of the tea-kettle, by the escaping steam, spoke a language whose every syllable was prophetic of power. And when Stephenson emphasized its potency with the locomotive, men were ready to not consider Archimedes a teetotal lunatic for his celebrated boast that he would move this earth with his lever if he had another world to stand on; and all the industries of the civilized world were "surprised into greatness" by the revelation of the powerfnl ally they were thenceforth to have; and the men who had translated the significance of this wonderful force, whose facts eclipse all fables, stepped to the front of the world's benefactors, as soon as they were recognized as other than the world's fools; and no one croaked, *monopoly's egg!* to disturb the general jubilee among level-headed men; and yet how little did any one then dream of the mighty impetus to the increase of the world's wealth and health that force was to give; had any one predicted a tithe of what has come to pass, he would have been reckoned about as Abraham Lincoln would have been had he, while "roughing it" on his "flat boat," mentioned the fact that he was to be the occupant of the "White House." Watt and Stephenson prudentially abstained from oracular airs over their achievements, or they had done better than they knew.

Standing below Niagara's mighty cataract and looking upward, one can realize the sublimity of water-power. Standing at this end of the last fifty years and looking backward, one can get an idea of what a very small amount of water, compared to the vol-

ume poured over that precipice during the time, can do, when applied where and how it will do the most good. When looking back fifty years from current date — from the terminus of the last mile of the over one hundred thousand miles of railway built and put in operation within that period — at the poor twenty-five miles then in existence, and considering what changes have been wrought by this grand progress of the "*chemin dè fer*," the "man of affairs" puts away his "guide book of Niagara," and turns to the statistical tables of railways, and studies with wonder akin to awe the mammoth figures thereof, among the first of which will be the five thousand millions of dollars invested therein by men of every social grade, profession and trade, and women innumerable. Next he finds that the representatives of this capital — lands, tenements, shops, tracks, bridges, locomotives and cars, together with all the force of brain and brawn engaged in working this mighty industry, earn five hundred million dollars in a year; then he will follow the lead thus obtained and find that of this great sum the average amount that finds its way into the coffers of the shareholders is only three per cent.; after which he will naturally inquire into the reasons therefor, when he will find that the prices of transportation of both persons and property have been steadily decreasing — as rapidly where left to the laws of trade as where under the pressure of statutes; that, *a la* American, no line of railway develops a capacity to earn enough to keep out of the bankrupt court, without counties, towns, municipalities and enthusiastic or envious individuals rushing into railway construction with an eagerness savoring of the "neck or nothing to the devil," with which spendthrifts run through their fortunes. The result is, most of them are as barren of profit as the sterile region described as being so poor that the crows carry their rations with them when flying over it in their migrations. But of this, more anon.

When the prudential gentleman referred to gets thus far he will, if possessed of the complacency of the average bonanza man, conclude that those fellows did not work it right, and he will take a hand in just to show them how the thing can be done, "you know," and after a few years he finds out — and either

"crawls out at the little end of the horn," or has railways at his command as plentiful as the dealer in real estate, of a dashing turn, has corner lots, and is the butt of all the bears in the market.

The prudential man and the philanthropist look at the same thing, sometimes, in vastly different lights; for while the man of the world has been indulging in the speculations named, the other has been considering the impetus given to the great aggregate of the world's industries; how time and space have been annihilated practically; how the proverb, "Time is money," has been verified; how all values have been enhanced in geometric ratio to the rapidity of exchanges, almost; how the arts have been fostered, science illumined, and superstition banished. For he will see at a glance, that had not men seen and appreciated the power in a tiny drop of water when converted into steam, before the inventor of telegraphs appeared on the stage, there would have been an *auto de fe* with that party for the victim, or the nearest lunatic asylum would have had its muster roll embellished with his name, and he would have had quarters in the "incurable" ward.

The statesman and level-headed business man goes straight to the logic of the matter; he looks back to the America of fifty years since and at the America of to-day, and is at no loss to discover the cause, and don't classify the railway as a robber, its owners as monsters, and its operatives as of no more account than the "Greaser" drivers of the overland caravans of ye olden time, whatever exceptional cases he may find answering those descriptions. It would be amusing, but for the consequences to which their conduct "leads up," to study the character of the men who make the forum, the legislative hall, the field, the shop, and even the bench, hideous with their dismal forebodings or bitter denunciations of railways; neither sacred or profane history or the legends of mythology can discount them in grotesqueness or diabolism.

If there is anything in the logic of history the railway is the most comprehensive factor of the industries of the world, and has added a chaplet to the brows of the carrier family; it is time, however, to take account of something higher than that term conveys; that was well enough in the early days; the carrier then was

a drudge, now he is the comparison of princes. Fifty millions of people can handle greater enterprises than three millions, or they are not worthy successors of those to whom the inaugural of George Washington was addressed through their representatives. Then it was a week's journey from Boston to Washington; now about twenty hours. A carrier who can accomplish the distance from New York to San Francisco in eighty-four hours is of a little higher grade than the party who first received the designation, not above being a common carrier, but a common carrier grown to a high estate — a thoroughbred. Since these things are so, it is no presumption to claim there is a grade of usefulness in railways and the railway system which those on a level with Pollock's fabulous character "who never had a dozen thoughts in all his life," or those who put in motion the disintegrating forces of national life, or engineer jobbing at the expense of railways, never dreamed of.

It is time to make a reconnoisance of another portion of the route over which this paper advertised to travel; reserving the right to skirmish back and forth as the ideas occur or facts suggest themselves, for we have not the opportunity to reduce either to their logical sequence.

The abuses of railways may be classified about thus: Those which are self inflicted; those which they inflict on each other; the consequential damage therefrom to the public; and the abuses inflicted through ignorance or design by outsiders upon them. And there are so many points to each class, that to make an apropos selection is as much of a conundrum as which is the best knife to the boy taking his pick from a lot at a store. The railway family is not inaptly described by the on dit concerning the tendency of the Irishman and his wife to make a truce of their domestic quarrels whenever an interloper offers to assist the apparently weaker party.

Railways are the subjects of abuse by reason of the penchant to build them where there is no more necessity therefor than for the fifth wheel to a coach; it is an essentially American trait to rush into any kind of enterprise that seems prosperous, and crowd competition till a collapse comes and sends everything to the

bow-wards; if men would only enter into foolish experiments who have the ready means so to do, even if there were no more reason, there would be less want of rhyme in their craze; but they run recklessly into debt to raise money to half build a railway, and mortgage the whole to raise the wherewith to complete the balance, and then another mortgage to half equip it, and when ready to run, something must be done to carry a semblance of activity whether anything is accumulating to pay interest or not. It is not very far wide of the mark to say that one-half the mileage of railways, in this country, if located where sound business principles indicate, would be ample to do all the paying business; while double the mileage would scarce suffice to do all the non-paying business that offers; but more concerning this farther on.

Improvidence in management, and inadequacy of service to the necessities of the case; blood being allowed to discount brain, and "cheek" to crowd competent capacity; frequent changes of administration; non-appreciation of tried and proved men, men of honor and unswerving integrity and unsullied loyalty; ignoring the fact that one man whose mind is not distracted with the shadow of the "wolf" upon his door at home can do more for the profit of his employer than three of equal ability in other respects; but by short rations for themselves, to keep their families from suffering, manage to keep soul and body together and "live on at a poor dying rate," or whistle to keep up courage, drop out of social life, because they cannot appear above the role of poor relation, lose their self respect, even, and become an obscure cypher in the world's life, because of the pinched condition of their exchequer, through insufficient compensation; these are self-inflicted abuses by the railways, for no railway worth running but can do better; nothing so much the spirit cramps as non-appreciation of a substantial nature.

It don't pay to grind or squeeze the enthusiasm out of men upon whose skill, industry, energy, capacity and fidelity reliance is placed. In all successful industries, the proprietors thrive best whose employes feel best toward them. Men fit to be entrusted with any responsibility can't be "dragooned" into their best estate. Another serious abuse consists in permitting men whose

brain power is taxed to its utmost to be dependent upon their own brawn to keep up the routine work of their stations. It is a sad commentary on the boasted enlightenment and humanity of the age that so many men become decrepit or imbecile, and thus fade out ere they reach the age when they should stand erect in all the strength and buoyancy of a grandly matured manhood. Shame on such exaction! So much for so much.

Railways are not conspicuous as *Damons and Pythiases* to each other — two of a trade are not generally so; besides, there are more members of the family than there are potatoes, and some must needs be short; and in the scramble to see who shall "not get left," the "Devil take the hindmost" is the war cry; and sometimes they carry their animosities and strife so far that a stranger comes in and carries off the potatoes, platter and all. These abuses will continue so long as men will build railways where there is not traffic enough to support drays and keep the horses fat. The incentives to such enterprises are worthy of the cause in which engaged; some are ambitious to flourish as railway men, and gain the *entrée* among the "high joints;" some have a score to settle with parties who have worsted them at some other game; while others, still, entertain the peculiar idea that a farm which can support one family well will make two families rich; or, at the worst, the occupant of the field will buy off those who come to force a divide. Greed, selfish greed, is what prompts railways to poach upon each others preserves. It was human nature in Samson to pull down the building over the head of his enemies; they may not have been the worst creatures in the world, but they were there and got hurt. The powerful generally contrive to make their prowess felt, in all lines of pursuit; and there is no exception in the case of those who embark upon the railway maelstrom.

The slaughter of revenues by contending roads is a many edged sword and a dangerous weapon to set in motion, for it has a way of hacking at all railways, even after the combatants are wearied out — wielded by the press and the legislature. People reason the matter, that railway managers are not foolish enough to do business without some margin for profit — it being generally un-

derstood that shrewd merchants will advertise a "slaughter in prices;" "selling out below cost," etc., and make a "nice plumb" out of their apparent sacrifice. In other cases railways ignore the lesson of the boy's experience who "paid too dear for his whistle" — buying business at too high figures; there is where zeal outruns discretion, and in most cases brings the managements as well as constituents to grief, when the "damnation of expenses" comes to realization in empty treasuries and used up track and rolling stock. If these occurrences were always the work of boys in years there might be an apology, but they as frequently are caused by those whose age ought to be a warrant for better conduct. It would be amusing but for the morale, to see the boyish methods pursued by full grown men in getting up a scrimmage of this kind and getting out of it again. As pointed out in one case, these abuses, from whichever cause, affect public interests disastrously; for the gain to a few by getting cheap transportation for a while is more than counterbalanced by the paralysis to the trade of the many caused by the uncertainties and fluctuations to which such events give rise. The clever artist of a comic weekly recently depicted a scene in parliament, under a supposed Irish regime; the same artist could employ his talent profitably in representing railway nonsense through the cartoon. Railways are responsible to the public for this reflex action, and they cannot shirk it by trying to find who began it, or agreeing to forfeit to each other what they get for doing crooked business; the only way they can make a satisfactory adjustment is to prevent effectually a recurrence of the fever.

It is not surprising that such things occur; they will continue until those who are expert in more than one specialty are placed over the whole. Again, railway managements would be more than human, however much they fall short of the divine, if they were not swayed by animosities at times; moreover there are very many crudities in systems which time will remedy, if patience and perseverance in the right direction obtain. Facts have accumulated with a rapidity which makes it difficult for men under a hot front, rear and enfilading fire to digest and formulate them into theories. These matters have in great measure fallen to

the lot of those who are about as *au fait* in real science of railway operation as the chap who "crammed" for a lecture on "Chinese Metaphysics" by reading up in the encyclopedia under the heads "China" and "Metaphysics," and combining the information thus acquired. Of course there are able and thorough treatises on all branches of railway science, but there is so much charlatanism that the *true* stands related to the false in about the same proportion that two grains of wheat bear to two bushels of chaff. Furthermore, most railway officials, after getting their harness on, don't get much time to speculate in *abstract* theories; or, if they do, they are apt to get considerable *concrete* nonsense into their experiments.

But enough has been said under these heads to awaken thought, and that is all there is time to do herein.

The next thing in order is a consideration of the abuses wherein the railways are helpless victims; and these are so numerous that but a very few of the more prominent ones can be even named. It is not true that a decimal of those who fire random shots at railways are nihilists, socialists or communists, but every shot fired by a man of position and influence is the signal for those classes to open their whole batteries upon the heads of the railways, because there is fat picking if they bring down their goose.

It is a noticeable fact that the lowest and foulest denunciators of railways bear the same relation to the substantial classes that those who were foremost in deprecating the danger to the community from banks bore to those who had dealings with banks in the great crash of 1837 — those who never had a dollar's dealings therewith. The doctrine that railways have no rights which legislatures are bound to respect, and that there are no precedents which courts may not overrule with impunity — nay, are required to do so to appease popular clamor — when railways are parties, is not one calculated to promote national safety, the welfare of the whole people, or secure the blessings of peace to either ourselves or our posterity; for if the property of one class can be confiscated with impunity, it is but a question of time when pretexts will be found to apply the same to other classes.

It is objected that too strong coloring is given to the picture;

that there is nothing in the utterances of the respectable classes to stir the passions of the destructives, or weaken values of legitimate railway securities; let the optimist, who takes such rose-tinted views of the seething elements, read the whole of an opinion by Judge Black, formerly attorney-general of the United States, furnished an "anti-monopoly" committee, of which the following is a very mild extract, i. e., it is the most temperate portion thereof, viz.: "Railways are public highways, like turnpike roads, canals or navigable rivers, and consequently stockholders have no proprietary right, title or claim to them beyond the franchise." The remainder of the letter is a tissue of misstatements, framed with reference to justifying the claim of right to practically confiscate the property in railways. If any one is curious to see how far the once venerable judge wandered from the truth to predicate his theory on a plausible basis, let him read the letter published in the *Chicago Railway Age*, and then read Albert Fink's series of letters in reply thereto, in same journal, exposing the falsehoods and sophisms so speciously paraded in the opinion cited. The judge need not fear bombardment with nitro-glycerine balls; the classes who use such weapons to fortify their cause will applaud his utterances.

It is sufficient for the present purpose to suggest that, if property invested in public improvements of a beneficent character has no surer tenure to the party so investing, the dreams of those who supposed by separating from Great Britain and establishing a government one of whose cardinal principles was the right to own and control property honestly earned, they had accomplished something for the permanent benefit of their posterity, were a chimera and their efforts of no more account than the "fool's errand." They certainly left no record of any purpose or dream that their descendants could be or would be reduced to the condition of a *sansculotte* by a mere legislative enactment, and especially one framed to induce them to invest their earnings and their time in the business of common carriers. But it is charged that railways are monopolies, and that they are dangerous to life, liberty and property. Will some political or social economist point to any fact in their history which justifies such charges? It is said

they control the price of transportation and can make it what they choose. A lawyer, doctor, merchant, mechanic or farmer can do the same, but if any of them put their price higher than their service or commodity is worth, they will have the privilege of retaining it for their own use and behoof. So it is with railways. It is in the memory of men of half a century old that the same charges were made against merchants and large manufacturers by similar classes of people, and associations were organized to crush them out, but the merchants and manufacturers survived; the organizations did not; so it will be with railways. When the nonsense of demagogues has evaporated, they will be acknowledged as *pari passu* with the most beneficent industries of the world in just claims upon popular favor. If one-half of the charges made against the dangerous possibilities of railways were true, the cemeteries where are buried those who granted the first charters therefor should be plowed up and their ashes exhumed and burned and scattered to the winds.

But this monopoly boom will prove a boomerang to some of those who persist in working it up. There is no class of men, except, perhaps, the "sand lots statesmen" of San Francisco and their kindred spirits in other slums, but are "monopolists" with reference to some other class; the owners of stage coaches or "prairie schooners" are monopolists to those who can't muster more than a wheelbarrow; the "wheelbarrow brigade" are monopolists to the hod-carriers. The farmer, with his comfortable frame house and spacious barns, is a monopolist to him who can't afford more than a log cabin, and has to stack his produce; the log cabin owner is a "bloated monopolist" to the tramp who has not where to lay his head, and won't try to earn enough to furnish himself therewith. So the list might be carried on to the "crack of doom." There is not a trade but is a monopoly as to those not skilled therein. Civilized society is formed by a union of these several monopolies for the general good, each working in his own several sphere, and exchanging his product with his neighbor who can make something he cannot. And it is only the constitutional vagabond who has nothing but his vices to exchange for anything of value; who reviles the law and order which regu-

late the affairs of nations, states and communities; and when it comes to aristocracy, the man with an honestly earned dollar and a clean face and hands is an aristocrat to the one who never earned nor ever means to earn an honest penny, no matter how much "pelf" he may have acquired. There is an aristocracy of decency and an aristocracy of robbery, and he who belongs to the first has no envy for any soul on earth, while those of the opposite class are forever envious toward all who are above their own degraded level; and the more conspicuous the difference in character, the more the one on the lower plane will hate the other.

We are told that the concentration of railway control in a few hands will result disastrously to other industries; that they will "ride rough shod" over all other classes, and hence must be double-bitted and over-checked. If ever railways come to be controlled by unmitigated fools, such an attempt may be made, but if so, it will last about as long as a summer cloud. 1st The people of the United States won't submit to such nonsense, and the railways have too much sense to try it. 2d. Railways would not be profitable in a country full of paupers. The better off every man, woman and child is, the more business for the railways, and they know too much to kill the bird which lays their golden eggs. There is no industry under the sun so helpful to every person who will try to help himself. Those who lie down and bellow, like the lout in the fable, because their carts are too heavy laden, will receive the same encouragement Hercules gave that chap, and will not, while whining, derive much benefit therefrom, unless they can contrive to get their ankle sprained or some joint out of gear, and recover more damages therefor, through an "anti-monopoly" jury, than their necks are worth.

If there is anything which full-grown men can enact the role of fools in to perfection the first time trying, it is to attempt to cure the evils alleged to be the effect of railway monopoly by legislation. They can kill the railways at one fell swoop, according to the modern doctrine of railways being footballs for every tribunal having a little brief authority to play fantastic tricks with; but killing don't cure in this case, as the communities which have tried it have found out to their cost.

A blacksmith undertaking to tinker a chronometer watch with his sledge hammer and monkey wrench would be a prince in common sense compared with the the legislative tinker who essays to overhaul that of which he neither understands the mechanism or philosophy. Blacksmiths are worthy of respect while they attempt no more than they can perform, and they can become great and grand men if they have the natural endowments and improve them as they may. Farmers can become statesmen, and noble ones too, by cultivation. The world affords abundant evidence of the verity of these statements; so does it of the fact the blacksmiths and farmers who have achieved renown in other professions didn't undertake to handle the affairs of a different range until they had familiarized themselves therewith. While upon this topic the remark is in order that your humble servant has the most profound respect for farmers, as his father was a farmer, and a good one, and he never made a fool of himself and brought the profession into disrepute by dropping the honest Anglo-Saxon style of designation, and strutting about under the French title of "Granger," nor did he leave his agricultural implements out of doors through the winter, let his stock or their fodder go unhoused through the inclement seasons of the year, or burn up that which should be saved and prepared for recuperating the soil; and grow poor and cry out that the railways were ruining him. That sort of nonsense is not out of keeping with those who sport the title "Granger," but is entirely out of character in a true-blue farmer.

But enough of this for once. Attention is next invited to a catalogue of abuses to which railways are subjected, either one of which would drive men with less than iron nerve frantic; and the first in order is the "dead beat," professional and amateur, the "class leader" of which is the pass fiend. People who have traveled in the once holy land mention one of the idiosyncracies of certain classes there, as being the practice of calling for "Backsheesh," and that it gets to be so monotonous after a time that it becomes absolutely disagreeable. To such as contemplate that trip and are desirous of getting accustomed to disagreeable things, want, in fact, to become indurated like the cuticle of a rhinoceros,

we would recommend that they "change works" for a little while with the manager or head of department of a first class railway, and get used to the applications for "passes;" and if that fails to "case harden" sufficiently, let the patients be brought *vis a vis* with one of the class of "business men" who, if offered free transportation without first requiring some compensation, however trifling, would demand a premium for his patronage! If still further trial should be deemed necessary, bring in a "dead set" advertising solicitor or subscription agent; and, lastly, if there still should be a doubt as to his ability to cope with those Saracen devils, let him undergo an "interview" by an enterprising newspaper reporter. Having survived these experiences, if he could not face the whole legion of foreign bores without wincing, America's prestige is waning.

In view of the situation, if any American citizen, whether of native or foreign birth, feels like shying a stone at any railway official whose duties subject him to such ordeals, let us be permitted to "pass" when he deals.

We protest it is no fair play to put railways through the paces required of them, and afterwards execute them and require them to pay forty shillings into the bargain.

It is time, however, to "ease up" on the throttle valve. It was not intended to discuss these matters according to scientific methods. We have tried to strain patience as little as possible in presenting the truths bearing upon the most salient points in controversy between the railways and those who denounce them as monsters; nothing extenuating where the railways are at fault, or setting down aught in malice which is susceptible of a milder interpretation in favor of their opponents. There are two sides to most questions. You will find herein many things which those who condemn railways to outer darkness for their failings and mischances don't make prominent in presenting their side of the case to those whom they desire to enlist under their banner.

We are far from the point of exclaiming with the "old guard," "Save himself who can!" We don't despair of justice at the hands of an enlightened public, especially any one who can pray without lying, "That mercy I to others show, Lord, that mercy

show to me." There is no "bloody chasm" between the railway interest and any legitimate industry under the sun. On the contrary, the railway is the most cosmopolitan factor of the world's prosperity and of American greatness.

When the other factors are willing to accord to this the rights and privileges guaranteed in the national bill of rights, there will be no trouble. Railways are only aggressive so far as it is a vital necessity to protect themselves from the nihilists and their confreres, and when the day comes that the various elements of American life take a survey of the situation, and ascertain their whereabouts, and compute the benefits received from the railways, they will marvel that there ever was a murmur against them as a whole.

When the philanthropist looks forth at the magnificent stretches of these wonderful parallel bars of iron and steel, across plains and over mountains, traversing lands and carrying civilization and enlightenment where, ere their advent, there was nothing but the presence of God; and when he considers their relation to the whole material, mental and ethical life of our people, mysterious almost, as yet, as the "giant foot projected into the mystic circle," he will have no fears for the safety of anything worth preserving in our national, state or social life, from any use or abuse of the railways of the land, for which they are responsible.

"Waiting for time" at the Lake Shore Railway depot in Buffalo a few weeks since, our eye caught that clever advertising chromo representing the mail carrier of a hundred years ago on his sorry nag, picking his way over a corduroy road, with a solitary mail pouch *en croupe*, in the back-ground, while at the front was the "flying special fast mail train," with its several cars filled with mail matter and equipped with a retinue of clerks doing the work of the post office, and accomplishing the distance between New York and Chicago in twenty-four hours. There was revealed the whole story of what this country owes to the railway! The "shadowy continental" no more dreamed of what the mail service was coming to than that *he* was to become a whole train of cars. And yet he was as adequate to the necessities of his day as that wonderful train is to the requirements of

the present. Men who honestly think the railway is a monopoly, fraught with danger, are about as much out of joint with the facts of the times as the hatter who should undertake to fit the hat of a boy upon a Websterian head. The conviction is becoming more and more impressed upon us, that when the hurly-burly is done, when men capable of a sober second thought shall come to appreciate the significance of the terms factor and industry, the air will be less charged with the peculiar odors exhaled by the monopoly shriekers, who live upon the credulity of those who are susceptible of such influences.

When the time comes, as come it will, that men give rein to their reflective faculties for the consideration of the facts their perceptives have gathered, there will be a better understanding of the problem that staggers legislators, commissioners and judges. There is a proverb that "the unknown is always great," and that accounts for the bugbears conjured up by many honest souls concerning the abuses inflicted by the railways. Mark Twain's representation of the "Grand Turk" spelling his way through the columns of the English journal published in Constantinople, with a world of wisdom in looks, knowing as much of its significance as a juvenile porker does of the New Testament, is a clever satire upon the average of railway censors. It seems an easy matter to ascertain just what it costs to run a railway for any given time. It would be if the road started off in its career at the beginning of the period and ended at its close, so that a final balance could be struck. But while it continues approximation only is attainable; appreciation or depreciation are only subjects of estimate. "Profit and loss" on trial balances is an uncertain quantity; but it takes an expert to arrive at any approximation worth the ink of the figures of which it is composed to get them near to exactitude. How much more difficult, then, to fix a just maximum rate for the transportation of any specific article in order to reach a certain result in the future, any level minded business man can imagine.

Could it be known what the whole tonnage, or number of people, and the proportions of each class, would be in a given time, one could estimate pretty accurately what to charge to secure a

given per centum on the investment, and the unskilled might find a tolerable basis to figure out maximum rates. It is a larger job than most railroad commissioners can handle properly, to adjust tariffs for a lot of railways all working under different conditions. It is considered the nicest work of the most expert in commercial relations to frame tariffs which shall yield a fair amount of revenue without bearing injuriously upon the commodities upon which placed. There are certain approximate rates per ton, or per passenger per mile, which experience has given as a basis for minimum rates, but all are subject to an infinite number and variety of conditions which only those familiar with the circumstances of each case can regulate properly. Every prudent business man, after ascertaining what he will probably need to make his revenues and expenses meet, and give a fair per centum of profit, allows a margin for contingencies, and that has to be levied upon his customers in the nature of an insurance. He may over or under estimate, which will affect his contingent account. Accordingly, railways are subject to more contingencies, and more momentous ones, than most lines of business; and wherefore should they be placed under the control of men not skilled in the business or acquainted with the details of their charges?

There is another very important item not to be overlooked on the credit side of the railways: the extraordinary expenses of providing the equipment requisite to meet the demands of their patrons for fast time and luxurious accommodations. The second class passenger of to-day will sniff at carriages once considered elegant by first class passengers, while first class passengers, at the present date, don't pay as much as the second class passenger of twenty-five years since, on the average.

It is objected that "common people," as they denominate themselves, don't require such "luxuries." There is just where the objector is capitally mistaken. Let two railways running parallel to each other try the experiment, — one with "palace coaches," for which five cents per mile would be a reasonable rate; the other with "ordinary coaches," for which three cents per mile would be ample; and one not acquainted with the characteristics of the average American citizen, his wife and daughters, who don't know

that the highest priced hotels and dry goods stores are always full of customers, and if there are any vacant rooms in hotels or stools at the counters of the stores, they are not in those accounted "first class," will be astonished to find that the higher priced line will not be the one where empty seats are plenty; and were the lowest price charged for the best accommodations there still would be grumblers.

On the whole, is it not about time for level-headed men to quit being led away by mere "soldiers of fortune," whose motto is, "The world is my oyster," especially the railway world, and deal with the roads as they do with other lines of industry, which cannot be crushed or crippled without serious injury, not only to trade and commerce, but to civilization itself?

There is another consideration that cannot be overlooked by a wise economist. There is no other industry which more elevates the moral sense, in respect of obedience to wholesome discipline, and gives patience under salutary restraint; for there is no other where absolute sobriety, attention to the least item of regulations, promptness and fidelity are so indispensable. Railway men are not generally of the mild-mannered, adewy-eyed type which distinguishes the regulation Sunday school teacher; theirs is a field where "snappy, able men," as Mark Twain described the "overland stage" men of the pre-railway date. Men who will throw a rascal into a river and then jump in after him if he cries *peccavi*, are at a premium.

If the average railway official don't butter his words at all times, it is possible he has run against an object similar in its effect upon his sensibilities to the "thistle" our friend Mark Twain found in Syria, "from contact with which there is no relief save in profanity." There are plenty of these in America, and railway men collide with them more than any other class do.

Judging from the "lay of the land," we have surveyed as far as profitable for one reconnoissance, and so will make ready to "park our train" and take a rest.

Let us comrades of the service not be mistaken in what we have said in extenuation of those who may utter occasionally choleric words. Profanity or its equivalents are not accomplishments

to be cultivated. Equanimity and urbanity are gems, and pay better in the long run than any other investment in the article of deportment. We only meant to be understood that we do not think that the "recording angel" will "count" an emphatic retort by a railway official on one of the rank and file, when under fire. On looking over our "wayside notes" we find it recorded that, if corporations have no souls, corporators have; that they are susceptible to the same influences as other men, and a "soft answer" will turn "away wrath," where "grievous words stir up anger;" the corollary of which is, that both railway men and the public will find it very profitable to come to a better understanding than has characterized their intercourse in the past; that the first will find it most advantageous to eschew their clannishness, and learn that they are not, normally, at antipodes to the world's life; but should be in cordial unison therewith, and participants in its work, and co-bearers of its burdens, as well as sympathetic with its joys and sorrows; and probably there are as many Abou Ben Adhems to the dozen among them as in any other circle in the world. Meanwhile the party of the other part should not forget that railways and their employes are in the world to stay; that the latter are their own fellow men, and can and do help as much as they require help; that the most profitable as well as the most pleasant course to pursue is to greet them "hail fellows well met." In short, both sides of the house will find it vastly to their advantage to treat one another as well as their behavior entitles them. Then when any differences arise as to what is fair and just they can be settled as any other differences are between rationable men, and there will be no occasion for demagogues or blatherskites to stir them to assert or maintain their rights.

It is time, we think, to try all kinds of human institutions by their fruits. When trades unions, granges and kindred associations shall develop aught but supreme selfishness, either in purpose or conduct, let them have credit for it. Until they do so it is hardly in good taste for them to arraign railways for entering into compacts not to slaughter each other.

It is safe to say that every thorough railway man is in search

of light to enable him to do right towards the community as well as the interest he represents. There is not a combination of railways made for any of the purposes charged against them; *i. e.*, to get something for nothing, or to get more than their services are worth compared to the market value of other things. The whole aim is to protect legitimate lines, built and operated for legitimate business purposes, from the operations of guerilla lines which do no soul on earth any good. It is safe to say further, that whenever it becomes the accepted and prevalent sentiment of the public, that notwithstanding railways were not specified in the catalogue of goods, wares and merchandise that should not be stolen or coveted, at the date of promulgation of the decalogue, yet they are included in its scope. The railways will beat their swords into plow-shares, and be neighborly with their fellow industries, and they are ready to reciprocate all advances in the direction of peace and good will.

In conclusion: We are optimistical in these matters; in fact, have not "soured" on any class of men, or become pessimistic as to results in any case now pending, or within probability. We hope and trust that the day is not far distant when no business man who can gain admission "on 'change" will consider himself justified in asking railways for concessions or gratuities which he would not ask of other business interests. When genuine men are ready to treat the railway barnacle as they do other barnacles, they will do more toward freeing the community from its greatest burden than they could possibly do in any other direction. Those dead weights and sappers of railway life out of the way, abuses by railways will cease to exist in greater ratio than in any other well-regulated business. Statutes and edicts are no more requisite to adjust and maintain healthy relations between railways and the commonwealth or its constituents than between any other legitimate, square-dealing industries and their contemporaries; and the farmer, mechanic and laborer, of any grade, will find more profitable occupation than neglecting all things else to whip railways into the traces, to suit their particular views; and the proprietors of railways will more and more appreciate that they have

more legitimate uses than to be kicked about Wall street, or "blown up," like soap bubbles.

It needs but an application of sound business principles on both sides of the question — each paying for what it receives, at fair rates — and the air will be purified of monopoly odors. The best anti-monopolist agencies in the world are square dealing in business, and the application of the principles of the golden rule between the factors of any industry; and let no one forget it.

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[Abstract from the *Congressional Record* of the United States House of Representatives, Washington, D. C.]

## LIVE STOCK GROWERS.

Hon. L. B. Caswell, of Wisconsin — *Mr. Speaker:* I ask by unanimous consent that the resolutions adopted by a convention of live stock growers of the United States, recently held in Chicago, in reference to pleuro-pneumonia of cattle, be printed in the *Record* and referred to the committee on Agriculture. They are brief, and relate to a subject-matter interesting to every member on this floor.

Mr. Conger — Yes; let them be printed in the *Record* and referred to the committee on Agriculture.

They are as follows:

At a meeting of the live stock growers of the United States, held in Chicago, Illinois, November 17, 1880, the Hon. S. R. Scott, of Champaign, Illinois, was called to the chair, and General George E. Bryant, of Madison, Wisconsin, was chosen secretary. The meeting, after a lengthy discussion, passed unanimously the following preamble and resolutions:

WHEREAS, The contagious pleuro-pneumonia of cattle exists in several of the states of the Union bordering on the Atlantic seaboard; and

WHEREAS, It is evident that, so long as unrestricted traffic in live cattle is permitted between these infected states and those not infected, the live stock interests of all sections of our country are menaced by a terrible danger; and

WHEREAS, The state of things above indicated has resulted in the adoption of regulations by the British government which materially interfere with our export trade in live cattle with that country, thereby entailing great damage to all cattle raisers and feeders in the United States; and

WHEREAS, In view of the decision of our state and federal courts the states acting as such are powerless to protect themselves from infection from an adjoining state, and for the same reason an infected state is powerless to stamp out the contagion as long as it exists on its borders in an adjoining state: Therefore,

*Resolved*, That it is the imperative duty of congress to enact such a law as shall effectually prevent the spread of this disease into states not already infected, and which shall result in its entire extermination at the earliest practicable date.

*Resolved*, That as an important preliminary step we heartily second the recommendation made by Judge Jones, of Ohio, to the president of the United States for the appointment of one or more veterinary inspectors, who shall definitely ascertain and designate the infected regions.

*Resolved*, That we recognize the bill introduced into the house of representatives at its last session by General Keifer, of Ohio, as embodying the essential features necessary to an intelligent and efficient supervision of contagious and infectious diseases of live stock generally on the part of the federal government, and that we heartily recommend its passage, with an additional provision which shall clothe the commission with authority to prescribe rules and regulations under which the live stock of any infected state, territory or district may be transported or taken therefrom, and under which live stock may be transported through such infected state, district or territory, or in their discretion to prohibit absolutely the transportation of live stock from or through such infected district when in their opinion the same shall be essential to the general safety.

*Resolved*, That we further recommend that petitions be prepared and circulated in all parts of the country and forwarded to congress calling attention to this subject, and urging favorable consideration for the measures proposed in the foregoing resolutions.

*Resolved*, That these resolutions be engrossed and a copy of the same delivered to the chairman of the committee on Agriculture of the senate and house of representatives of the United States.

A true copy.

Attest: GEO. E. BRYANT,
*Secretary.*

## STATEMENT OF THE PRINCIPAL FARM PRODUCTS GROWING IN THE SEVERAL COUNTIES AT TIME OF MAKING ANNUAL ASSESSMENT FOR 1880.

| COUNTIES. | NUMBER OF ACRES. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Wheat. | Corn. | Oats. | Barley. | Rye. | Potatoes. | Root Crops. | Cranberries. |
| Adams | 5,898 | 9,764 | 5,664 | 99 | 8,633 | 759 | 32 | 32 |
| Ashland | 24 | 26 | 200 | 15 | 8 | 496 | 64 | ..... |
| Barron | 8,093 | 876 | 5,335 | 1,164 | 164 | 405 | 112 | ..... |
| Bayfield | 5 | 2 | 11 | ..... | ..... | 24 | 6 | ..... |
| Brown | 22,028 | 2,421 | 15,164 | 1,989 | 2,463 | 3,344 | 110 | ..... |
| Buffalo | 53,167 | 8,086 | 13,340 | 2,412 | 583 | 884 | 20 | ..... |
| Burnett | 2,808 | 199 | 962 | 86 | 121 | 108 | 46 | 759 |
| Calumet | 33,696 | 4,421 | 9,145 | 6,919 | 295 | 1,029 | 1 | ..... |
| Chippewa | 22,681 | 4,210 | 14,312 | 830 | 261 | 750 | 76 | ..... |
| Clark | 3,285 | 1,701 | 4,540 | 281 | 434 | 649 | 61 | ..... |
| Columbia | 61,011 | 42,650 | 28,351 | 8,466 | 4,399 | 2,078 | 115 | 16 |
| Crawford | 23,119 | 17,327 | 14,247 | 1,134 | 1,046 | 936 | 6 | ..... |
| Dane | 66,448 | 89,940 | 72,150 | 22,775 | 4,748 | 3,681 | 73 | ..... |
| Dodge | 128,026 | 27,323 | 25,756 | 15,603 | 1,504 | 2,460 | 82 | 1 |
| Door | 11,404 | 247 | 4,522 | 491 | 535 | 902 | 238 | 6 |
| Douglas | 90 | 10 | 100 | ..... | ..... | 150 | 5 | ..... |
| Dunn | 37,455 | 10,343 | 19,694 | 1,617 | 963 | 1,478 | 82 | ..... |
| Eau Claire | 41,126 | 7,357 | 15,100 | 789 | 734 | 1,984 | 25 | ..... |
| Fond du Lac | 90,828 | 19,309 | 24,714 | 12,927 | 997 | 2,678 | 70 | ..... |
| Grant (incomplete returns) | 28,196 | 63,962 | 50,958 | 2,342 | 2,197 | 2,509 | 39 | ..... |
| Green | 13,077 | 51,600 | 38,051 | 639 | 2,417 | 1,342 | 11 | ..... |
| Green Lake | 39,746 | 16,152 | 9,181 | 1,526 | 3,641 | 849 | 41 | 111 |
| Iowa | 26,643 | 43,946 | 40,229 | 1,577 | 1,247 | 1,598 | 11 | ..... |
| Jackson | 28,027 | 10,676 | 18,366 | 3,143 | 1,099 | 605 | 18 | 5,534 |
| Jefferson | 36,452 | 23,449 | 16,367 | 9,205 | 4,640 | 1,799 | 57 | 95 |
| Juneau | 9,391 | 10,777 | 14,027 | 570 | 4,098 | 1,989 | 60 | 5,875 |
| Kenosha | 6,229 | 14,410 | 15,171 | 1,326 | 530 | 1,061 | 1 | ..... |
| Kewaunee | 24,510 | 1,286 | 9,139 | 1,234 | 2,549 | 2,482 | 636 | ..... |
| La Crosse | 38,829 | 11,913 | 12,815 | 1,888 | 3,202 | 891 | 39 | 29 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| La Fayette | 11,880 | 60,582 | 55,979 | 1,534 | 1,165 | 1,901 | 11 | ..... |
| Lincoln | 547 | 25 | 778 | ..... | ..... | 125 | ..... | ..... |
| Manitowoc | 53,153 | 954 | 22,302 | 5,257 | 5,232 | 2,780 | 148 | 1 |
| Marathon | 6,030 | 572 | 7,643 | 483 | 625 | 903 | 277 | ..... |
| Marinette | 1,112 | 141 | 919 | 100 | 177 | 306 | 94 | 100 |
| Marquette | 10,195 | 13,087 | 5,149 | 28 | 11,084 | 980 | 71 | 163 |
| Milwaukee | 12,778 | 5,928 | 12,328 | 7,845 | 2,583 | 3,323 | 137 | ..... |
| Monroe | 35,387 | 13,618 | 18,602 | 1,943 | 2,007 | 1,741 | 84 | 1,002 |
| Oconto | 3,447 | 630 | 2,478 | 317 | 209 | 476 | 84 | ..... |
| Outagamie | 34,836 | 8,066 | 13,952 | 3,355 | 1,126 | 1,789 | 77 | ..... |
| Ozaukee | 27,849 | 4,205 | 11,370 | 6,457 | 2,238 | 1,500 | 1,366 | ..... |
| Pepin | 15,361 | 5,194 | 4,463 | 416 | 1,221 | 381 | 23 | 1 |
| Pierce | 60,927 | 7,899 | 11,105 | 2,289 | 309 | 796 | 22 | ..... |
| Polk | 22,882 | 1,347 | 5,447 | 397 | 182 | 481 | 226 | 28 |
| Portage | 17,006 | 11,406 | 10,958 | 687 | 7,725 | 2,541 | 83 | 360 |
| Price | 11 | 12 | 50 | ..... | ..... | 56 | 27 | ..... |
| Racine | 13,409 | 13,617 | 16,644 | 1,691 | 1,162 | 1,579 | 70 | 1 |
| Richland | 19,674 | 24,086 | 12,309 | 312 | 627 | 1,051 | 9 | ..... |
| Rock | 28,637 | 71,180 | 54,545 | 22,618 | 5,131 | 2,497 | 60 | 100 |
| St. Croix | 98,564 | 6,357 | 18,240 | 920 | 249 | 858 | 870 | ..... |
| Sauk | 28,734 | 30,391 | 29,360 | 1,692 | 3,158 | 2,808 | 57 | 1 |
| Shawano | 10,428 | 2,116 | 6,960 | 568 | 1,338 | 2,437 | 3,153 | 1 |
| Sheboygan | 42,804 | 10,546 | 18,111 | 9,676 | 4,730 | 2,165 | 347 | ..... |
| Taylor | 120 | 35 | 254 | 8 | 10 | 183 | 116 | ..... |
| Trempealeau | 65,369 | 14,593 | 22,395 | 3,798 | 1,341 | 778 | 36 | ..... |
| Vernon | 40,130 | 22,421 | 28,544 | 4,614 | 1,387 | 1,309 | 38 | 5 |
| Walworth | 27,007 | 39,047 | 27,474 | 10,577 | 1,471 | 1,673 | 43 | 18 |
| Washington | 54,754 | 10,587 | 14,308 | 8,645 | 4,555 | 2,062 | 117 | 2 |
| Waukesha | 45,514 | 21,526 | 18,879 | 11,236 | 3,556 | 3,195 | 181 | 49 |
| Waupaca | 20,359 | 13,078 | 12,631 | 1,912 | 4,601 | 2,709 | 85 | 29 |
| Waushara | 16,494 | 17,315 | 10,591 | 299 | 12,889 | 1,432 | 44 | 909 |
| Winnebago | 49,114 | 14,582 | 14,689 | 1,843 | 671 | 1,491 | 60 | 85 |
| Wood | 1,117 | 1,260 | 1,830 | 62 | 1,914 | 559 | 233 | 2,491 |
| Total | 1,737,921 | 940,785 | 938,898 | 212,626 | 138,181 | 88,784 | 10,386 | 17,804 |

STATEMENT OF THE PRINCIPAL FARM PRODUCTS GROWING IN THE SEVERAL COUNTIES OF THE STATE AT THE TIME OF MAKING ANNUAL ASSESSMENT FOR THE YEAR 1880 — continued.

| COUNTIES. | APPLE ORCHARD. | | NUMBER OF ACRES. | | | | | MILCH COWS. | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of acres. | No. of bearing trees. | Flax. | Hops. | Tobacco. | Grasses | Growing timber. | Number. | Value. |
| Adams | 181 | 6,481 | 2 | 319 | 9 | 5,539 | 41,023 | 2,821 | $33,945 |
| Ashland | ..... | 10 | ..... | ..... | ..... | 253 | 800,000 | 127 | 1,540 |
| Barron | 49 | 1,317 | 1 | 8 | 8 | 2,943 | 300,000 | 1,591 | 21,705 |
| Bayfield | 2 | 100 | ..... | ..... | ..... | 233 | 944,640 | 26 | 650 |
| Brown | 268 | 10,023 | ..... | ..... | ..... | 10,227 | 42,396 | 5,936 | 70,145 |
| Buffalo | 205 | 8,924 | ..... | ..... | ..... | 9,666 | 22,684 | 5,284 | 63,707 |
| Burnett | 8 | 274 | ..... | ..... | ..... | 329 | 269,415 | 835 | 9,922 |
| Calumet | 697 | 25,712 | 2 | 9 | 1 | 11,300 | 46,905 | 5,986 | 92,821 |
| Chippewa | 91 | 3,689 | ..... | ..... | ..... | 6,843 | 1,400,000 | 2,659 | 36,775 |
| Clark | 198 | 6,425 | ..... | ..... | ..... | 11,841 | 750,000 | 2,382 | 30,457 |
| Columbia | 2,067 | 73,022 | 13 | 240 | 56 | 39,589 | 86,223 | 12,367 | 189,016 |
| Crawford | 946 | 22,793 | 5 | 1 | 26 | 11,404 | 121,527 | 4,403 | 53,401 |
| Dane | 3,883 | 113,892 | 158 | 116 | 6,240 | 51,389 | 119,844 | 21,665 | 331,182 |
| Dodge | 2,987 | 105,436 | 83 | 52 | 10 | 28,847 | 45,837 | 17,244 | 267,012 |
| Door | 143 | 3,248 | ..... | ..... | 2 | 5,638 | 80,922 | 2,309 | 28,950 |
| Douglas | ..... | 100 | ..... | ..... | ..... | 120 | 171,650 | 84 | 1,800 |
| Dunn | 195 | 9,013 | ..... | 35 | ..... | 12,950 | 92,630 | 5,266 | 68,464 |
| Eau Claire | 252 | 10,689 | ..... | ..... | ..... | 9,502 | 30,196 | 4,986 | 75,829 |
| Fond du Lac | 3,246 | 113,921 | 38 | 28 | 3 | 38,717 | 58,672 | 14,406 | 219,715 |
| Grant | 2,432 | 102,504 | 7,815 | 62 | 40 | 32,484 | 93,555 | 11,104 | 174,846 |
| Green | 1,636 | 64,778 | 900 | 850 | 190 | 35,645 | 54,757 | 15,740 | 274,939 |
| Green Lake | 1,324 | 49,997 | 163 | 20 | 8 | 13,439 | 23,165 | 4,800 | 67,697 |
| Iowa | 1,093 | 42,937 | 9,527 | 33 | 4 | 21,142 | 63,781 | 11,489 | 175,186 |
| Jackson | 201 | 7,395 | ..... | 45 | 1 | 10,243 | 108,969 | 4,222 | 61,639 |
| Jefferson | 7,255 | 114,035 | 4 | 411 | 259 | 15,539 | 29,355 | 16,083 | 254,494 |
| Juneau | 612 | 18,244 | 1 | 502 | 3 | 8,826 | 29,151 | 4,732 | 49,453 |
| Kenosha | 1,957 | 62,562 | 4,635 | ..... | ..... | 16,318 | 16,486 | 6,252 | 140,946 |
| Kewaunee | 145 | 4,612 | ..... | ..... | 28 | 10,610 | 34,559 | 4,891 | 64,486 |
| La Crosse | 1,049 | 15,160 | ..... | 137 | 10 | 15,435 | 49,726 | 5,372 | 83,375 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| La Fayette | 1,549 | 58,462 | 14,241 | | 18 | 33,032 | 37,895 | 11,620 | 184,997 |
| Lincoln | 5 | 105 | | | | 310 | 1,820,000 | 217 | 3,235 |
| Manitowoc | 1,167 | 24,237 | 2 | 5 | 3 | 28,184 | 109,306 | 12,066 | 164,754 |
| Marathon | 37 | 2,104 | | | | 5,397 | 274,383 | 2,882 | 34,544 |
| Marinette | 35 | 464 | | 3 | | 129 | 450,000 | 420 | 4,452 |
| Marquette | 533 | 16,232 | 2 | 50 | 13 | 3,448 | 45,634 | 3,426 | 41,004 |
| Milwaukee | 1,842 | 63,743 | 62 | 38 | | 17,554 | 15,691 | 7,308 | 132,497 |
| Monroe | 792 | 16,768 | 68 | 161 | 7 | 18,401 | 88,603 | 6,356 | 79,688 |
| Oconto | 99 | 2,582 | | | 2 | 4,208 | 450,000 | 1,381 | 19,407 |
| Outagamie | 1,030 | 26,439 | 21 | 13 | | 17,509 | 112,281 | 6,457 | 76,441 |
| Ozaukee | 1,227 | 31,126 | 5 | 2 | 1 | 12,791 | 23,128 | 5,517 | 74,112 |
| Pepin | 91 | 5,021 | 5 | | 5 | 3,053 | 10,879 | 2,027 | 24,481 |
| Pierce | 284 | 8,318 | | 2 | | 14,608 | 88,834 | 4,726 | 73,621 |
| Polk | 72 | 3,416 | | | 4 | 4,401 | 164,426 | 2,843 | 39,095 |
| Portage | 120 | 3,730 | | 352 | | 7,014 | 35,392 | 3,941 | 50,134 |
| Price | 1 | | | | | 328 | 664,320 | 38 | 895 |
| Racine | 2,230 | 66,753 | 5,443 | 10 | | 18,240 | 16,036 | 6,129 | 113,088 |
| Richland | 914 | 27,701 | 2 | 84 | | 20,751 | 140,093 | 6,463 | 83,187 |
| Rock | 3,628 | 129,764 | 115 | 1 | 6,238 | 56,115 | 53,458 | 15,237 | 299,661 |
| St. Croix | 353 | 9,260 | 1 | | | 16,761 | 83,327 | 5,377 | 80,275 |
| Sauk | 1,705 | 56,944 | 4 | 927 | 7 | 22,677 | 93,338 | 9,602 | 131,977 |
| Shawano | 118 | 3,410 | | | | 5,092 | 334,358 | 2,357 | 24,075 |
| Sheboygan | 2,428 | 86,582 | | 17 | 3 | 33,259 | 55,874 | 17,356 | 296,942 |
| Taylor | 7 | 15 | | | 1 | 786 | 618,630 | 224 | 3,367 |
| Trempealeau | 401 | 16,014 | 7 | 43 | | 14,656 | 57,702 | 6,470 | 81,364 |
| Vernon | 1,058 | 34,096 | 127 | 36 | 103 | 26,371 | 119,734 | 7,636 | 98,966 |
| Walworth | 3,998 | 122,834 | 931 | 25 | 33 | 41,095 | 50,037 | 12,462 | 264,678 |
| Washington | 2,229 | 69,582 | | 11 | | 12,669 | 51,485 | 9,758 | 124,871 |
| Waukesha | 3,361 | 117,026 | 63 | 145 | 3 | 34,193 | 45,442 | 12,076 | 208,048 |
| Waupaca | 453 | 14,480 | 4 | 117 | 9 | 13,818 | 112,069 | 6,224 | 66,495 |
| Waushara | 500 | 24,488 | 1 | 216 | 11 | 9,924 | 84,516 | 5,347 | 75,772 |
| Winnebago | 1,727 | 98,769 | | 33 | | 21,679 | 19,324 | 9,068 | 149,908 |
| Wood | 76 | 2,871 | | 14 | | 3,033 | 170,000 | 1,411 | 19,159 |
| Total | 67,192 | 2,140,629 | 44,451 | 5,173 | 13,329 | 957,997 | 12,424,263 | 399,484 | $6,069,287 |

## STATEMENT OF PRINCIPAL FARM PRODUCTS GROWN IN THE SEVERAL COUNTIES IN 1879.

| COUNTIES. | NUMBER OF BUSHELS. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Wheat. | Corn. | Oats. | Barley. | Rye. | Potatoes. | Root crops. | Cranberries. | Apples. |
| Adams | 63,458 | 142,998 | 105,189 | 1,306 | 92,547 | 40,156 | 5,406 | 547 | 1,542 |
| Ashland | 261 | 636 | 2,540 | 200 | 38 | 13,127 | 7,504 | ..... | ..... |
| Barron | 99,732 | 18,625 | 152,420 | 31,713 | 2,497 | 28,710 | 8,115 | ..... | 150 |
| Bayfield | 85 | 100 | 1,100 | ..... | ..... | 4,450 | 780 | ..... | ..... |
| Brown | 247,674 | 60,172 | 298,162 | 38,809 | 33,395 | 118,931 | 21,047 | 135 | 1,606 |
| Buffalo | 657,727 | 244,235 | 384,532 | 42,231 | 9,988 | 80,021 | 1,094 | ..... | 1,432 |
| Burnett | 34,636 | 3,823 | 20,289 | 1,570 | 2,084 | 10,729 | 3,162 | 421 | 46 |
| Calumet | 413,504 | 132,602 | 273,523 | 143,827 | 2,665 | 59,675 | 3,568 | ..... | 3,063 |
| Chippewa | 223,630 | 98,748 | 348,239 | 24,636 | 3,515 | 73,124 | 18,562 | 13 | 601 |
| Clark | 46,694 | 61,617 | 123,703 | 6,309 | 4,844 | 72,323 | 8,741 | ..... | 1,158 |
| Columbia | 640,359 | 959,210 | 746,357 | 128,068 | 55,638 | 148,747 | 9,022 | 56 | 20,919 |
| Crawford | 259,458 | 362,340 | 264,008 | 19,381 | 11,466 | 76,381 | 803 | ..... | 10,100 |
| Dane | 764,889 | 2,278,864 | 1,919,933 | 402,471 | 69,090 | 210,365 | 28,308 | ..... | 42,416 |
| Dodge | 1,590,742 | 890,765 | 904,937 | 317,360 | 24,366 | 192,636 | 23,256 | ..... | 27,295 |
| Door | 164,529 | 6,927 | 97,665 | 13,897 | 9,300 | 59,054 | 48,252 | ..... | 681 |
| Douglas | 350 | 150 | 200 | ..... | ..... | 2,100 | 250 | ..... | 5 |
| Dunn | 379,649 | 218,595 | 495,783 | 38,388 | 14,243 | 80,936 | 19,134 | ..... | 1,898 |
| Eau Claire | 439,360 | 191,070 | 412,879 | 20,236 | 10,788 | 54,583 | 6,920 | ..... | 1,448 |
| Fond du Lac | 1,085,303 | 585,882 | 815,497 | 245,600 | 11,611 | 205,837 | 16,219 | ..... | 25,447 |
| Grant (incomplete returns) | 363,061 | 2,596,577 | 1,292,808 | 33,773 | 41,863 | 224,898 | 5,986 | ..... | 44,108 |
| Green | 162,892 | 1,649,833 | 1,084,195 | 9,191 | 41,380 | 95,157 | 337 | ..... | 25,400 |
| Green Lake | 400,073 | 405,447 | 567,847 | 26,327 | 39,942 | 63,811 | 6,323 | 825 | 12,179 |
| Iowa | 396,104 | 1,351,099 | 1,135,526 | 31,352 | 16,152 | 96,656 | 215 | ..... | 25,053 |
| Jackson | 253,107 | 194,097 | 338,797 | 64,857 | 11,463 | 44,431 | 4,193 | 8,137 | 1,442 |
| Jefferson | 539,163 | 808,128 | 470,003 | 219,807 | 51,985 | 137,007 | 9,599 | 39 | 38,404 |
| Juneau | 141,345 | 223,533 | 323,278 | 7,973 | 40,761 | 140,876 | 7,432 | 12,769 | 5,392 |
| Kenosha | 73,410 | 673,759 | 494,857 | 24,002 | 12,455 | 43,620 | 630 | ..... | 35,623 |
| Kewaunee | 299,201 | 11,625 | 226,088 | 20,463 | 35,369 | 59,218 | 9,893 | ..... | 816 |
| La Crosse | 458,310 | 297,003 | 386,351 | 43,830 | 38,642 | 86,878 | 7,735 | 150 | 3,404 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| La Fayette | 122,824 | 2,146,549 | 1,485,640 | 22,828 | 19,179 | 132,547 | 196 | ..... | 15,600 |
| Lincoln | 5,326 | 435 | 13,780 | 223 | ..... | 9,148 | 4,000 | ..... | 144 |
| Manitowoc | 681,195 | 26,431 | 542,374 | 95,779 | 68,574 | 125,245 | 13,391 | 1 | 1,788 |
| Marathon | 71,732 | 11,029 | 133,571 | 6,730 | 5,265 | 83,818 | 35,814 | ..... | 250 |
| Marinette | 14,612 | 4,353 | 21,982 | 1,682 | 4,158 | 23,641 | 11,686 | 100 | 82 |
| Marquette | 89,773 | 334,151 | 114,197 | 666 | 112,298 | 62,989 | 6,053 | 390 | 8,267 |
| Milwaukee | 182,258 | 210,639 | 435,244 | 189,194 | 70,005 | 240,189 | 18,874 | ..... | 25,810 |
| Monroe | 441,511 | 313,547 | 505,100 | 39,402 | 20,704 | 108,246 | 8,598 | 900 | 5,251 |
| Oconto | 47,080 | 21,141 | 44,407 | 5,251 | 6,146 | 70,677 | 21,494 | ..... | 827 |
| Outagamie | 479,105 | 300,520 | 424,906 | 62,209 | 15,946 | 172,077 | 16,043 | ..... | 5,023 |
| Ozaukee | 337,832 | 83,448 | 323,576 | 109,947 | 34,616 | 101,949 | 11,418 | ..... | 7,961 |
| Pepin | 162,300 | 121,125 | 120,804 | 7,773 | 14,701 | 37,464 | 9,362 | ..... | 1,672 |
| Pierce | 691,628 | 224,108 | 333,579 | 36,765 | 3,349 | 83,778 | 13,422 | 5 | 2,022 |
| Polk | 272,726 | 36,661 | 165,977 | 13,516 | 4,577 | 49,817 | 38,618 | 289 | 904 |
| Portage | 159,297 | 188,203 | 178,547 | 14,170 | 82,762 | 149,389 | 12,641 | 1,335 | 977 |
| Price | 95 | 115 | 1,170 | ..... | 2 | 8,410 | 4,900 | ..... | ..... |
| Racine | 162,720 | 430,597 | 482,495 | 40,549 | 29,440 | 101,749 | 16,609 | 6 | 26,284 |
| Richland | 300,177 | 763,289 | 294,015 | 5,290 | 9,306 | 92,972 | 1,157 | ..... | 8,041 |
| Rock | 295,319 | 2,134,348 | 1,536,782 | 452,839 | 104,621 | 189,481 | 16,356 | ..... | 57,383 |
| St. Croix | 1,064,461 | 170,995 | 619,701 | 22,325 | 3,490 | 93,849 | 11,321 | ..... | 2,081 |
| Sauk | 529,925 | 741,911 | 771,741 | 39,323 | 48,117 | 199,460 | 5,835 | 7 | 19,866 |
| Shawano | 152,201 | 40,035 | 138,473 | 10,595 | 20,290 | 58,375 | 27,628 | 68 | 537 |
| Sheboygan | 517,040 | 270,569 | 555,469 | 186,562 | 67,413 | 136,547 | 54,166 | ..... | 19,876 |
| Taylor | 802 | 816 | 3,284 | 45 | 53 | 17,894 | 15,387 | ..... | ..... |
| Trempealeau | 739,275 | 360,753 | 625,489 | 60,579 | 13,778 | 58,129 | 10,971 | 3 | 1,727 |
| Vernon | 576,757 | 556,809 | 737,422 | 75,609 | 19,324 | 115,775 | 4,563 | 18 | 9,747 |
| Walworth | 297,793 | 1,281,354 | 774,459 | 203,455 | 25,835 | 127,213 | 13,159 | 137 | 61,342 |
| Washington | 737,210 | 380,769 | 469,999 | 178,052 | 71,298 | 143,363 | 16,818 | 10 | 23,460 |
| Waukesha | 655,280 | 809,546 | 716,842 | 332,434 | 84,829 | 254,956 | 47,526 | 119 | 56,919 |
| Waupaca | 194,641 | 245,858 | 220,513 | 28,563 | 57,105 | 167,109 | 14,566 | 122 | 5,285 |
| Waushara | 149,965 | 300,965 | 219,059 | 4,276 | 133,584 | 80,859 | 9,215 | 17,739 | 5,915 |
| Winnebago | 697,690 | 523,672 | 458,555 | 41,208 | 12,222 | 133,659 | 17,282 | 2,258 | 11,125 |
| Wood | 11,082 | 26,920 | 44,721 | 1,036 | 18,176 | 39,810 | 20,733 | 20,740 | 893 |
| Total | 21,040,238 | 27,539,121 | 27,197,579 | 4,246,452 | 1,869,250 | 5,994,923 | 815,688 | 67,339 | 718,687 |

## STATEMENT OF THE PRINCIPAL FARM PRODUCTS GROWN IN 1879 — continued.

| COUNTIES. | No. of Bushels. | | No of Acres Harvested for Seed. | | Number of Pounds. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Clover seed. | Timothy seed. | Clover. | Timothy. | Flax. | Hops. | Tobacco. | Grasses, tons. | Butter. | Cheese. |
| Adams | 3,820 | 452 | 1,580 | 122 | ..... | 121,863 | 6,325 | 3,681 | 162,981 | 9,550 |
| Ashland | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 332 | 3,055 | ..... |
| Barron | ..... | 91 | ..... | 8 | 10 | 4,947 | 1,926 | 2,557 | 72,935 | 205 |
| Bayfield | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 423 | 700 | ..... |
| Brown | 21 | 14 | 213 | 34 | 41 | 157 | 1,677 | 14,315 | 298,348 | 42,235 |
| Buffalo | 326 | 150 | 161 | 42 | ..... | ..... | 1,104 | 10,876 | 211,140 | 32,052 |
| Burnett | ..... | ..... | ..... | ..... | ..... | ..... | 110 | 178 | 24,391 | 701 |
| Calumet | 7,922 | 15 | 4,137 | 6 | ..... | 33,000 | 540 | 11,685 | 297,814 | 119,623 |
| Chippewa | 18 | 17 | 22 | 17 | ..... | 525 | 875 | 8,003 | 148,723 | 510 |
| Clark | 359 | 259 | 96 | 14 | ..... | ..... | 507 | 13,804 | 170,916 | 25,715 |
| Columbia | 8,233 | 5,776 | 4,471 | 1,133 | 4,370 | 84,751 | 1,720 | 39,545 | 777,929 | 362,537 |
| Crawford | 528 | 196 | 307 | 87 | ..... | 432 | 12,084 | 31,810 | 143,746 | 4,950 |
| Dane | 14,755 | 2,082 | 7,702 | 616 | 33,572 | 49,646 | 5,173,870 | 59,706 | 1,630,677 | 262,664 |
| Dodge | 8,815 | 1,870 | 4,250 | 531 | 389 | 15,140 | 7,500 | 42,487 | 972,976 | 626,593 |
| Door | 76 | 36 | 37 | ..... | ..... | 9 | 656 | 4,781 | 110,513 | ..... |
| Douglas | ..... | ..... | 5 | 10 | ..... | ..... | ..... | 213 | 1,200 | ..... |
| Dunn | 127 | 158 | 120 | 51 | ..... | 1,554 | 200 | 9,332 | 240,428 | 1,350 |
| Eau Claire | 555 | 188 | 330 | 50 | ..... | ..... | 150 | 8,868 | 185,181 | 1,855 |
| Fond du Lac | 10,148 | 1,620 | 6,034 | 415 | 107 | 18,900 | 1,050 | 55,082 | 721,284 | 1,068,343 |
| Grant | 12,385 | 1,154 | 6,180 | 534 | 3,200,995 | 18,062 | 19,041 | 45,624 | 777,184 | 37,542 |
| Green | 8,134 | 2,530 | 4,820 | 675 | 23,535 | 10 | 71,480 | 44,861 | 686,060 | 2,116,245 |
| Green Lake | 8,459 | 8,461 | 2,303 | 1,685 | 6,376 | 15,000 | 1,119 | 7,744 | 285,253 | 365,733 |
| Iowa | 5,856 | 1,244 | 2,086 | 271 | 5,326,728 | 4,920 | 1,297 | 20,817 | 695,664 | 10,700 |
| Jackson | 2,377 | 275 | 1,218 | 130 | ..... | 15,590 | 525 | 8,948 | 199,000 | 5,043 |
| Jefferson | 10,594 | 331 | 6,835 | 104 | 11,875 | 290,590 | 161,182 | 24,769 | 558,441 | 1,960,433 |
| Juneau | 2,348 | 435 | 1,429 | 116 | 100 | 129,383 | 455 | 7,037 | 226,880 | 35,240 |
| Kenosha | 2,386 | 314 | 1,099 | 174 | 1,582,878 | ..... | 10 | 21,824 | 537,129 | 199,257 |
| Kewaunee | 197 | 15 | 67 | 1 | ..... | 50 | 6,525 | 7,383 | 116,189 | 94,268 |
| La Crosse | 2,013 | 235 | 1,052 | 102 | ..... | 71,964 | ..... | 19,345 | 319,346 | 46,690 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| La Fayette | 7,805 | 853 | 4,706 | 236 | 6,733,870 | 417 | 11,920 | 31,711 | 878,498 | 43,663 |
| Lincoln | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 370 | 2,267 | ..... |
| Manitowoc | 9,745 | 49 | 5,151 | 110 | 452 | 3,180 | 1,285 | 21,563 | 460,227 | 464,637 |
| Marathon | ..... | 85 | 10 | 60 | 50 | ..... | 553 | 7,948 | 82,135 | 262 |
| Marinette | ..... | ..... | ..... | ..... | ..... | 1,400 | 250 | 1,375 | 1,275 | ..... |
| Marquette | 5,000 | 74 | 2,572 | 32 | 37 | 12,574 | 984 | 6,100 | 149,376 | 13,525 |
| Milwaukee | 2,399 | 22 | 1,064 | 7 | 1,074 | 13,504 | ..... | 27,066 | 535,078 | 37,042 |
| Monroe | 7,807 | 781 | 3,395 | 208 | ..... | 75,408 | 1,068 | 24,199 | 357,796 | 46,291 |
| Oconto | ..... | 8 | ..... | ..... | ..... | ..... | 741 | 3,411 | 65,032 | 13,000 |
| Outagamie | 3,057 | 40 | 1,515 | 1 | ..... | 6,824 | 856 | 20,923 | 494,479 | 95,752 |
| Ozaukee | 10,693 | 14 | 7,209 | 12 | 2,014 | 2,250 | 248 | 15,748 | 316,439 | 197,800 |
| Pepin | 83 | 237 | 25 | 84 | 25 | ..... | 881 | 3,602 | 88,975 | 22,087 |
| Pierce | 552 | 57 | 258 | 28 | 20 | 1 | 762 | 14,515 | 244,406 | 3,173 |
| Polk | 4 | 35 | ..... | 7 | ..... | ..... | 1,341 | 5,919 | 156,830 | 2,185 |
| Portage | 2,018 | 523 | 698 | 196 | ..... | 153,810 | ..... | 5,280 | 217,745 | 7,137 |
| Price | ..... | ..... | ..... | 12 | ..... | ..... | ..... | 277 | 450 | ..... |
| Racine | 3,271 | 332 | 1,504 | 124 | 62,253 | 5,415 | ..... | 11,378 | 491,813 | 62,830 |
| Richland | 3,355 | 662 | 1,494 | 140 | 66 | 9,851 | 1,195 | 23,934 | 429,708 | 644,897 |
| Rock | 15,004 | 6,364 | 8,439 | 1,570 | 120,035 | 450 | 3,506,670 | 52,947 | 1,226,963 | 768,340 |
| St. Croix | 617 | 275 | 428 | 152 | ..... | ..... | 209 | 13,432 | 271,433 | 2,875 |
| Sauk | 8,383 | 1,006 | 4,163 | 246 | 432 | 179,591 | 1,793 | 27,843 | 579,022 | 150,941 |
| Shawano | 31 | 26 | 208 | 107 | ..... | 7 | 1,766 | 4,222 | 56,632 | 207 |
| Sheboygan | 14,569 | 79 | 16,283 | 28 | 3 | 18,600 | 372 | 39,423 | 482,835 | 4,170,517 |
| Taylor | ..... | 2 | ..... | ..... | ..... | ..... | 638 | 729 | 8,989 | ..... |
| Trempealeau | 1,776 | 773 | 978 | 278 | 7 | 1,160 | 1,130 | 13,012 | 391,307 | 18,135 |
| Vernon | 2,915 | 326 | 1,737 | 154 | 82,568 | 21,249 | 33,562 | 23,462 | 386,877 | 37,807 |
| Walworth | 15,267 | 6,578 | 8,267 | 1,491 | 378,029 | 7,530 | 8,300 | 52,381 | 1,076,809 | 879,924 |
| Washington | 15,318 | 12 | 8,196 | 3 | ..... | 4,540 | ..... | 17,119 | 544,651 | 120,737 |
| Waukesha | 9,515 | 653 | 4,945 | 258 | 25,567 | 130,839 | 1,167 | 41,609 | 857,455 | 459,943 |
| Waupaca | 5,554 | 418 | 1,811 | 107 | ..... | 50,818 | 630 | 11,576 | 267,236 | 101,995 |
| Waushara | 3,003 | 641 | 1,745 | 313 | 1 | 65,579 | 450 | 17,975 | 342,598 | 114,096 |
| Winnebago | 5,083 | 132 | 2,275 | 28 | 380 | 24,111 | 154 | 27,754 | 582,838 | 467,028 |
| Wood | 25 | 14 | 28 | ..... | ..... | 2,100 | 100 | 2,879 | 79,292 | 385 |
| Totals | 263,311 | 48,989 | 145,658 | 12,920 | 17,597,859 | 1,667,612 | 9,050,954 | 1,098,713 | 22,703,549 | 16,407,145 |

## LIST OF OFFICERS OF AGRICULTURAL SOCIETIES FOR 1880, WITH THEIR P. O. ADDRESS, AND PLACE AND DATE OF HOLDING FAIR IN 1879.

| COUNTIES. | Name of Society, and place and date of holding Fair of 1879. | Name and Post Office Address of President. | Name and Post Office Address of Secretary. | Name and Post Office Address of Treasurer. |
|---|---|---|---|---|
| Adams..... | Adams County Agricultural Society, Friendship, Sept. 24–25. | L. W. Holmes, Big Flats. | W. R. Newton, Friendship. | A. F. Hill, Friendship. |
| Barron..... | Barron County Agricultural Society, Barron, Sept. 16–17. | W. W. Flinn, Moose Ear. | Fred. Telke, Barron. | Ed. C. Coleman, Rice Lake. |
| Brown..... | Brown County Agricultural Society, Cormier Park, Oct. 13–16. | Frank Hagemeister, Green Bay. | J. D. Emeigh, Green Bay. | A. G. E. Holmes, Green Bay. |
| Buffalo..... | Buffalo County Agricultural Society, Alma, Sept. 17–19. | John Burgess, Alma. | Robert Lees, Alma. | Erick Alme, Alma. |
| Burnett..... | Burnett County Agricultural Society, Grantsburg, Sept. 24–26. | William Irvin, Grantsburg. | J. J. Buck, Grantsburg. | Andrew Ahlstrom, Grantsburg. |
| Calumet..... | Calumet County Agricultural Society, Chilton, Sept. 11–13. | John B. Nugent, Sherwood. | C. G. Cone, Chilton. | William Paulsen, Chilton. |
| Calumet..... | Calumet County Agricultural Association, Held no fair. | B. F. Carter, Sherwood. | Geo. D. Breed, Chilton. | R. F. Connell, Hayton. |
| Clark..... | Clark County Agricultural Society, Neillsville, Sept. 16–18. | J. F. Canon, Neillsville. | Wm. Campbell, Neillsville. | Herman Schuster, Neillsville. |
| Columbia... | Columbia County Agricultural Society, Portage, Sept. 13–18. | D. Buchanan, Rio. | Z. J. D. Swift, Pacific. | George Yule, Portage. |
| Columbia.... | Columbus Union Agricultural Society, Columbus, Sept. 24–26. | James Webster, Danville | Nic. Adams, Columbus. | L. Birdsey, Columbus. |
| Columbia.... | Lodi Union Agricultural Society, Lodi, Sept. 23–25. | A. A. Boyce, Lodi. | E. W. Gardner, Lodi. | Job Mills, Lodi. |
| Crawford..... | Crawford County Agricultural Society, Seneca, Sept. 16–18. | Edward Garvey, Seneca. | A. B. Withee, Seneca. | D. W. Briggs, Mt. Sterling. |
| Dodge..... | Dodge County Agricultural Society, Juneau, Sept. 16–18. | J. H. Dunham, Juneau. | Eli Hawks, Juneau. | John A. Cole, Hustisford. |
| Door..... | Door County Agricultural Society, Sturgeon Bay, Sept. 26–27. | George Walker, Sturgeon Bay. | Henry T. Scudder, Sturgeon Bay. | Henry Martin, Sevastopol. |

| | | | | |
|---|---|---|---|---|
| Fond du Lac.. | Fond du Lac County Agricultural Society, Fond du Lac, Sept. 24–26. | A. C. Whiting, Ladoga. | G. de Nevu, Fond du Lac. | Frank B. Hoskins, Fond du Lac. |
| Fond du Lac.. | Ripon Agricultural Association, Ripon, Sept. 23–25. | H. Z. Town, Ripon. | G. F. Horner, Ripon. | A. Orsborn, Ripon. |
| Grant..... | Grant County Agricultural Society, Lancaster, Sept. 17–19. | A. H. Barber, Lancaster. | J. M. Kilbourn, Lancaster. | Jas. Woodhouse, Lancaster. |
| Grant .... ... | Boscobel Ag'l and Driving Park Association, Boscobel, Sept. 24–26. | Geo. F. Hildebrand, Boscobel. | T. J. Brooks, Boscobel. | Th. Kronshage, Boscobel. |
| Green ..... | Green County Agricultural Society, Monroe, Sept. 17–20. | Joseph B. Treat, Monroe. | Wm. W. Wright, Monroe. | John Bolender, Monroe. |
| Iowa..... | Iowa County Agricultural Society, Dodgeville, Sept. 24–26. | Joel Whitman, Dodgeville. | Wm. H. Prideaux, Dodgeville. | James J. Hoskins, Dodgeville. |
| Iowa .... .... | Southwestern Wis. Industrial Association, Mineral Point, Sept. 2–5. | R. D. Pulford, Mineral Point. | Delos P. Beech, Mineral Point. | Thos. Priestley, Mineral Point. |
| Jackson ..... | Jackson County Agricultural Society, Black River Falls, Oct. 1–3. | W. T. Price, Black River Falls. | John Parsons, Black River Falls. | W. R. O'Hearn, Bl'k River Falls. |
| Jefferson ..... | Jefferson County Agricultural Society, Jefferson, Sept. 16–19. | W. S. Greene, Milford. | D. W. Curtis, Fort Atkinson. | Solon Brown, Jefferson. |
| Jefferson ..... | Central Wisconsin Ag'l and Mech. Associat'n, Watertown, Sept. 22–26. | Jesse Stone, Watertown. | F. P. Brook, Watertown. | Jos. Salick, Watertown. |
| Juneau ..... | Juneau County Agricultural Society, Mauston, Oct. 1–4. | S. Phillips, Mauston. | M. H. Case, Mauston. | M. Temple, Mauston. |
| Kenosha..... | Kenosha County Agricultural Society, Kenosha, Sept. 16–20. | Edward Bain, Kenosha. | Robert F. Roberts, Woodworth. | Emery J. Bentley, Kenosha. |
| Kewaunee .... | Kewaunee County Agricultural Society, Kewaunee, Sept. 18–20. | Lorenz Lutz, Kewaunee. | Louis Bruemmer, Kewaunee. | Wenzel Kieweg, Carlton. |
| La Crosse..... | La Crosse County Agricultural Society, West Salem, Sept. 17–19. | Wm. Van Waters, West Salem. | L. Lottridge, West Salem. | Harvey Dickinson, West Salem. |
| La Fayette.... | La Fayette County Agricultural Society, Darlington, Sept. 9–11. | J. H. Earnest, Shullsburg. | Neil Fisher, Darlington. | D. Schreiter, Darlington. |
| Manitowoc ... | Manitowoc Co. Central Mech. & Ag'l Society, Clark's Mills, Sept. 23–25. | R. S. O'Connell, Cato. | W. H. Nelson, Cato. | Chris. Larson, Oslo. |
| Marathon..... | Marathon County Agricultural Society, Wausau, Sept. 25. | B. G. Plumer, Wausau. | Wm. Wilson, Wausau. | D. L. Plumer, Wausau. |
| Marquette .... | Marquette County Agricultural Society, Montello, Sept. 24–25. | John Ellis, Moundville. | Wm. H. Peters, Montello. | M. G. Ellison, Montello. |

LIST OF OFFICERS OF AGRICULTURAL SOCIETIES FOR 1880—continued.

| COUNTIES. | Name of Society and Place and Date of Holding Fair of 1879. | Name and Post Office Address of President. | Name and Post Office Address of Secretary. | Name and Post Office Address of Treasurer. |
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| Monroe..... | Monroe County Agricultural Society, Sparta, Sept. 24–26. | C. A. Hunt, Melvina. | C. E. Boyden, Sparta. | T. B. Tyler, Sparta. |
| Monroe..... | Eastern Monroe Co. Agricultural Ass'n, Tomah, Sept. 17–19. | David Johns, Tomah. | E. L. Bolton, Tomah. | Wm. G. Baker, Oakdale. |
| Oconto ..... | Oconto County Agricultural Society, Oconto, Sept. 9–11. | Wm. H. Young, Oconto. | E. F. Paramore, Oconto. | C. S. McKinzie, Gillett Center. |
| Outagamie.... | Outagamie Co. Agricultural Society, No report of fair in 1879. | John Dey, Greenville. | J. E. Harriman, Appleton. | Dan. Woodard, Appleton. |
| Ozaukee..... | Ozaukee County Agricultural Society, Saukville, Sept. 24–25 | A. M. Alling, Saukville. | L. C. Larsen, Port Washington, | Aug. Koenig, Saukville. |
| Pepin .... ... | Pepin County Agricultural Society, Durand, Sept. 10-13. | S. L. Plummer, Arkansaw. | Miletus Knight, Durand. | Geo. Tarrant, Durand. |
| Pierce..... | Pierce County Agricultural Society, Prescott, Sept. 18-19. | W. T. Bunker, Prescott, | Daniel J. Dill, Prescott. | John A. Stirrat, Prescott. |
| Portage ..... | Portage County Agricultural Society, Amherst, Sept. 23–25. | Thomas Pipe, Sheridan. | James Thompson, Jr., Amherst. | David Allen, Amherst. |
| Racine ..... | Racine County Agricultural Society, Burlington, Sept. 30–Oct. 3. | H. B. Roberts, Franksville. | John Reynolds, Burlington. | F. J. Ayers, Burlington. |
| Richland ..... | Richland County Agricultural Society, Richland Center, Sept. 19–21. | J. L. R. McCollum, Richland Center. | W. M. Fogo, Richland Center. | D. L. Downs, Richland Center. |
| Rock .... .... | Rock County Agricultural Society, Janesville, July 3–5. | Seth Fisher, Center. | R. J. Richardson, Janesville. | N. P. Bump, Leyden. |
| Rock ..... | South. Wis. & North. Ill. Ind. Ass'n, Beloit, Sept. 2–5. | H. D. Northrop, Clinton. | B. A. Chapman, Beloit. | G. A. Houston, Beloit. |
| St. Croix..... | St. Croix County Agricultural Society, New Richmond, Sept. 9–11. | Geo. B. Kidder, Star Prairie. | R. R. Young, Hudson. | A. D. Richardson, Hudson. |
| Sauk ..... | Sauk County Agricultural Society, Baraboo, Oct. 1–3. | John M. True, Baraboo. | F. N. Peck, Reedsburg. | J. B. Duncan, Baraboo. |

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| Shawano ..... | Shawano County Agricultural Society, Shawano, Sept. 3-5 | Henry Luecke, Bonduel. | D. H. Pulcifer, Shawano. | A. M. Andrews, Shawano. |
| Sheboygan ... | Sheboygan County Agricultural Society, Sheboygan Falls, Sept. 16-18. | Henry Wheeler, Plymouth. | Byron Sanford, Sheboygan Falls. | J. D. Parish, Sheboygan Falls. |
| Sheboygan ... | Sheboygan Co. Ger. Ag. & Ind. Association, Sheboygan, Sept. 23-25. | Carl Wippermann, Mosell. | Joseph Bast, Sheboygan. | Carl Reich, Sheboygan. |
| Trempealeau . | Trempealeau County Agricultural Society, Galesville, Sept. 3-5. | A. R. Carhart, Trempealeau. | E. H. Clark, Galesville. | A. H. Kneeland, Galesville. |
| Vernon ..... | Vernon County Agricultural Society, Viroqua, Sept. 17-19. | D. A. Bean, Red Mound. | O. B. Wyman, Viroqua. | E. Powell, Viroqua. |
| Walworth .... | Walworth County Agricultural Society, Elkhorn, Sept. 23-26. | C. R. Gibbs, Whitewater. | W. H. Morrison, Elkhorn. | Hollis Latham, Elkhorn. |
| Washington .. | Washington County Agricultural Society, West Bend, Oct. 1-4. | Geo. W. Jones, West Bend. | L. S. Barney, West Bend. | E. Frankenberg, West Bend. |
| Waukesha... | Waukesha County Agricultural Society, Waukesha, Oct. 7-10. | Eph. Beaumont, Hartland. | M. L. Butterfield, Waukesha. | Geo. F. H. Barber, Waukesha. |
| Waupaca..... | Waupaca County Agricultural Society, Weyauwega, Oct. 1-3. | Isaac Alden, Weyauwega. | Geo. W. Taggart, Weyauwega. | Andrew Gardner, Weyauwega. |
| Waupaca..... | Waupaca Agricultural and Mech'l Associati'n, Waupaca, Sept. 10-12. | A. Gordon, Waupaca. | C. Caldwell, Lind Center. | D. Parish, Waupaca. |
| Waushara.... | Waushara County Agricultural Society, Wautoma, Sept. 24-26. | J. N. P. Bird, Wautoma. | W. S. Monroe, Wautoma. | S. M. Olds, Wautoma. |
| Winnebago... | Northern Wis. Ag'l & Mechanical Association, Oshkosh, Sept. 15-19. | H. B. Sherman, Burnett Junction. | R. D. Torrey, Oshkosh. | E. W. Viall, Oshkosh. |
| Wood ..... | Wood County Agricultural Society, Grand Rapids, Sept. 2-5. | Geo. R. Gardner, Grand Rapids. | L. O. Schultz, Grand Rapids. | Seth Reeves, Grand Rapids. |

## ENTOMOLOGICAL NOTES.

By F. W. CASE.

HISTORY AND CULTIVATION OF PYRETHRUM.— As this plant is doubtless soon to come into general use as an insecticide, everything in relation to its history and cultivation will be of interest, and therefore we copy a very interesting article on this subject, written by Prof. Riley for the *American Naturalist :*

"There are very few data at hand concerning the discovery of the insecticide properties of Pyrethrum. The powder has been in use for many years, in Asiatic countries, south of the Caucasus mountains. It was sold at a high price by the inhabitants, who successfully kept its nature a secret, until the begining of this century, when an American merchant, Mr. Jumtikoff, learned that the powder was obtained from the dried and pulverized flower-heads of certain species of Pyrethrum, growing abundantly in the mountain region of what is now known as the Russian province of Trans Caucasia. The son of Mr. Jumtikoff began the manufacture of the article on a large scale, in 1828, after which year the Pyrethrum industry steadily grew, until to-day the export of the dried flower-heads represents an important item in the revenue of those countries.

"Still less seems to be known of the discovery and history of the Dalmatian species of Pyrethrum *(P. cinerariæfolium)*, but it is probable that its history is very similar to that of the Asiatic species. At the present time, the Pyrethrum flowers are considered by far the most valuable product of the soil of Dalmatia.

"There is also very little information published regarding either the mode of growth or the cultivation of Pyrethrum plants in their native home. As to the Caucasian species, we have reason to believe that they are not cultivated, at least not at the present time, statements to the contrary notwithstanding. The well-known Dr. Gustav Radde, director of the Imperial Museum of Natural History at Tiflis, Trans Caucasia, who is the highest living authority on everything pertaining to the natural history of

that region, wrote us recently as follows: 'The only species of its genus, *Pyrethrum roseum*, which gives a good, effective insect powder, is nowhere cultivated, but grows wild in the basal-alpine zone of our mountains, at an altitude of from six to eight thousand feet.' From this it appears that this species, at least, is not cultivated in its native home, and Dr. Radde's statement is corroborated by a communication of Mr. S. M. Hutton, Vice-Consul General of the United States at Moscow, Russia, to whom we applied for seed of this species. He writes that his agents were not able to get more than about half a pound of the seed from any one person. From this statement it may be inferred that the seeds have to be gathered from the wild and not from the cultivated plants.

"As to the Dalmatian plant, it is also said to be cultivated in its native home, but we can get no definite information on this score, owing to the fact that the inhabitants are very unwilling to give any information regarding a plant the product of which they wish to monopolize. For similar reasons we have found great difficulty in obtaining even small quantities of seed of *P. cinerariæfolium* that was not baked or in other ways tampered with to prevent germination. Indeed, the people are so jealous of their plant that to send the seed out of the country becomes a serious matter, in which life is risked. The seed of *Pyrethrum roseum* is obtained with less difficulty, at least in small quantities, and it has even become an article of commerce, several nurserymen here, as well as in Europe, advertising it in their catalogues. The species has been successfully grown as a garden plant for its pale rose or bright pink flower-rays. Mr. Thomas Meehan, of Germantown, Pennsylvania, writes us: 'I have had a plant of *Pyrethrum roseum* in my herbaceous garden for many years past, and it holds its own without any care much better than many other things. I should say from this experience that it was a plant which will very easily accommodate itself to culture anywhere in the United States.' Peter Henderson, of New York, another well known and experienced nurseryman, writes: 'I have grown the plant and its varieties for ten years. It is of the

easiest cultivation either by seeds or divisions. It now ramifies into a great variety of all shades, from white to deep crimson, double and single, perfectly hardy here, and I think likely to be nearly everywhere on this continent.' Dr. James C. Neal, of Archer, Florida, has also successfully grown *P. roseum* and many varieties thereof, and other correspondents report similar favorable experience. None of them have found a special mode of cultivation necessary. In 1856 Mr. C. Willemot made a serious attempt to introduce and cultivate the plant on a large scale in France. As his account of the cultivation of Pyrethrum is the best we know of, we quote here his experience in full, with but few slight omissions: 'The soil best adapted to its culture should be composed of a pure ground, somewhat silicious and dry. Moisture and the presence of clay is injurious, the plant being extremely sensitive to the excess of water, and would in such case immediately perish. A southern exposure is the most favorable. The best time for putting the seeds in the ground is from March to April. It can be done even in the month of February if the weather will permit it. After the soil has been prepared and the seeds are sown they are covered by a stratum of ground mixed with some vegetable mould, when the roller is slightly applied to it. Every five or six days the watering has to be renewed, in order to facilitate the germination. At the end of about thirty or forty days the young plants make their appearance, and as soon as they have gained strength enough they are transplanted at a distance of about six inches from each other. Three months after this operation they are transplanted again at a distance of from fourteen to twenty inches, according to their strength. Each transplantation requires, of course, a new watering, which, however, should only be moderately applied. The blossoming of the Pyrethrum commences the second year, toward the end of May, and continues to the end of September.' Mr. Willemot also states that the plant is very little sensitive to cold, and needs no shelter, even during severe winters.

"The above quoted directions have reference to the climate of France, and as the cultivation of the plant in many parts of North

America is yet an experiment, a great deal of independent judgment must be used. The plants should be treated in the same manner as the ordinary Asters of the garden or other perennial Compositæ.

"As to the Dalmatian plant, it is well known that Mr. G. N. Milco, a native of Dalmatia, has of late years successfully cultivated *Pyrethrum cinerariæfolium* near Stockton, Cal., and the powder from the California-grown plants, to which Mr. Milco has given the name of 'Buhach,' retains all the insecticide qualities, and is far superior to most of the imported powder, as we know from experience. Mr. Milco gives the following advice about planting — advice which applies more particularly to the Pacific coast: 'Prepare a small bed of fine, loose, sandy, loamy soil, slightly mixed with fine manure. Mix the seed with dry sand and sow carefully on top of the bed. Then with a common rake disturb the surface of the ground half an inch in depth. Sprinkle the bed every evening until sprouted; too much water will cause injury. After it is well sprouted, watering twice a week is sufficient. When about a month old weed carefully. They should be transplanted to loamy soil during the rainy season of winter or spring.'

"Our own experience with *P. roseum*, as well as *P. cinerariæfolium*, in Washington, D. C., has been so far quite satisfactory. Some that we planted last year in the fall came up quite well in the spring, and will, perhaps, bloom the present year. The plants from sound seed which we planted this spring are also doing finely, and as the soil is a rather stiff clay, and the rains have been many and heavy, we conclude that Mr. Willemot has overstated the delicacy of the plants.

"In regard to manufacturing the powder, the flower heads should be gathered during fine weather, when they are about to open, or at the time when fertilization takes place, as the essential oil that gives the insecticide qualities reaches, at this time, its greatest development. When the blossoming has ceased, the stalks may be cut within about four inches from the ground and utilized, being ground and mixed with the flowers in the proportion of one-third of their weight. Great care must be taken not

to expose the flowers to moisture, or the rays of the sun, or, still less, to artificial heat. They should be dried under cover and hermetically closed up in sacks or other vessels to prevent untimely pulverization. The finer the flower heads are pulverized, the more effectually the powder acts and the more economical is its use. Proper pulverization in large quantities is best done by those who make a business of it and have special mill facilities. Leon & Fink, of New York, have furnished us with the most satisfactory powder. For his own use the farmer can pulverize small quantities by the simple method of pounding the flowers in a mortar. It is necessary that the mortar be closed, and a piece of leather through which the pestle moves, such as is generally used in pulverizing pharmaceutic substances in a laboratory, will answer. The quantity to be pulverized should not exceed one pound at a time, thus avoiding too high a degree of heat, which would be injurious to the quality of the powder. The pulverization being deemed sufficient, the substance is sifted through a silk sieve, and then the remainder, with a new addition of flowers, is put in the mortar and pulverized again.

"The best vessels for keeping the powder are fruit jars with patent covers, or any other perfectly tight glass vessel or tin box."

In a later article Prof. Riley treats of

ITS USE AS AN INSECTICIDE.—Up to a comparatively recent period the powder was applied only to the destruction of those insects that are troublesome in dwellings, and Mr. C. Willemot seems to have been the first to point out its value, when used against insects injurious to agriculture and horticulture. He goes, however, too far in its praise, especially when claiming that sowed with wheat it will prevent the ravages of the weevil. During the last three years we have experimented with it on many species of injurious insects, and fully appreciate its value as a general insecticide, which value has been greatly enhanced by the discovery that it can be most economically used in liquid solution, but we are far from considering it a universal remedy for all insects. No such universal remedy exists, and Pyrethrum has its disadvantages, the same as all other insecticides now in use. The follow-

ing are the most serious ones: 1. The action of the powder, in whatever form it may be applied, is not a permanent one in the open air. If it is applied to a plant, it immediately affects the insects on that plant with which it comes in contact, but it will prove perfectly harmless to all insects which come on the plant half an hour, or even less, after the application. 2. The powder acts in the open air, unless applied in very large quantities, only upon actual contact with the insects. If it is applied to the upper side of the leaf, the worms that are on the under side are not affected by it. 3. It has no effect on insect eggs, nor on pupæ that are in any way protected or hardened. These disadvantages render Pyrethrum in some respects inferior to arsenical poisons; but, on the other hand, it has the one overshadowing advantage that it is perfectly harmless to plants or to higher animals; and if the cultivation of the plant in this country should prove a success, and the price of the powder become low enough, the disadvantages mentioned above can be overcome to a great degree by copious and repeated applications.

In a closed room the effect of Pyrethrum on insects is by far more powerful than out-doors. Different species of insects are differently affected by the powder. Some resist its action most effectually, as very hairy caterpillars, and especially spiders of all kinds; while others, as all Hymenoptera, succumb most readily. In no case are the insects killed instantaneously. They are rendered perfectly helpless a few minutes after application, but do not die till sometime afterward, the period varying from several hours to two or three days, according to the species. Many insects that have been treated with Pyrethrum show signs of intense pain, while in others, the outward symptoms are much less marked. Differences in temperature and other meteorological changes do not appear to have any influence on the effect of Pyrethrum.

Pyrethrum may be applied in the dry powder, as a fume; as an alcoholic extract diluted; by simple solution of the powder in water, and as a tea or decoction. In applying it as a powder the method most familiar to housekeepers is by means of a small pair of bellows. It is then generally used without diluent, but

if it is unadulterated and fresh, which cannot be said in many instances of the powder sold at retail by our druggists, it may be considerably diluted with other pulverized material without losing its deadly effect, the use of the powder thus becoming much cheaper. Of the materials which can be used as diluents, common flour seems to be the best, but finely sifted ashes, sawdust of hard wood, or any other light and finely pulverized material that mixes well with the powder, will answer the purpose.

If the mixture is applied immediately after preparation, it is always less efficacious than when left in a perfectly tight vessel for about twenty-four hours, or longer, before use. This has been so far only with the mixture of Pyrethrum with flour, but doubtless holds true with other diluents. Mr. E. A. Schwarz experimented largely under our direction with the mixture of Pyrethrum and flour for the cotton worm, and he found that one part of the powder to eleven parts of the flour is sufficient to kill the worms only a portion of the full-grown worms recovering from the effects of the powder), if the mixture is applied immediately after preparation; but if kept in a tight glass jar for about two days, one part of the powder to twenty-two parts of flour is sufficient to kill all average sized worms with which it comes in contact. For very young cotton worms, a mixture of one part of Pyrethrum to thirty parts of flour, and applied one day after preparation, proved most effective, scarcely any of the worms recovering.

An ordinary powder bellows will answer for insects infesting dwellings, or for plants kept in pots in rooms, or single plants in the garden, but it hardly answers on a large scale out of doors, for it works too slowly; the amount of powder discharged cannot be regulated, and there is difficulty in covering all parts of a large plant. Another method of applying dry powder is to sift it on to the plants by means of sieves. This method is no doubt excellent for insects that live on the upper side of the leaves; for large, shrub-like plants, and for insects that live or hide on the under side of the leaf, it will prove less servicable. A very satisfactory way of applying the powder on large plants, in the absence of any suitable machinery or contrivance, is to throw it with the

hand, as in seed sowing. This method is more economical, more rapid, than those mentioned above, and has the advantage that, if the plants are high enough, the powder can be applied to the under side of the leaves.

Prof. W. A. Henry, in speaking at the joint convention of his experiments with Pyrethrum powder, or Bubach, as it is called by Mr. Milco, who is manufacturing it, said he believed it would soon become one of our most popular and most effective insecticides. It could be used to destroy household pests, in the hot-house, garden and field, or on our domestic animals, as it was perfectly harmless except to insect life. The plant from which the powder is made resembles the Wild Sunflower or Rosin Weed. Like it, it has a volatile oil which is the destructive principle. The flowers are picked when in full bloom, and when dried are ground up very fine. It is so harmless to men that it may be eaten in small quantities without injury. If drawn up the nostrils in applying it a slight irritation is produced, but soon is gone and no harm results. This enables it to be used in many places where the active poisons cannot be applied without danger. Most of this powder in the market is brought from Europe, and sold as Persian Insect Powder. This has not proved always satisfactory, as much of it has been adulterated, and from loss of strength by age. That manufactured in California is stronger and cheaper. The price was still high and serves to limit its use except on a small scale, but there was a good prospect of its cost being soon so reduced as to make it possible to use it largely. The company formed to raise and manufacture it have eight hundred acres devoted to its cultivation, and employ over three hundred men. They have expended $60,000 and have received but small returns, but they propose soon to reduce the cost of production so much that they can put it on the market in large quantities at low rates.

Prof. Cook, of Michigan, had used it with great success for the cabbage worm, and Prof. Henry himself had experimented with it quite largely, at Washington and other places, under the direction of Prof. Riley, and had not found an instance in which it

was not effective. There were no insects that it did not destroy. Spiders were quickly killed. House flies dusted with it, by a little insufflator discharging the powder in the air, would soon fall dead from the ceiling, or while on the wing. It may be applied in the powder state, mixed with flour or other light substance, or with water, and sprinkled over the plants in the form of a spray, or may be made into a tea or infusion, and be applied the same way. The two last methods are the most convenient, the cheapest and most effectual, especially on trees and out-door plants, but should be applied at a time when the evaporation would not be rapid. In making the infusion, the leaves and stalks as well as the flowers can be used, but the mixture will not have the strength as when made from flowers alone. In making, the water must not boil, as the volatile elements will thus be driven off. Briskly boiling water should be used, then cover lightly and steep slowly. From some experiments reported, there is reason to believe that where the plant is raised among other plants, it acts as a shield to them from the attacks of insect enemies. All insects avoid the plant itself.

EXPERIMENTS WITH PYRETHRUM.— The following are the experiments alluded to by Prof. Henry, as performed with this powder by Prof. A. J. Cook, of Michigan Agricultural College, taken from the American Naturalist.

SEPTEMBER 27, 1880.

I placed ten cabbage caterpillars (*Pieris Rapæ*, Schrank) in each of two small wooden boxes which were covered with wire gauze. In one box I dusted the least possible amount of Pyrethrum mixed with flour in the proportion of one part of the Pyrethrum to twenty parts of the flour. I sprayed those in the other box with a liquid mixture, using one tablespoonful of Pyrethrum (seven grammes, one-fiftieth pound) to two gallons of water. In five minutes all the larvæ were on their backs; nor did any of them recover. A large number of the caterpillars on the cabbage plants were sprinkled or dusted with the Pyrethrum, the proportion the same as given above. In one hour the plants were examined, and in every case the caterpillars were found dead.

The same experiments as those detailed above were tried with the potato beetle (*Doryphora ten lineata*). Those in the boxes were all down in fifteen minutes, both beetles and larvæ; nor did they recover. I watched those on the vines for twenty minutes, when several had fallen to the ground. These were some distance from my home, and I could not watch them longer. Whether all dropped or not I am not able to say, nor whether all or any recovered.

WEDNESDAY, September 29, 1880.

In the following experiments, the cabbages were simply dusted or sprinkled, with no effort to secure actual contact of the liquid or powder with the larvæ. The experiments were tried under my direction by a very trusty and careful assistant, with the following results:

*First experiment* — By use of a common sprinkler, nine cabbages were treated with the liquid mixture, composed of one tablespoonful of Pyrethrum (seven grammes) to a gallon of water. In one and a half hours after the application, a hasty examination discovered thirteen dead larvæ and three live ones.

*Second experiment* — Ten cabbages were treated the same as above, except that two applications of the liquid were made; nineteen dead larvæ and one live one were found.

*Third experiment* — Twenty-six cabbages were treated with a liquid mixture of one tablespoonful of the powder to two gallons of water. One application was made with Whitman's fountain pump. Eleven dead and four live larvæ were found.

*Fourth experiment* — The same as experiment three, on thirteen cabbages, except that two applications of the liquid were made. There were five dead caterpillars and two alive.

*Fifth experiment* — Twenty cabbages were dusted with a powder compound of one part of Pyrethrum to forty of flour. Five dead larvæ and one live one were found.

*Sixth experiment* — Twenty cabbages were treated the same as number five, except that the mixture was in the proportion of one to twenty. Three dead and three live caterpillars were found.

The examinations in all the above cases were made one and a half hours after the application of the liquid. The examination was too hasty to be thorough.

The next day all were again examined with great care, so that very few, if any larvæ, were omitted in the count.

Number one, cabbages, 9; larva dead, 17, stupefied 39; alive, 3.
Number two, cabbages, 10; larva dead, 42; stupefied, 30; alive, 1.
Number three, cabbages, 26; larva dead, 18; stupefied, 0; alive, 58.
Number four, cabbages, 13; larva dead, 25; stupefied, 3; alive, 1.
Number five, cabbages, 20; larva dead, 18; stupefied, 3; alive 9.
Number six, cabbages, 20; larva dead, 9; stupefied, 0; alive, 1.

FRIDAY, October 1, 1880.

*First experiment* — Treated twelve cabbages; used one gallon of water and one-half spoonful of Pyrethrum. Careful examination revealed eleven dead and eleven alive.

*Second experiment* — Twelve cabbages; used one gallon of water to one-fourth spoonful (two grammes) of the powder. Eleven dead and four alive.

*Third experiment* — Twenty-six cabbages; used Pyrethrum and flour, one to forty. Three dead, five alive, and one stupefied.

*Fourth experiment* — Twelve cabbages ; one gallon water to one spoonful of the powder. Result, thirteen dead, four alive and four stupefied.

The above experiments show conclusively that this powder is fatal to the caterpillars, and that, too, in very dilute liquid mixtures, as only one two-hundredths of a pound to the gallon of water was used in experiment two of October 1st, and eleven larvæ were killed. We have only to sprinkle it on the plants, though it may be necessary to make more than one application to insure complete success. The success was better with the liquid than with flour mixture, and can be applied with greater speed and economy.

A twig of alder (*Alnus serrulata*), covered beneath with woolly Aphides (*Eriosoma tesselatum*, Fitch), was dipped into the liquid mixture of one-fiftieth of a pound to a gallon of water. The next morning all the lice had fallen to the ground, never to rise again.

Flies and mosquitoes in a room where the powdered Pyrethrum had been blown in not very large quantities, less than one one-hundredth of a pound to a room twelve feet square, were felled

to the floor, where nearly all remained till morning, though the application was made the night before. If not swept up some of the flies would recover. The flies commence to fall in ten minutes.

Squash bugs (*coreus tristis*) were kept in the clear powder, in a close tin box, for three days, and were still alive. I also sprinkled and dusted these insects on the vine, and could see no signs of success in killing them.

THE CHINCH BUG — *Blissus leucopterus.* Of the many insect pests that abound in this country, there are none so insignificant in size, so generally well known in their habits and transformations, so much exposed to attack during the greater portion of their existence, and yet are so much beyond control as the chinch bug. This is mainly due to their immense numbers, the wide extent of territory over which they extend, the rapidity with which they multiply, and the fact that owing to their small size they usually escape notice until their myriad hosts have full possession of the fields and their work of destruction is well nigh accomplished. It is also doubtful whether there is any other foe that occasions so frequent, so extended and so great losses to the country.

In compiling the following history and description, much of the information has been taken from the report of Prof. C. Thomas, State Entomologist of Illinois, and member of the United States Entomological Commission, to the Department of the Interior, and from the authorities therein quoted.

In giving the history of the chinch bug in this country, he quotes as follows from the early reports of Dr. Fitch, State Entomologist of New York:

"It was just at the close of the Revolutionary War that the chinch bug was first noticed as a depredator on wheat in the interior of North Carolina. It was at first supposed to be identical with the Hessian fly, which, at this time, was making great havoc in wheat crops on Long Island and New Jersey. Two years before this the British army, accompanied by a detachment of its German auxiliaries, had marched through North Carolina, and the

battle of Guilford Court House was fought. Mr. J. W. Jeffreys states that an aged and highly respectable citizen of Orange county, North Carolina, informed him that it was 'immediately after this event that the Hessian fly or Hessian bug destroyed their crops of wheat; and they believed and do believe to this day (1839) that those soldiers left the flies or bugs as they passed through the country.' The insects continued to increase and spread through the Carolinas and Virginia for several years. In 1785 the fields in North Carolina were so overrun with them as to threaten a total destruction of the grain. And at length the crops were so destroyed in some districts that they were obliged to wholly abandon the sowing of wheat. It was four or five years that they continued so numerous at this time.

"The only particular account which was published of the insect and its habits at this period, of which we have any knowledge, appeared in London, in Young's Annals of Agriculture. It is from this notice of it Kirby and Spence state that 'America suffers also in its wheat and maize from the attack of an insect, which, for what reason I know not, is called the chintz bug fly. It appears to be apterous, and is said in scent and color to resemble the bed bug. They travel in immense columns from field to field, like locusts, destroying everything as they proceed; but their injuries are confined to the states south of the fortieth degree of north latitude. From this account the depredator here noticed should belong to the tribe *Geocorisæ* Latreille; but it seems very difficult to conceive how an insect that lives by suction and has no mandibles, could destroy these plants so totally.'

"About the year 1809, Mr. Jeffreys says that the chinch-bug again became so destructive in North Carolina that in Orange county the farmers had to abandon the sowing of wheat for two years, and according to this statement the insects were subdued thereby. At various other times, of which we have no record, it has undoubtedly been abundant in that and the adjacent states, that section of country appearing to be its headquarters.

"In 1839 we have accounts of its having again become excessively numerous and destructive in Virginia and the Carolinas.

"The bug had now become so numerous in Carolina and Vir-

ginia that, with its continued increase in 1840, the total destruction of their crops appeared inevitable. The prospect was so alarming that Sidney Weller, of Brinkleyville, Halifax county, North Carolina, and others in his neighborhood, united in the spring of 1840 in pledging a handsome sum as a prize for some feasible method to arrest the career of this depredator. But at this juncture providence interfered to accomplish what no human agency could have effected. Instead of being dry, like the two or three preceding years, the summer of 1840 proved to be of an opposite character, and the ravages of this insect were at once suppressed.

"It was about this period that the chinch-bug began to be noticed along the Upper Mississippi and through the northern parts of Illinois. It made its appearance there simultaneously with the establishment of the Mormons at Nauvoo (1840–1844), and many ignorant people firmly believed they were introduced there by these strange religionists, and 'Mormon lice' became the name by which they were currently designated through that district."

The first notice of their appearance in Wisconsin was given by David Williams, of Geneva, in 1854 and 1855. The first notice made of them in Illinois was in 1840, in the northwestern part of the state, near the Mississippi. In 1847 they were seen in Iowa, and in Indiana in 1848. In 1850 they were very abundant in many parts of the northwest. Mr. Walsh estimates the damage they caused that season in the state of Illinois alone at $4,000,000. In 1864 they appeared in much larger numbers and proved far more destructive. The loss incurred throughout the country is figured by Dr. Shimer and others at $100,000,000. The following spring they appeared again in great numbers and the complete annihilation of the crops was expected, but the season proved to be a wet one and the bugs soon disappeared. Again in 1871 they spread over the whole country. Dr. La Baron, at that time State Entomologist of Illinois, places the damage they occasioned in Illinois at $10,600,000, and at $30,000,000 in the northwest. But the year 1874 was perhaps the season when the greatest amount of damage was done by them. The losses even exceeded those of the year 1864. Prof. Riley places the losses of that year, in Missouri, at $19,000,000,

and Prof. Thomas those of Illinois at $30,000,000. From these and other data, Prof. Thomas computes the average annual loss they occasion the country at not less than $20,000,000.

DESCRIPTION.—"The chinch-bug is a small insect less than one-fourth of an inch long, its length usually not exceeding three-twentieths of an inch; its width something less than one-half its length; rounded on the under side and flat above; of a coal-black color, with white wings which have a triangular, black dot on their outer margins. It belongs to the order hemiptera and sub-order heteroptera, to which group also belong the common bed-bug, squash-bug and other similar true bugs. This species like all the rest belonging to the order, has the mouth prolonged into a slender, horny, jointed beak, usually turned under the breast when not in use. With this instrument and the slender needle-like setæ inclosed within it, they puncture the bark, leaves and stems of plants, and suck out their juices. It is in this way the chinch-bug obtains its food. As it has no means of gnawing plants, and is so diminutive in size, it would seem to be incapable of inflicting any very serious injury on vegetation; but as heretofore stated, what it lacks in individual capacity for inflicting injury is made up by the immense numbers which are occasionally developed. A myriad of tiny pumps incessantly drawing away the juices of a plant must in a short time cause it to decay and die."

The egg is at first of a pale dull whitish or testaceous color, but at length assumes a reddish color, from the changes transpiring within; the embryo can be seen as a red speck in the center through the transparent shell. When first hatched, the young bug is red, with a white stripe across it; afterwards it turns of a brownish or grayish-brown color. Soon after it is hatched, it inserts its tiny beak into the plant on which it is situated and commences pumping out the juices on which the vigor and life of the plant depend. As their growth is rapid, their moults are frequent; before reaching the perfect or winged state, it passes through four of these changes, varying in color and markings after each. According to Mr. Riley's observation, "it is bright red, with a pale band across the middle of the body after the first; somewhat darker, with the merest rudiments of wing-pads after the second;

and quite brown, with distinct wing-pads, but with the pale transverse band still visible after the third." The entire process requires from five to seven weeks; according to Dr. Shimer's observations, from the time the egg is deposited until the imago appears is usually from fifty-seven to sixty days.

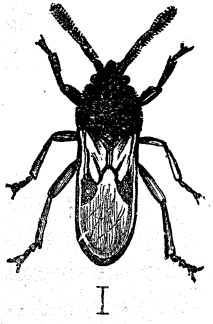

FIG. 5.

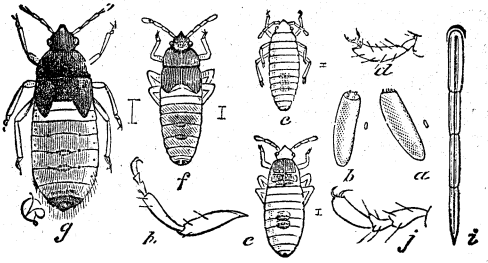

FIG. 6.

The accompanying cuts are taken from Prof. Riley's report on this insect, and are also used in the governmental report of Prof. Thomas, mentioned before. Figure 5 represents the full-grown larva, magnified. The natural size is represented by the line at the side. In figure 6, *a* and *b* are magnified views of the eggs, the small figures at the side denoting their natural size; *c*, the young larva, when first hatched; *d*, the tarsus of the same; *e*, the larva after the first moult; *f*, after the second moult. The pupa is represented by *g*; *h* is the leg, magnified; *i*, the beak, with which the sap is drawn out of the plants, and *j*, the tarsus of the matured bug.

For a long time it was the general opinion that there were three or more broods a year, but careful observation has established the fact that there are but two. The adults of the fall brood, on the approach of cold weather, seek shelter, generally near at hand, under shocks of corn, straw piles, logs, fences or other rubbish in and around the field. Sometimes, though but seldom, they fly to the thick timber and take refuge on the ground under the leaves. They have been found in large numbers in such winter quarters in woods far from the cultivated fields. In these places they pass the winter in a torpid, or semi-torpid, state. Where sheltered

from sudden changes they can endure the cold with safety, even a number of degrees below zero. They have been found frozen in the solid ice, and on being thawed out became as active as ever. When not well sheltered a temperature of —12° or —15° generally proves fatal to them.

The time at which they make their first appearance in the spring depends somewhat on the latitude and character of the season. Hot, dry weather is very favorable to them and hastens their development; and on the other hand, wet and cool weather retards them and even keeps them back till late in the season. Their first appearance, usually made in May, but occasionally in April, seldom attracts attention, unless a special outlook is kept up, as they are comparatively few in number, small in size and are mainly on the wing at this time. Often the first that is known of their presence is when the second brood is hatching out in great numbers, and the work of destruction is well under way.

In a very few days after leaving their winter quarters, the females commence to deposit their eggs, laying them not in large clusters and all at one time, as is done by many of the insect foes, but a few at a time, and during a period of two or three weeks. It is to this fact that their destructiveness is largely due, for it insures their perpetuation in large numbers. In the egg and early larval stages, they are very tender, and much exposed to injury. A severe storm, or even a very heavy shower, often destroys them by myriads at this time, and if the eggs were all deposited at once, the whole brood would occasionally be nearly annihilated in this way. It is generally believed that the vitality of the females is much greater than the males, and that the great majority of those that survive the winter and the exposure of the breeding season, are females.

If the soil is loose and dry, and the weather warm and clear, the female usually works her way down to the roots of the plant and there deposits her eggs. When the soil is heavy or wet, and the weather is unfavorable, the eggs are laid on the stalk, near or even above the surface of the ground. Bright sunshine, a dry, sandy soil and hot weather are the most favorable conditions to their development; and where these conditions obtain early in the season, it

insures such an early, rapid and prolific development that nothing can withstand them. On the other hand, when the weather is cloudy and wet, and the soil heavy and filled with moisture, they propagate but slowly, and are sometimes kept back so that they do not become numerous enough to do any harm until the early grain is out of the way. Then, should the weather become favorable, they fall heavily upon the corn and oats. The effect that the season has upon them is clearly seen in the fact that, notwithstanding the wonderful rapidity with which they propagate, each female reproducing her kind five hundred times, they seldom get numbers sufficient to do much harm except where two very dry seasons come together, and then the amount of harm done is proportionate to the heat and dryness of the seasons.

Spring wheat and barley are the cereals best adapted to their wants, and which suffer most from their attacks; in fact it is thought by many, that were it not for these two varieties of grain the bugs would not develop in such numbers, or have sufficient vitality to do much harm. It is true that they will thrive on oats and corn, but they will only feed upon them after the wheat and barley are gone and there is nothing else to devour. The most natural place and time for them to propagate is on the wheat and barley; when these are gone the egg depositing season is nearly over and the insects have attained their greatest numbers. It is at this time that they are often seen marching in compact masses great and little in search of new fields to devour.

REMEDIES.—Many plans have been tried by which to destroy or at least so to reduce the numbers of this pest as to prevent the wholesale destruction they occasion, but none of them have proved very effectual. Notwithstanding their weakness, insignificance in size and power, they have carried the day by sheer force of numbers, and it is very doubtful whether the power or wisdom of man will ever be able to exterminate this insignificant, and yet mighty foe. The most one can hope to do is to keep down their numbers and thus lessen their power to injure. Nature, aside from the storms and climatic conditions mentioned, will not afford much aid. Their natural enemies are very few and limited in numbers; a few of the Lady Birds and Lace-wing Fly, are

the main ones, and they seem to have but little appetite for the work, but in their greatest force, they are not able to make any impression on the horde of the destroyers. Of parasites there are none. There is apparently not an insect parasite so vile, so depraved in taste as to prey on it or on its first cousin, the bed bug.

Among the remedies proposed is to stop sowing and planting the grains on which they feed. Objections have been raised to this method, that it would compel us to stop raising all the most essential grains needed to support life, and that, too, for a number of years, which would well nigh occasion a famine, and that it is better to have little than none at all. But this objection is not altogether sound, for in many sections of the country winter wheat could be raised, and this is seldom injured by the bug. Then, as remarked before, it is very doubtful whether they would develop in sufficient numbers to seriously injure the other grains were it not for the more timely and better adapted cereals, spring wheat and barley. Neither would it be necessary to follow this practice for a number of seasons to receive any benefit. To the careful observer they always give some token of the coming danger. It is a well established fact that it is only in the second of two consecutive dry seasons that much damage is done, and if, when they are seen in larger numbers than usual at the close of one dry season, we sow no wheat and barley the next, we would escape the greater portion of the loss that would otherwise follow; and by raising other crops might dispense even with corn and oats on such seasons without great inconvenience, and to the great disgust of the hateful pest. If this course, even so far as the two first cereals are concerned, were generally followed, an effectual check, at least for a number of years, would doubtless result. But to be largely beneficial, concurrent action by farmers generally would be required.

Another plan recommended is early seeding. This practice, it is true, has not in all instances been effectual, and will occasionally fail to secure exemption from loss, but the chances, or rather the probabilities, are in its favor. By all means sow as early as the ground and weather will permit with any hope of the germ-

ination of the seed, and plow in the fall to secure an earlier start. It is impossible in a chinch bug year to secure a crop from late sown seed, and in many cases fair, and even good crops have been raised from early sowing in such seasons. In all years the chances are greatly in favor of the early sowing In most cases the same conditions that favor the development of plant and fruit bring forward the foe that preys on them, but here it is different. After germination of the seed, cool, wet weather develops strength and vigor of root in the cereals, which leads to rapid and early maturity soon after the hot, dry weather comes, so favorable, in fact essential, to the development of this its enemy. Therefore it would seem to be wise policy to sow early, and especially in the seasons when the conditions are such as to indicate trouble from the chinch bug.

The application of salt is said by some to be of great benefit in hastening the maturity of the grain, and holding the bugs in check. Others, and scientific men too, say it is of no use whatever. Both doubtless judge from actual experience, either their own or that of others. While we know of no instances where it has been tried and did not prove beneficial, we do know of cases where great good resulted from its application. At the winter convention at Madison, two years since, Mr. Porter, of Waukesha county, gave the result of an experiment he tried in sowing refuse salt on a portion of a field of wheat on his farm. Where the salt had been sowed the growth of straw was much larger, the wheat ripened earlier, was plump and a very good yield, while the rest of the field was a very light crop and was badly shrunken. On running the reaper from one piece to the other, the table was black with bugs in the part unsalted, while very few were seen in the other. The conditions of the experiment were such as clearly to prove that the result was due to the salt applied, but whether it was produced by the stimulus to growth and early maturity, or to its causing unfavorable conditions in the soil for the breeding of the bugs, or to both, is a question which further experiments will only determine, but the probabilities are that the first is the real cause.

It is undoubtedly possible to do much to check their numbers

by making the soil less adapted for their breeding purposes; as to make it more compact by fall plowing and rolling; to sow clover, winter wheat or rye with the spring grain, and thus secure an undergrowth to shade the ground, and thus lessen the heat and increase the moisture, both of which would make the conditions more unfavorable for the propagation and development of the bug. Some have recommended sowing of rye with the grain, in order to draw the insects from the wheat to the greener growth underneath, but they do not feed on the leaves, but draw the sap from the ripening stalk, and would not leave it while there was any nourishment left in it.

There is no doubt but that irrigation, and drenching the eggs and young larvæ with water or some offensive liquids, would be effectual, but the conditions are such that they could be practiced only in a limited degree or at great expense.

Another plan, recommended by Prof. Thomas and others, is to destroy them in their winter quarters. With a little care, the numbers of those that survive the winter and stock the fields anew in the spring could be greatly lessened, and thus reduce by millions the summer horde. Their disposition to go into winter quarters near at hand can be turned to good account by providing little straw piles, shocks of corn stalks, and other combustible material for them to take shelter in, and then burn the piles in winter or early spring; also by burning the grass and rubbish along the fences, and the leaves in the woodland near at hand. Much would be accomplished by cleaning out the line of fences alone. When we adopt a more civilized style of farming, and do away with all fences except for stock, we shall not only save a great expenditure, improve the appearance and increase the productiveness of our farms, by enlarging their area, but we shall greatly lessen the losses occasioned by this and other insects now harbored there.

PLUM CURCULIO — *Conotrachelus nenuphar.* Herbst. Of all our insect enemies there is none that makes uniformly so thorough and so complete destruction of the crop on which it preys, as the Curculio. It is not in an occasional year or in here and there an

orchard that they sweep the whole crop before them, but each and every year, they are on hand early and in such numbers as to annihilate nearly every specimen of the plum, throughout the whole country, and then they go for the cherry, the apple or the peach. So regular has been their appearance and so complete the destruction they occasion, that the cultivation of the plum, one of the most delicious and hardy of our native fruits, has virtually been abandoned. Yet there is, perhaps, no insect that can be so easily met, and no crop of fruit that can be protected with greater certainty and less labor than this, except it be the currant worm and the currant. That productive, hardy old standby has also been given up to a relentless foe, without an effort to save it.

There is no crop in field or garden, excepting fruit, that we expect to secure any return from, without much care and labor, and with many of them, it is one continued war with weeds, enemies or adverse conditions from the time the seed is planted until the crop is harvested. This, farmers take for granted, and accept as one of the necessary conditions, but the great majority of them seem to think that the fruit crop needs no attention; if it don't take care of itself, it must go. It is a shame that two such hardy, productive and valuable varieties of fruit should be given up to certain annihilation, where an amount of labor, ten to one less than is required for an acre of wheat or corn, would usually secure a return ten times to one greater. Much has been said and written about the Curculio. It is a hackneyed subject. Everybody is acquainted with "The Little Turk," and many can tell just how to go to work to outwit him, and save their plums, but they don't do it, and it will, probably, be of little use to refresh their memories, or to try to get the masses to put their knowledge to practical use, but the hope that a few may be induced to give a little attention to saving a fruit so well adapted to our soil and climate, and which will yield so liberal returns for the care bestowed, and that the practical demonstration of what can be accomplished will lead others to do likewise, has induced us to give a brief description of this well known enemy, and of the means by which he may be overcome.

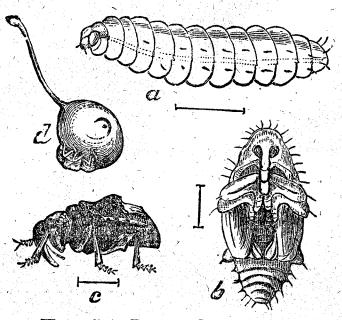


FIG. 7. PLUM CURCULIO.

The accompanying cut (Fig. 7) illustrates the Curculio in its different stages of development. The full grown grub, or maggot, is represented by *a*; *b* gives the chrysalis form; *c* the perfect beetle; *d* the young plum, showing the way the egg is deposited, with the crescent incision above it, which gives rise to the appellation of "Little Turk." The hair lines at the sides denote the natural lengths of the different forms. One of the most marked peculiarities of the form of the perfect beetle or weevil is its snout, and on account of this characteristic, it is grouped with the snout beetle family. This snout is short and thick, with elbowed antennæ at the sides. In position resembles that of the trunk of the elephant, hanging down from the head. When the Curculio is disturbed this snout is drawn back close to the body, and rests in a groove between the forelegs, as seen in *b*, the chrysalis form. The length of the beetle is about one-fifth of an inch; its color is a dark gray, with a yellowish white band across the back. There is a glossy black elevation on each of the wing covers, which gives it a hump-back form. The beetle makes its first appearance in the spring about the first of May (but is occasionally seen in April), and continues to come during the months of May and even June. It is now generally conceded that it is single brooded, and that it passes the winter only in the perfect beetle state. The fact that young beetles appear in July, August, and sometimes in September, for a long time led many to infer that there were two broods in a season, but careful observation has shown that the egg-laying season of the parent beetle extends through two months and over, and consequently the larval state is also extended, and also that the young beetles show no propensity to propagate the first season of their existence, but forage on the fruit until the advent of cold weather, when they go into quarters and abide the coming of spring, then to perpetuate their species. Both the parent beetle and their progeny feed throughout the

season, and often do much damage to the mature fruit, causing it to rot by their stings. When the fruit is gone, they will feed on leaves and tender twigs.

The female deposits her eggs one at a time, at the rate of from five to ten a day and to the number of from fifty to one hundred each. Generally but one egg is laid in a single plum or apple, but when fruit is scarce and Curculio are plenty, a number are often seen in the same fruit. In laying the egg, the female makes an incision with her jaws, enlarges and deepens it with her snout, deposits the egg at the mouth of the incision, and crowds it to the bottom of the hole with her snout, and then cuts the familiar crescent mark. The egg is oval in form, and of a pearly white color. In a few days it hatches out and eats its way into the fruit. Its growth is rapid, reaching maturity in two or three weeks. When full grown it is about half an inch in length. The grub by feeding checks the growth of the fruit and causes it to drop from the tree. Soon after the fruit falls the worm digs its way out, and burrowing in the ground, goes into the chrysalis state, where it remains for three or four weeks, when it emerges in the form of a perfect beetle.

In the selection of its winter quarters, the beetle seems to prefer the shelter of trees or timber, for they are seen in much larger numbers in orchards standing near timber land and in the trees in the outside rows of the orchards, but they take shelter in the fences and under bark, boards, shingles or any rubbish on the surface of the ground in the open field or garden. They have been found under the rough bark on the trees, and under shingles on buildings. They are very hardy and are little affected by cold. If their place of shelter is exposed to the early warmth of spring, they make their appearance earlier in the season; in fact very many of them come out, often two or three weeks in advance of the time when the fruit sets or is large enough to be injured, and may be destroyed before they can do any harm. They are nocturnal in their habits, and, except when the female is depositing her eggs, they remain concealed during the day and feed at night. In the early part of the season, and during cool weather, they prefer shelter during the day on the ground, and may be

found at such times, in quite large numbers, concealed under boards, sticks or shingles placed on the ground under the trees for that purpose, but later in the season when the weather becomes warm, they remain all day concealed on the trees. This peculiarity can be used to good advantage for their destruction in many cases, but will not enable us to exterminate them, as some claim, for large numbers of the beetles do not leave their winter quarters until the weather will permit them to remain night and day on the trees.

The extreme timidity of the beetle is another peculiarity which can be taken advantage of, in fact is used largely for its destruction. When disturbed suddenly on the trees, it has the habit of dropping to the ground and feigning death, and the plan the most used to kill them is to place sheets stretched on a frame under the trees, and then, by giving the tree a sudden sharp blow, cause them to drop on the sheets, when they are readily killed. For some time after falling they will remain perfectly quiet, hoping to escape notice. Their size, dark color and irregular form would enable them to practice this deception completely, when this habit is not known or a sharp look-out kept. Early in the morning is regarded as the best time to jar the trees by most, but some who have tried both think that toward evening is better. During the warmer part of the day they fly more readily, and are not usually found on the trees in as large numbers.

Another point favorable for attack is found in the fact that the larvæ do not leave the fruit until some little time after it drops from the tree, and if the fruit that has been stung were picked from the tree, or picked up from the ground soon after it falls, and destroyed, the race would be well nigh exterminated, so that a crop might be obtained the next and a number of following seasons. Some have advised making light floors of boards or cement under the trees, and thus prevent the worms from going into the ground, and as they cannot travel they must soon perish. Another way to accomplish the same object is to arrange a screen of cloth or boards, so that when the fruit drops it will roll into a tight barrel, box or tub. Where the number of trees is small, and the numbers of the Curculio have been so reduced that but a

portion of the crop is stung each year, this method might be used advantageously, but to depend on this alone will not be likely to prove very satisfactory to those who expect fruit without any care or labor.

Another means used to prevent the destruction of the fruit is by the application of poison or some offensive substance to the tree at the time the eggs are deposited. Instances have been given where the application of Paris green and arsenic has been followed by a full crop of plums. Some entomologists claim that this is not feasible, for, to have any effect, the poison must come in contact with the beetles, and very frequent application would be necessary to do any good at all: but where we have the testimony of well known and reliable fruit growers, and of such men as Prof. A. J. Cook, of Michigan, that the application of poison will prevent the depredations of the Codling moth, there is some reason to believe that it will also be beneficial in destroying the Curculio. Experiments made with quick-lime and ashes have been reported as successful. Trees to which they have been applied have borne full crops; others, where the Curculio had taken part of the crop before they were used, gave a part of a crop, while trees standing near, that were not so treated, did not bear a plum.

That there is some virtue in such applications would seem to be demonstrated by the statements made by T. S. Gold, Secretary of the Connecticut State Board of Agriculture, before the Massachusetts Board of Agriculture. In giving his experience with the Curculio, he says: "It has been said that you cannot scare away the Curculio; that you must catch him and kill him; but if I have not scared him away from my place, I have deceived him, and made him believe there was no place for him to lay his eggs in the young plums. With very little trouble, say two hours trouble a year, in caring for the trees, I have been able to obtain a full supply for my family for the last ten or fifteen years, of some dozen varieties of plums. The secret of success is to apply to the tree, soon after the calyx falls, some mixture or substance, either liquid or in powder, that shall so affect the Curculio that he will avoid the tree. There are two that I have used successfully. One is to take the drainage of the barnyard, the liquid

manure, put a few pailfuls in an old barrel, mix in a pound of sulphur and a quart of salt; let it stand until you want to apply it. When the flower has just fallen off and the Curculio begins his work, take a few quarts of the liquid, reduce it with water to a moderate degree of strength, add to it a quantity of ashes, making it about the consistency of cream, and, with a basin or broom, drench the top of the tree. If not washed off by a shower, one application will be sufficient. If washed off, repeat the operation, two, three or four times, and your trees, that have lost every specimen of fruit before, will come to the harvest loaded with plums. The other is to mix common tar with soap, boiling it up in an old kettle, dissolve this in water and apply the liquid to the trees with a garden syringe or in other ways."

Another method by which the same object has been reported as having been attained is, by burning coal tar under the trees and covering leaves and young fruit with a coat of lamp black. In the use of these methods and application, the conditions may not be always alike favorable and consequently the results may not be equally satisfactory; but, if the remedial agent is used understandingly and thoroughly, much benefit will be obtained from any or all of them. The proper time to do the work, as well as the observance of the other conditions, and habits of the insect, must be regarded. Boards, shingles, or other things placed under the trees to trap the beetles will be of little or no avail if left until settled and warm weather has come, or they are not visited in the early part of the day; the beetles will not be found there, and the experiment will be a complete failure. So with jarring, if left until much of the fruit has been stung, or it is followed up carelessly, or left until well into the forenoon, the result will not be satisfactory, and the remedy will be pronounced worthless. Also the applications, whether of lime, ashes, poisons, offensive liquids or tar smoke, if applied imperfectly or not repeated after heavy showers or rain, the anticipated benefit will not be realized, and the remedy will be regarded worthless. The failure to use the remedy at the proper time and in the right manner will doubtless account for the great diversity in result, and

the consequent conflicting opinions entertained in regard to them. Therefore we have faith to believe that any and all of them are good and may be used to great advantage, and that a little effort and labor will enable us to secure a regular and abundant supply of this native fruit.

But little aid in the work of protection or destruction can be expected from natural agencies. The beetles are tenacious of life and are little affected by climatic conditions. Their parasite enemies are few, and can do but little to diminish their numbers. Chickens and hogs, when confined under the trees, will destroy many in the larval state, and if the number of trees is small, and they are so situated as not to be continually restocked from other trees near by, and if the range is limited, and the number of chickens and pigs is large, a good crop of fruit may sometimes be obtained by their help alone, but generally, unless other means are used, enough of the beetles will escape to secure the destruction of the crop from year to year. When the bulk of the insects are destroyed by artificial means, then these animals will do most effective service as gleaners.

We have, as stated before, thus grouped together these old facts and remedies in the hope that some might be led to declare war against the "Little Turk," and by their victories encourage others to enter the contest, so that, at least, the number of the foe will be so reduced that his natural enemies can hold him in check. Much may be done by individual efforts, but the labor would be greatly lessened by concerted action. With farmers generally, the excuse given for neglecting the destruction of these insect foes is want of time, but it is better and will be cheaper to cultivate less, and by giving the necessary care, realize the best possible results from what they do. Some of these methods for the destruction of the Curculio can be entrusted to children, and if a stimulus in the way of reward were given, their interest would be aroused. Local societies or neighbors interested have offered bounties for the largest number of beetles captured, or so much per hundred, and have thus secured the destruction of a large number and saved their fruit. When the labor and expense connected with any or all the means recommended are less than those necessary

to secure a crop of anything else, and we do not make any effort, we should certainly not complain of the losses incurred.

APPLE CURCULIO, *Anthonomus quadrigibus*, Say.— Complaints are occasionally made of the gnarly, deformed condition of apples and pears, and wonder is frequently expressed, even by old hands in fruit raising, as to what can be the cause. Little, if any of the trouble may have been noticed for some years previous, when all at once there comes a season in which the fruit is so badly injured as to greatly lessen the value of the crop. Old and well known varieties are sometimes so distorted as to be recognized with difficulty. Instead of the usual round, smooth form, they are very much dwarfed in size, irregular in shape, with ridges, humps and depressions here and there, and in each depression a small, black dot is seen, looking as though the surface of the apple had been drawn down by a thread, as in a well-stuffed cushion. Coming so suddenly, and producing so great a change and loss in the fruit, it occasions much surprise to those not acquainted with the real cause, which we fear includes the majority of our farmers and fruit raisers. If they had taken careful observation, especially of the pear and native crab and thorn apples, they would have seen more or less of this trouble every fruit season, and the sudden appearance and extent of the evil would then have been to them much less a matter of surprise.

The general belief is, that this condition is caused by the sting of some poisonous insect when the fruit is small, but what the species is, which one of the many insect enemies is the guilty cause, few are able to tell. Most of them may have heard of the apple Curculio, and have seen the work of the plum Curculio. They find that when the plum is stung an egg is laid, which hatches, and the plum drops off and soon rots or withers up, but on examination of the stings in the apple or pear, they find in a great majority of cases no signs of an egg or anything to denote that one had ever been deposited there. In the few instances where there are signs of a worm having been at the core, it resembles, and is often judged to be the work of the codling moth; but the apple still hangs to the tree, and continues to grow,

though slowly, through the season. Not being acquainted with the habits and manner of work of the apple Curculio, the real culprit, he escapes their notice and they give the discredit to some other enemy.

This beetle, like the plum Curculio, is a native of this country, and was seen at a very early period on the Wild Crab and Thorn Apple trees. Until a comparatively recent date their depredations were mainly confined to these varieties of the apple, but they have gradually acquired a taste for better fruit and seem to be steadily increasing in numbers and destructiveness. The perfect beetle is of a dull brown color, with reddish brown and ashy gray shading on the wing covers. On these wing covers are located four humps, which are peculiar to it, and which give it a distinctive name. Like the plum Curculio, it is a snout beetle, but differs from it in the form, length and position of its snout. With the plum Curculio, it hangs down and can be folded back to the body, but cannot be extended in front; it is also short and stout; but while the apple Curculio is much smaller, its snout is much longer and more slender, in proportion to size of the insect. In the male it is about half the length of the body, but in the female it is fully as long as its whole body; in both it is curved in form and extends forward in nearly a straight line with the body and cannot be folded back.

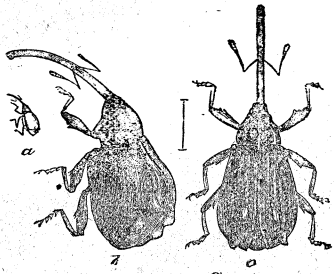

FIG. 8. APPLE CURCULIO.

In the above cut (Fig. 8), *b* gives a side view of the full grown beetle, *c* the back view; *a* represents the natural size, and the line at the side of *c* the full length of beetle and its snout.

The apple Curculio, like the plum, is single brooded and passes the winter in the perfect beetle state. It makes its appearance in the spring, the last of May or the first of June; usually a little later than the plum Curculio. With their long slender snouts they attack the fruit, both male and female drilling small, round holes almost a tenth of an inch in depth, but scooped out much broader at the base. Most of these holes are made for the purpose of getting their food, a few only for depositing their eggs. As the

beetle is supposed to live for a number of months, and as far as known feeds entirely on the fruit, each one makes many incisions for this purpose, and wherever they sting the fruit, the effect is to check all growth. In the part thus stung a hard callous is formed about the hole, and by preventing any development of the fruit, gives it an irregular, distorted form.

For the depositing of her eggs the female makes these holes somewhat larger than usual. The egg is placed in the bottom of the cavity made, and soon hatches out and makes its way to the core, feeding around it. In about a month it reaches its mature larval state, when it is a soft, clumsy, humpbacked worm, full of crinkles, without feet, and, as it cannot straighten, with little power of locomotion. Thus it is shut up in the apple, and compelled to go into its chrysalis state where it hatched out and grew to maturity, as said before, the fruit still clinging to the tree. In about three weeks it transforms to the perfect beetle state and digs its way out, to live on the now mature, ripening fruit, causing it to decay by its poisonous stings. On the advent of cool weather, it seeks shelter under the leaves and rubbish on the ground, or in the fence corners and under the rough bark of the trees, to appear again in the spring and renew its destructive work.

REMEDIES.— 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 useful 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 tree 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 totally 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 also to furnish the beetles with inviting shelter, near at hand, for winter quarters, and then to destroy home and occupant. Those inflicted with this and other pests should carefully observe their habits and try all possible, practical means to effect their destruction.

THE PEA WEEVIL — *Bruchus pisi.*— All who are interested in gardening, or who use dry peas, are more or less acquainted with "buggy peas." Their presence in the mature pea, when ground and used for cooking purposes, or for planting, is regarded with anything but favor; and the sight of a few peas that have been inhabited by the bug, as it is usually called, often causes the rejection of the whole lot with disgust, but this same insect in the larval state is unconsciously eaten in large numbers by the most fastidious, and with great relish. Surely, "ignorance is bliss" to the lover of "roast lamb and green peas," for did he realize what is in a great measure true of every mess of green peas grown in this state, except in the extreme northern portion, that at least one-half of them are inhabited by a worm which in time would develop into one of these bugs, it would not add greatly to the flavor of the dish. It cannot be said that their presence really detracts from the flavor or is in any way harmful to the eater, yet most epicures would prefer to take their soup clear from them. Aside from greater pleasure and confidence in the use of peas in the green state, where they are not infested by the weevil, it would add much to the value of the dry, mature pea whether to

be used for seed or for food, for few care to plant infested seed, and the mature beetle is decidedly harmful in the meal or berry, where it is to be served for the table. For this reason, great care should be taken to secure seed free from the weevil, and in every possible way to exterminate the pest.

The Weevil makes its appearance the last of May or in June, according to the temperature of the season, and is ready as soon as the young peas begin to swell in the pods to provide for the continuation of the species. The eggs are deposited on the outside of the pods and fastened there by a viscid substance which quickly hardens. These eggs can be readily seen on the pods during the month of June. They are about a thirtieth of an inch in length, long and slender in form, of a deep yellow color. Sometimes a dozen and more will be found on a single pod. The larva soon hatches out, drills through the pod and works its way into the young berry. The hole in the pod soon grows up and there is nothing to indicate the presence of the inhabitants within. The color of the young larva is a deep yellow with a shiny black head. There are often many more larvæ on the pod than there are peas within, but there is only one to a berry; the rest perish. The larva continues to feed on the albumenous part of the pea and but rarely touches the life germ, so that the vitality of the berry is not destroyed. On reaching maturity it eats a round hole to the outside of the pea, leaving only the thin hull to inclose it, and then passes into the pupa state. It usually remains in this condition until the following spring, then to become the mature Weevil. When the season has been very favorable for their early development and the hot weather continues late, the larvæ sometimes mature and transform late in the fall, but in the majority of the cases they winter in the peas.

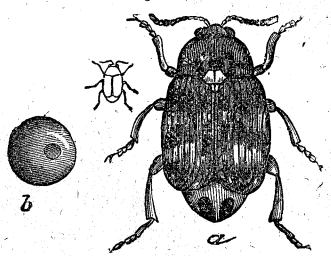

FIG. 9. PEA WEEVIL.

The Weevil is of a rusty black color, with several gray spots and bands on its back and wing covers. The abdomen projects beyond the wing covers and is tipped with white, inclosing two

well defined black spots, oval in form, as seen in figure nine. The small outline at the side denotes the natural size. The transformation takes place either in the ground where the seed is planted, or in the storehouse where the peas are kept. When the proper season comes they eat their way out through the slight shell left by the larva, and, if unrestrained, soon find the vines and stock them anew with young larvæ.

They are much more abundant and develop with greater rapidity in a southern climate, and are seldom seen where the summers are short and the seasons cool. It is generally believed that there are localities where the climate or the character of the soil are so unfavorable for their development that they are seldom or never seen, and peas from such places are much sought for for seed. Manitowoc and the adjacent counties in this state, and also a large portion of Canada, are reported as specially favored in this respect, and peas are extensively cultivated there for eastern and other markets. But, while the natural conditions doubtless hold the Weevils in check, the exemption they enjoy is largely due to greater care in selecting seed, and in preventing the escape of the beetles that may come out from the peas while in store.

In the selection of seed for planting, care should be taken to get that which is entirely free from the Weevil. This can be done by keeping the seed until two years old. Also by putting the peas into water, when the sound ones will sink, and the wormy ones swim. The Weevils can be, for the greater part, destroyed by soaking the peas in boiling water for a few minutes, just before planting them. Also by keeping them stored in tight jars, strongly impregnated with camphor. But it seems to us that the most effectual method would be to plant late in the season, either seed from the first crop or that which is two years old. The peas from such planting would be entirely free from "bugs," and if enough were raised to supply the neighborhood and the old crop was kept tightly sealed, so that the beetles could not escape, the first crop the next season would be entirely free from these insects.

THE CLOVER ROOT BORER — *Hylesinus trifolii.* This new enemy of the clover has recently made its appearance in this

country, and in some cases has done very serious damage. Prof. Riley states that in many places in the state of New York, it has been so prevalent as to destroy the crop of clover, entirely destroying the roots, so that the plants pulled out with the greatest ease, and gathered in winrows before the mower. He further states that in searching a number of hours he failed to find a single plant that did not contain more or less of these insects, many of them in large numbers. The insect is a native of Europe, and was doubtless introduced from that country here. It has been known there for many years, and was first described by Muller, who was of the opinion that its natural food plant was the clover, and as they do not apparently occasion any perceptible injury until the second year, he concluded that death of the clover at the third year was due to the injury done by these borers. Prof. Riley is also inclined to favor this opinion, from the observations he has made. This seems to be open to question, for the clover was classed among the biennials long before this insect was known either in this country or in Europe. This peculiarity or habit of the clover plant may have been induced by improper culture, or the rigors of the climate, but it has become a fixed characteristic of the *trifolium pratense*. The fact that occasionally plants are seen to live the third season does not disprove the theory, for on an examination it will usually, if not always, be found that the old root received some injury the second season, but had sufficient vitality to throw out new roots, and thus gain another year's lease of life.

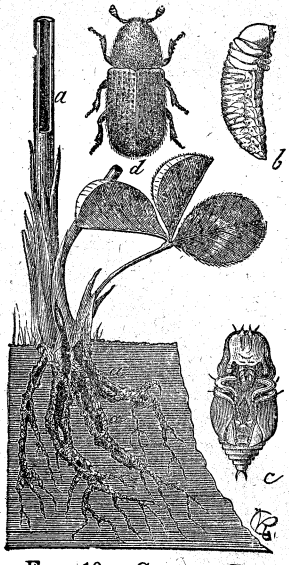


FIG. 10. CLOVER ROOT BORER.

Prof. Riley, in describing the beetle in its various stages of development, as far as it had come under his observation in this country, says: "It is undoubtedly true that this beetle flourishes most in the roots of plants that have been injured, and that have already begun to decay — bearing out in this respect the well-known habits

of other species of the family, which are known to prefer the bark of trees and the woody stems of plants that are sickly from one cause or another. I have found this insect in all three stages of larva, pupa and adult up to the time of frost (represented by *b*, *c* and *d*, in figure 10), though the perfect beetles at this season very greatly predominate. The insect hibernates in any of these stages, and continues propagating as spring opens, the beetles issuing from the ground and pairing during the early spring months. The female then instinctively bores into the crown of the root, eating a pretty large cavity, wherein she deposits from four to six, pale, whitish elliptical eggs. These hatch in about a week, and the young larvæ at first feed in the cavity made by the parent. After a few days, however, they begin to burrow downward, extending to the different branches of the root. The galleries made in burrowing run pretty regular along the axis of the roots, as seen at *a*, *a*, *a*, in figure 10, and are filled with brown excrements. The pupa is formed in a smooth cavity, generally at the end of one of these burrows, and may be found in small numbers as early as September.

"The clover seed is usually sown in the spring, while the snow is yet on the ground or the frost disappearing. The clover is allowed to go to seed in the fall, and usually produces but little. During the second year one crop of hay and a crop of seed are obtained. It is during this second year that the injury of the Hylesinus is most observed. No experiments have yet been made with a view of preventing the injuries of this clover pest, and no other mode of prevention suggests itself to my mind than the plowing under of the clover in the spring of the second year, if the presence of the beetle is observed."

This pest will doubtless soon reach this state, if it has not done so already, and farmers should be on the lookout and turn under the field as soon as signs of its presence may be discovered; and in this way, taken while few in number, and only here and there a field infested, they may effectually hold the enemy in check.

## FUNGUS IN LIVING PLANTS.

The subject of fungus growths and mildew is one of much importance, and one concerning which, much is said while but little is really known. To throw a little light on this question, we copy a very practical address delivered by Prof. W. S. Barlow, before the Massachusetts Board of Agriculture.

What is meant by a fungus? Fungi are plants of a very low organization, which are never of a grass green color, and which are not capable of absorbing inorganic matter, and converting it into nourishment for themselves, but must take directly from other plants or animals the organic matter which has already been formed out of the inorganic materials contained in the soil or air. All plants which are capable of changing inorganic into organic material, contain a quantity of green coloring matter known as chlorophyl, which is not found in fungi. Fungi are, in the strict sense, parasites, and not being able of themselves to assimilate the inorganic materials about them, must appropriate it from other plants and animals as best they can; consequently any plant which has a fungus growing upon it must not only manufacture food enough for itself out of the surrounding earth and air, but enough also to support the fungus. If enough cannot be provided for both, it is the plant which must suffer, and not the fungus, which helps itself without ceremony to any organic materials which it wants. The more the fungus grows, the worse for the plant on which it is growing. Fortunately for the world, the different species of fungi do not all require the same substance for their support. Some do not grow upon living animals or vegetables, but only on dead substances, and are useful, inasmuch as they hasten the decomposition of bodies which would otherwise slowly putrify. The fungi which live on dead, inert matter, are called "saprophytes," from a Greek word meaning rotten. Of course none of the fungi of this class are the source of disease in fruit trees. Other fungi grow upon living plants and animals, and produce many serious diseases. Of the fungi which grow upon living plants, the greater part of them are limited in their range, and do not grow indifferently upon any plant, but either upon a particular species or on several species which are botanic-

ally nearly related. The reason for this selection of plants upon which to prey is probably that different chemical substances are necessary to the existence of the different species of fungi, and consequently they can only flourish on the plants which produce these substances. This is a matter of inference rather than observation; for we do not yet know, for example, what the chemical substance is which enables the fungus known as *Sphæria morbosa* to grow on plums, and some varieties of cherries, and produce on them the excrescence known as "black knot," while it will not grow on apples or pears. The limitation of different species of fungi to a single plant, or at least to a comparatively few plants, is a great protection to the farmer; for, were this not the case, a disease once attacking a single crop would cause a general devastation.

Not only are fungi destitute of the green coloring matter found in the greater part of other plants, but their structure is much more simple than that of the ordinary plants with which you are most familiar. Instead of being composed of a more or less solid mass of cells packed together, as are the bricks in a house, for a great part of their existence fungi are composed only of delicate, colorless threads. When we say delicate, we must understand that the word refers to the general appearance of the threads and not to a lack of resisting power. If we submit the cells of the higher plants and the threads of fungi to the action of chemical reagents, as caustic potash or acids, we shall find that the threads are less quickly destroyed than the cells; consequently if we have a leaf in which a fungus is growing, we are able, on boiling it in caustic potash, to cause a separation and disintegration of the leaf-cells, while the threads of the fungus remain comparatively unaffected. The name given to the threads of the fungus taken collectively, is *Mycelium;* and the separate threads are called *hyphæ*, or *flocci*. In the case of the moulds which do not grow upon living plants, the mycelium forms usually a mass looking more or less like cotton wool. In those which inhabit living plants, the threads wind about amongst the cells of the plants on which they are growing, and when seen on the surface, appear like a fine web or frost work.

As has just been remarked, for a great part of their existence

fungi consist of a mass of threads, but, under favorable circumstances, reproductive bodies known as "spores" are produced, and in producing them, the threads undergo a variety of changes, some of which are very complicated. There are no true seeds or flowers in fungi, but in their power of germinating and reproducing the species from which they were derived, the spores of fungi correspond to the seeds of higher plants. Unfortunately for the easy understanding of the subject, the mode of production of the spores is a difficult subject to follow, and it is made more difficult by the fact that many, perhaps most, fungi produce more than one kind of spore, a state of things to which we have nothing directly corresponding in the higher plants with which we are familiar.

After this preliminary description of what is known as fungus, let us examine the disease known as the "black knot." The knots are most striking in the autumn and winter. If we make a microscopic examination of a knot gathered in mid-winter, we shall find that it is composed partly of a fungus and partly of the diseased and distorted cells of the plum-stem. The white threads of the fungus are found twisted together in bundles (Fig. 13 A), which in general are parallel to one another, and run from within outwards. They extend down into the stem for a short distance below the knot, but not more than a few inches. The threads in the knot, as they come near the surface, branch more and more and become black, and at the surface form a granular mass. The granulations can be seen with the naked eye, and when examined under the microscope each granulation is found to contain a cavity (Fig. 11), in which are a number of sacs intermixed with white threads. In the sacs are eight spores (Fig. 12), each of which consists of two parts, one being smaller than the other. The whole cavity opens outwards, and it is easy to see how the spores reach the air.

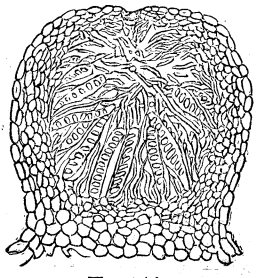

FIG. 11.

When spring comes, the threads which were concealed in the stem below the knot begin to grow again, and cause a new swelling just below the old knot. In a few weeks they will have

grown to such an extent as to burst through the bark and appear on the surface in spots which are green colored, not like the color of a leaf, however, but a very dark, deep green. A microscopic examination of the greenish knots which are found late in the

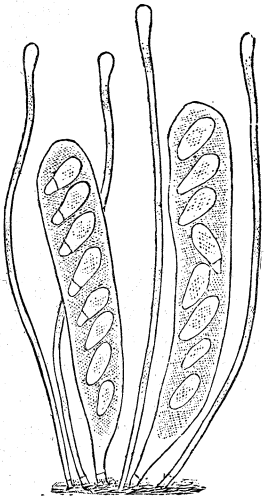

FIG. 12.

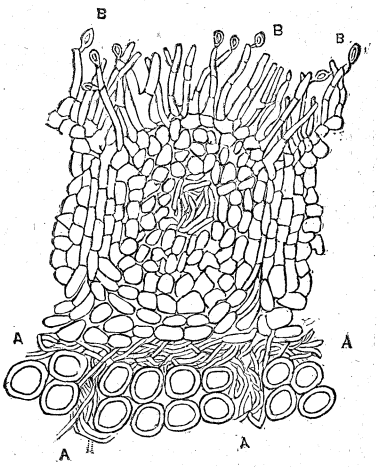


FIG. 13.

spring, shows on the surface a number of threads, on which are borne small bodies which are also spores; and to distinguish them from the other spores they are called *conidial* spores (Fig. 13 B). As the conidial spores ripen and fall off, we find beneath the surface the beginning of the cavities and the sacs which are to contain the winter spores. The knot grows rapidly blacker and rougher.

Having given as briefly as possible an account of the development of the black knot, it remains to state the conclusions which may be drawn from the knowledge obtained by means of the microscope. In the first place we may say that the disease is caused by a fungus. Why caused? you perhaps will ask. The word "cause" is not used in natural science to signify ultimate, but proximate cause. Ultimate causes are discussed in philosophy and theology, but they do not properly fall in the scope of natural science. When we say that a disease is caused by a fungus, we simply mean that the manifestation of symptoms which we collectively call the disease, is invariably preceded by the presence

and growth of the fungus. To illustrate: the formation of the black knot is invariably preceded by the presence of the fungus known to botanists under the name of *Sphœria morbosa*, and the onward growth of the mycelium of the fungus in the healthy stem of the plum is followed without fail by the swelling and blackened characteristic of the knot. On the one hand, we never find the fungus unless accompanied by the knot; on the other, we never find the knot unless accompanied and also preceded by the fungus. If you examine the slightly swollen branches of the Choke-cherry in the spring, before the bark has cracked open, you will find the threads of the fungus already in the stem, and later in the season you will certainly find the characteristic swelling and blackening. If the fungus were only found with the knot, we could not say that it was the cause of it. As the knots grow old, there is usually a number of insects and fungi found in or on them; they cannot, however, be considered the cause of the knot, as they are found in other excrescences as well. It is because the fungus consistently precedes as well as accompanies the knot, that we are entitled to say that it is the cause of the knot.

As to the means to be taken to prevent the spread of the disease: our knowledge of the habits of the fungus throws light upon this point. First, we have seen that the threads of the fungus extend in the stem some inches beyond the knot itself, and these threads will the next season be followed by a new knot. Hence, in cutting away the knots, one should cut several inches — to be safe, we will say about ten inches — below the knots. The way the disease increases in a plant once attacked is by the onward growth of the mycelium. The next question is, how to prevent its spreading to other trees. The spreading is produced by the growth of the spores, one kind of which ripens in mid-winter, and another in early summer. The spores are all light and easily blown about, and when they fall upon other trees, germinate by sending out new mycelial threads, which can enter into the stems upon which they have fallen. The object then should be to cut off the knots before the spores are ripe. By cutting in summer we can prevent the maturing of the winter spores; by cutting early in the spring we can prevent the ripening of the conidial spores. It is not enough, however, simply to cut off the diseased

branches. If the winter spores have begun to form, they go on, and ripen, even if the knots are cut from the trees, notwithstanding they may be exposed to a great degree of cold. Knowing this, we can infer that it will be safer to burn all knots which are removed.

The black knot is unknown in Europe, although the European cultivated plums and cherries are botanically the same as ours. How does it happen, then, that our trees have a disease unknown in Europe? The reason is, that the fungus which causes the disease is a native of America, and grows on our wild plums and cherries. * * * Being a native of America, when plums and cherries were introduced from Europe, the fungus grew upon them as well as upon our own wild species. Its injurious effects are better known on the cultivated plums and cherries, because, being cultivated for their fruit, they are more generally observed than the comparatively worthless wild species. All our wild cherries are not attacked by the fungus, as, for example, the rum cherry, *Prunus serotina;* and there are a number of cultivated varieties of cherry which are not subject to the disease. In attempting to check the disease, one should not forget to remove the knots from the wild cherries growing near orchards, as well as from the cultivated cherries.

Probably but few of the tumors on trees and shrubs can be said with certainty to be caused by fungi, yet no tumor of any size is probably free from them. The number of species of fungi is enormous, and not a small proportion inhabit dead wood and bark; and the rough surface of any old tumor forms a suitable place of growth for a great many species. They are, however, not the cause of the knots, but an aftergrowth, and are recognized as such by those who make a special study of fungi. Many tumors are known to be caused by insects, and, as a rule, the distortion produced arises not so much from the attack of the insects themselves as from the effort of the plant cells in succeeding years to perform their normal work. The injury often consists in the invasion of a leaf bud by some very small insect, and, as a result of the irritation, the leaves constituting the bud enlarge, become hardened, and often unite in a comparatively solid mass. The next year the indurated mass itself acts as a foreign body, and

there grow around it, in succeeding years, layers which are all more or less distorted, until finally we have a large knot in which it is quite impossible to detect the original lesion.

In the beginning of the lecture, we divided diseases caused by fungi into two general classes, tumors and blights. The latter is by far the larger and more destructive, and more generally recognized as caused by fungi. Of course the consideration of blights

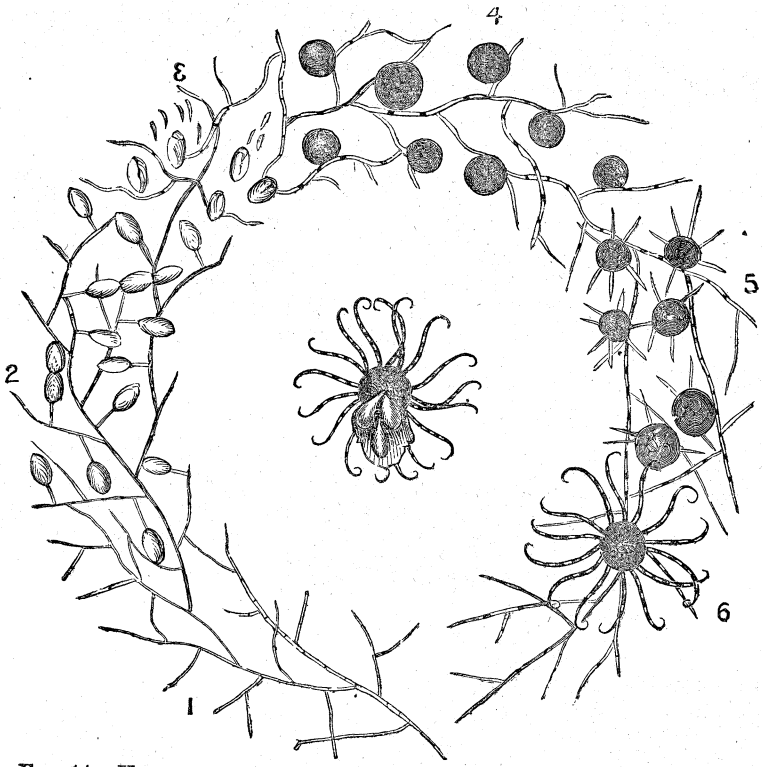


FIG. 14. UNCINULA SPIRALIS. 1, 2, 3, 4, 5, 6 show the different stages of its development.

on fruit-bearing plants should not be kept distinct from that of blights on vegetables, for in a scientific point of view they are very closely related. To describe in detail even a small portion of the blights of cultivated plants would require several lectures, and I can now call your attention only to two, which are common on grape vines, and let them serve as types, two large and very destructive orders of fungi. The fungi to which I refer are found

as well on wild grapes as on cultivated, and neither species is yet known to occur in Europe, although both are common through the Eastern United States.

You may have noticed that the leaves of many cultivated grapes are apt to look dusty after the first of August. The dustiness, if such it really were, would of course disappear after a heavy rain. But such is not the case. During the damp weather the dusty look increases, and after a while the leaf dries and shrivels. As the leaf shrivels the dustiness disappears, and in its place we see a number of very small black bodies scattered all over both surfaces of the leaves. In some cases, instead of looking dusty, the leaves seem to be covered with a tolerably thick white web, which extends to the leaf stalks, and in extreme cases to the grapes themselves. The blight is often supposed to be due to *Oidium Tuckeri*, the fungus which caused formerly a great deal of injury to the grape crop in Southern Europe, and especially in the island of Madeira. The development of that fungus is only partly known, and there is no proof that our fungus is the same. The American fungus referred to is called *Uncinula spiralis*, and belongs to a large group of leaf parasites, the *Perisporiacæ*. The dusty or webby appearance of the leaves is caused by the growth of the mycelium over the surface. The mycelial threads, although they may cover a great part of the surface of the leaves, do not enter into their interior, except that at intervals the threads are furnished with little suckers, which just penetrate into the external cells, and serve to attach the mycelium. During the summer some of these threads grow up from the surface of the leaf, and at the tip divide into a number of squarish ovoid cells (Fig. 15),

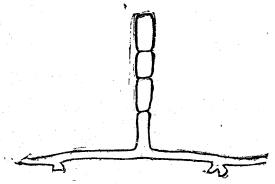

FIG. 15.

which are spores corresponding to the conidial spores of the black knot. Later in the season a number of round bodies

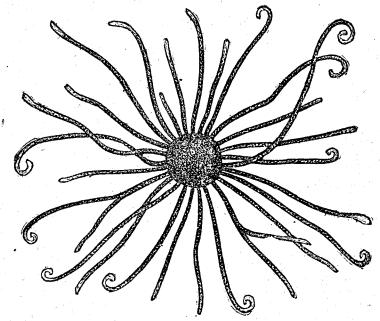

FIG. 16.

(seen in Fig. 14 at 4, 5, 6 and Fig. 16) are formed on the threads. They are at first yellowish and afterwards black. These black bodies are hollow, and contain a number of sacs (seen in the center of Fig. 14 and Fig. 17), in which are species which may be said to correspond to the winter spores of the black knot. These black bodies have attached to them a number of peculiar threads or appendages, which are rolled up at the end, from which the name *Uncinula* is derived.

FIG. 17.

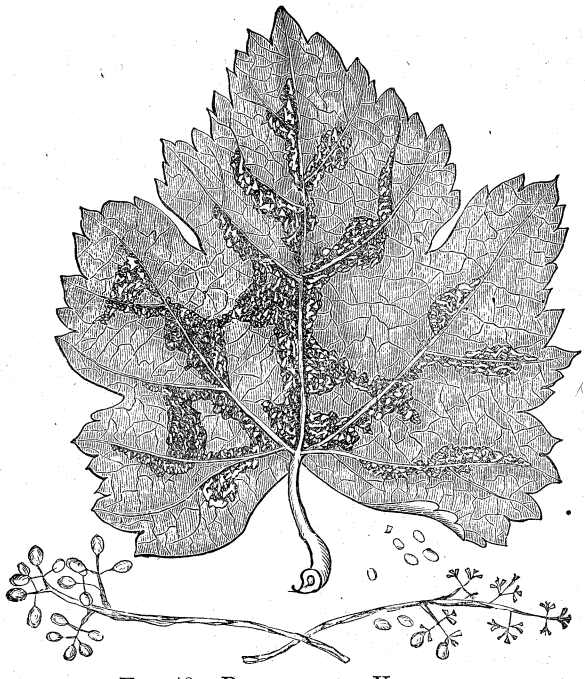

FIG. 18. PERONOSPORA VITICOLA.

The second form of blight which occurs on grapes begins to appear about the same time as the first, and may be mixed with it on the leaf; or more frequently it occurs alone. The first form of blight may be found on either side of the leaf. The second occurs only on the under surface and appears when fresh like frost work. The leaf stalks are sometimes covered by the fungus, but it does not attack the grapes themselves. An examination of the frost-like spots on the under surface shows that they consist

of branching threads, on whose tops are borne oval bodies (seen in the branches in figure eighteen), which are the conidial spores. The threads do not, however, grow all over the surface of the leaf, but make their way from the interior into the air, through the holes which abound on the under surface of most leaves, and are known by the name of "breathing spores." If we follow the threads still farther, we shall find that they penetrate through all parts of the leaves and stems, making their way between the leaf cells. The threads are also furnished with small suckers, which push their way directly through the walls of the plant cells into their interior. The bodies which we may call the winter spores of this blight are not found on the surface, but are imbedded in the leaf. They are round and have thick walls. The name of the second form of grape blight is *Peronospora viticola.*

A comparative study of the two blights we have just described is instructive. They both first appear on the leaves about the first of August, and both cause them to shrivel and drop off. One sometimes attacks the grapes, while the other does not. The two blights may be distinguished with the naked eye by an ordinary observer, as one forms a sort of dusty-looking web on any part; the other, frost-like spots on the under surface of the leaves. Both have conidial spores, which grow on stalks in the air. Both have what we may for convenience call winter spores, which ripen late in the autumn. Those of the *Uncinula* are in the round black bodies on the surface of the leaf; those of the *Peronospora* are in the interior of the leaf.

A microscopic examination shows us that it is not correct to speak of grape mildew, or blight, as a distinct disease. We have just seen that there are at least two different fungi which produce a blight; and the two differ decidedly in their habits and growth, so much so, that the means taken to prevent the growth of one will not apply to the other. Let us consider this practical point more at length. We will suppose that the grape grower recognizes that his plants are attacked by the first form of blight described — *Uncinula spiralis.* As a microscopic examination shows that the fungus is on the surface, and not in the interior of the leaves, it is plain that the object should be to

check the growth of the mycelium on the leaf. The injury that the *Uncinula* does to the grape is, that it covers the leaves, which in a certain sense may be said to be the respiratory organs of a plant, so that the necessary supply of light and air is shut off. The growth of the fungus may be checked by the use of sulphur strewn over the plants. We must also consider how the disease is propagated from one plant to another. The conidial spores already described are light and easily blown from one plant to another. Wherever they fall, if the weather is only moist enough, they begin to send out threads, which form the mycelium of a new *Uncinula*. The threads only grow to any length, as far as we yet know, when the spores have fallen on or near grape vines. From this we can infer that the *Uncinula* does not live entirely upon material found in the air, or accidentally on the surface of the grape leaves, but that it also requires some peculiar substance produced only by the grape plant. A great many of the species of fungi, however, which are botanically closely related to the *Uncinula*, are not limited to the plants of a single genus, but grow indifferently on plants which are not nearly related botanically.

Another question also arises. How does the fungus survive the cold of winter? The conidial spores which can spread the disease rapidly are killed by the cold. The round, black bodies which contain the winter spores are much tougher. The winter spores are not ripe till late in the autumn, and fall to the ground with the leaves on which they are growing. They remain dormant during the winter, and when spring comes, germinate and make their way into the nearest grape vines. It would not be unwise in the autumn to collect and burn all the grape leaves, that is, as far as practicable, in districts which have in the summer suffered from the *Uncinula*. In this place we should bear in mind what has been said about the black knot extending from wild species to the cultivated. This blight can extend in a similar way, as it is found on wild vines, but as far as we yet know the fungus does not grow on any wild plants except grape vines.

If we turn now to the *Peronospora*, which grows on grape vines, we see the preventive measures, which in the case of the

*Uncinula* would be of advantage, would here be of little avail; because the fungus is not confined to the surface, but pervades the whole plant, and in fact does not grow through the breathing pores into the air until it has already traversed a considerable part of the interior of the leaves and stems. The first warning of the presence of the fungus, viz., the white spots on the under surface of the leaves, is not to be interpreted as showing that the disease is beginning, but that it is already far advanced. To sprinkle sulphur on the leaves is quite useless in the case of the *Peronospora*, for it will not affect the mass of the fungus which is in the interior. The only thing which will check the disease is to diminish the moisture in the air, but that, unfortunately, is beyond human control. If the season happens to be dry, all very well; if very wet, then the *Peronospora*, once started, will grow in spite of everything.

The disease spreads from plant to plant during the summer by means of the conidial spores. They may be carried about by the wind and rain, just as the conidial spores of the *Uncinula;* but when they fall on a place sufficiently moist they germinate, but in a different way from the conidial spores of the *Uncinula.* The contents of the spores separate into a number of distinct bodies, which break through one end of the spore and escape, leaving the empty spore-wall behind. The bodies which escape, to which the name of "Zoöspores" is applied, swim about by means of two hair-like threads called "cilia," which are in constant motion. Being very small, they are able to move about in the moisture which is found on the ground and on plants when it is not dry weather. They swim about for only a short time, and then the cilia drop off, and the Zoöspores come to rest. They then give off threads like the conidial spores of the *Uncinula*, and the threads penetrate into the interior of the grape plants on which they may be. Once inside, the threads constitute a mycelium, which extends through the plant at a rate corresponding with the external moisture, and finally the threads make their way through the breathing pores into the air, and produce new spores. It will be seen that the conidial spores of the *Peronospora* have an advantage over those of the *Uncinula*, because they produce a num-

ber of Zoöspores, generally from five to fifteen, each of which is capable, under favorable conditions, of producing a new mycelium and spores. Like the corresponding bodies in *Uncinula*, the conidial spores are destroyed by cold.

The winter spores of the *Peronospora* are thick and tough, and are produced in the interior of the grape leaves by a rather complicated process, which, although interesting from a botanical point of view, need not be described here. They fall to the ground with the leaves in the autumn, and are set free by the rotting away, during the winter and spring, of the leaves in which they are contained, and as the season advances they germinate, and enter the nearest vines, but the details of the germination have not yet been made out. The remarks already made about burning the grape leaves apply also in this connection. The mycelium of the *Peronospora* in the interior of the vines affected during the summer may remain dormant during the winter, and start up again when the warm weather returns. Just how much harm the *Peronospora* does to the grape vines is not easy to decide. I have, on a previous occasion, expressed the view that it is not unlikely that the harm done has been exaggerated, because the fungus never attacks the berries, and it does not cause the leaves to shrivel and dry up until comparatively late in the summer, when, as some say, their room is better than their company, for what is especially needed is, that there shall be plenty of sunlight to ripen the grapes, which is not the case when the foliage is luxuriant, and covers up the branches. Whether the shriveling of the leaves in the latter part of August permanently injures the vines and injures the crop, is a point to be settled not by the botanist, but empirically by the grape grower, and, as far as can be learned, on this point opinions differ.

My object in describing the two principal blights on the American grapes has been to show that an accurate and scientific knowledge of the causes of diseases in plants requires a careful microscopic study, and that such study is not without definite and practical results. The time has passed when the labors of botanists should be considered of interest only to special students of science. From them the farmer may learn certain facts, of which

he cannot afford to be ignorant. The high science of one decade, it must be remembered, becomes, in the course of three or four decades, the popular belief, and is then honored with the name of common sense, just as though not more than half a century previously, people had not been considered fools for believing just such things. Only within a few years have fungi been recognized as the cause of disease in plants, and there is a growing tendency to account for almost all obscure plant diseases by saying that they are caused by fungi. If a disease suddenly makes its appearance, and inquiry is made as to its cause, up jumps Dr. A., and says, "it is a fungus; I have found some mycelium." Or Prof. B. startles the community with the announcement that he has found "spores." Neither Dr. A. nor Prof. B. tell the public to what form the mycelium and spores belong; nor do they apparently know that it is almost impossible to find a leaf or stem in which, or on which, there are not some traces of mycelium or spores. The spores and mycelia of the common mould are everywhere; and if one is determined to see in fungus the cause of all diseases, he has not to look long before finding them in abundance, such as they are. It savors of quackery to make a little bit of mycelium, or a few spores of some ordinary mould, explain the appearance of wide-spread and devastating diseases.

A few years ago everything was laid to insects by the agricultural quacks; but as a knowledge of entomology spread, that became dangerous ground, and they then took up fungi, about which the public were not so well informed. Before long, it is to be hoped that there will be such a general knowledge of the habits of fungi, that the war cry, "Mycelium! Spores!" will have lost its terrors. Where then will the quacks take refuge? At the lowest limits of the vegetable kingdom; some would say below the lowest limits is a large group of very minute beings called "Bacteria." They are very small; they are found everywhere; their study taxes the highest powers of the first scientific men. It will be a long time before the scientific world will know much about them, and longer still before the public do. Without being a prophet it will be safe to predict that within the next ten years the agriculturist will have to listen to an immense amount of

nonsense about the harm these small bodies do, and the diseases they cause. In the meanwhile let us not underrate the harm done by fungi, while deprecating all attempts to make them responsible for every disease which may make its appearance; and here, as in other things, a little knowledge is a dangerous thing, for it is only by cautious and careful research that we reach results that are really valuable, either scientifically or for practical application.

CUT-WORMS.— There are various kinds of worms embraced in this general class, differing but slightly in size, form and in their habits. The appellation, "cut-worm," is given to them from the manner in which they attack the plants upon which they feed. In Europe they are called surface worms or grubs, because they are found in the destructive period of their existence near the surface of the ground. The worms or caterpillars are stout in form, of a dusky, greasy color, varied in shadings and markings, in the different species, and also in the individuals of the same species. This variation has led to some confusion of names and classification, but instead of denoting different kinds, is usually to be attributed to the difference in kind, color or amount of food of which they have partaken, or to the different stages of growth or maturity. The first indication of their presence is usually the wilting or falling down of the plants in the field or garden. On examination the stalk will be found to have been cut off, or nearly so, at or near the surface of the ground. No worm will be in sight, but on carefully removing the loose dirt near the plants, a short, thick worm, apparently lifeless, rolled up in in a circular form, will usually be found. This inactive, torpid condition, is wholly assumed on being disturbed, for in their natural movements, they are quite active and lively. There is some difference in the part of the plant which these caterpillars will attack. While some cut off the main stalk of the plant below the surface, there are others which will cut it off at the surface, or even above it. Others will climb the stalk and cut off the leaves to devour them at their leisure. Others will climb shrubs and vines, rose bushes, and even standard fruit trees, and eat out the flower and terminal buds,

and even the leaf buds. The worm has eight pair of legs; three pair near the head, which are the true legs; four under the middle part of the body called prolegs, and a pair near the posterior part called anal legs. Their sudden appearance in an almost mature state, especially where their habits are not known, often occasions much surprise, as well as their more sudden departure, after a brief but destructive career. The reason for this will be evident when their habits are considered. As remarked at the outset, the different kinds differ but slightly in the manner of their development, so that one general description will serve for all.

During the months of July, August and September, dark, sombre colored moths are frequently seen flitting about in the early evening, and often come into rooms where a light is burning, attracted by the blaze, into which they often plunge. Though nocturnal in their habits, they are sometimes seen flying about in the daytime, in dark, cloudy weather. They are also to be found behind the shutters, under boards or in other places that will afford them a dry shelter from the bright light of day. Their bodies are stocky; about an inch in length. The wings when extended are usually from one to one and a half inches in length, the fore wings being narrower, but much longer, and generally of a darker color than the hind wings. When the moths are at rest, the wings cover the back like a flat roof, the hind wings being folded under and entirely covered by the fore ones. The color of the wings varies from an ashy gray to a dark brown, often mottled or shaded with spots of lighter or darker shades. Tufts of hair are usually placed on the shoulder and on the abdomen.

After mating, the female deposits her eggs either on the plant from which they are to draw their substance, or near it, on some substance close to the ground. The instinct of the moth leads it thus to provide for the future wants of the young larvæ, and this will account for the fact that land where the cultivation has been clean, and there is little vegetable growth, is seldom troubled with them, and that they especially abound in grass land that has been seeded for a number of years. Prof. Riley says that the moth of the variegated cut-worm lays its eggs in clusters on

the twigs of trees on which the young larvæ feed in the early stages of their growth, and to which it returns on reaching its maturity. These eggs soon hatch out, and the young worm works its way into the ground, feeding on the tender roots of the plants it may find there. It requires but little nourishment the first season, and as the food is abundant, but little damage is done. When cold weather approaches, the caterpillar burrows further down, curls up and passes the winter in a torpid condition. When warm weather returns, the larva starts out in search of food, and eagerly devours whatever it finds suited to its taste. It soon reaches the surface, nearly mature in size, but with an enormous appetite, and speedily lays waste all within its reach, going from plant to plant, feeding at night and lying concealed by day in the earth near at hand. It soon arrives at maturity, and disappears more suddenly than it came, burrowing into the earth for three or four inches, passes into the chrysalis state, where it remains from two to four weeks, then to appear as the parent moth.

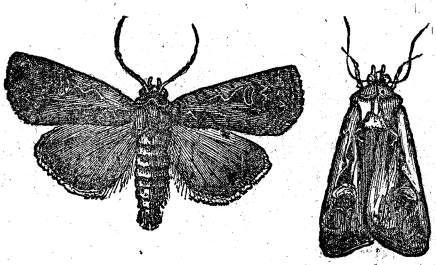

FIG. 19. WESTERN STRIPED CUT-WORM.

The Western Striped Cut-Worm, *Agrostis Subgothica*, Fig. 19, is the well known corn worm, but which by no means confines its depredations to corn alone. It is a general feeder, and will take melons, turnips, cabbage, tomatoes, young trees, tobacco, etc., with equal relish. This species has the reputation of providing for the day's food by dragging the plants cut down at night to its burrow, where it lies concealed by day and eats at leisure. Prof. Riley says: "When full grown they are from one inch to one inch and a quarter in length, of a dirty white or ashy gray color, with three broad dark lines, and two light narrow ones along the side, and a light one, edged on each side with a dark one along the middle of the back. This species remains longer in the ground than any of the others, and the moth does not appear till August and September." The wings of the moth are peculiarly marked, the lighter portion being of an ashy gray color, and the darker parts of a deep brown.

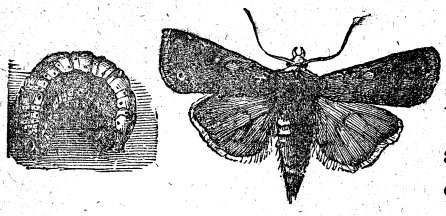

FIG. 20. THE DARK SIDED CUT-WORM.

*Climbing Cut-Worms.*—From what is generally known of the cut-worms' habits and from their form and appearance, the common opinion is that their depredations are confined to the portions of plants that are in or near the surface of the ground, and the statement that they climb trees and destroy leaves and fruit there will hardly be believed by many. But careful observation has demonstrated that some of the species do climb rose bushes, grape vines and other shrubbery, and even standard trees, and there eat out the fruit, flower and leaf-buds, to such an extent as sometimes to destroy the plant or tree, and some entomologists are of the opinion that all of the species can and do feed in the same way when driven by scarcity of food nearer at hand. Prof. Riley in treating of this class of worms says: "Orchardists in spring frequently find the heart of their fruit buds, on young trees especially, entirely eaten out and destroyed, and this circumstance is attributed to various causes; as birds, winged insects, beetles, slugs, or late frosts, unsuitable climate, etc. Never have cut-worms received the blame, all of which should have been ascribed to them, for the germ hold of many species on a sandy soil in early spring is the fruit tree. This is a very important fact to fruit raisers, and let those who have attempted to grow the dwarf apple and pear on a sandy soil, and who have become discouraged as many have, from finding their trees affected in this way every year, take courage, for knowing the cause they can easily prevent it.

"These climbing cut-worms will crawl up a tree eight or ten feet high, and seem to like equally well the leaves of the pear, apple and grape. They work during the night, always descending just under the surface of the earth at early dawn, which accounts for their not having been discovered at their work of destruction in former years. They seldom descend the tree as they ascend it, by crawling, but drop from the leaf or bud on which they have been feeding; and it is quite interesting to watch one at early morn, when it has become full fed, and the tender skin

seems ready to burst from repletion, and see it prepare by a peculiar twist of the body for the fall. This fact also accounts for trees on hard, tenacious soils being comparatively exempt from them, as their instinct doubtless serves them a good turn, either in preventing them from ascending, or by leading the parent moth to deposit her eggs, by preference, on a light soil. * * * The miller prefers to lay her eggs near the hill or mound over the roots of the trees in the orchard. They have been known to deposit them in a spring dressing of ashes and lime, put on to prevent the May beetles' operations, thus giving the larvæ a fine warm bed to cover themselves up in during the day, concealed from the observations of their enemies. They will leave potatoes, peas and other green plants for the buds of the apple and pear. The long, naked young trees of the orchard are almost exempt from their voracious attacks, but I have found them about midnight, in dark, damp nights, well up in the limbs of such trees. Salt is not repulsive to them; they burrow in it as quickly and as comfortably as in ashes and lime. Tobacco, soap and other washes do not even provoke them."

The dark sided cut-worm, given in figure 20, is one of this species, and perhaps the most common one. Prof. Riley, in his description, says: "The general color of the larva is a dingy, ashy gray, but it is characterized by its sides being darker than the rest of the body. When young, it is much darker, and the white which is below the lateral band is then cream-colored and very distinct. There is but one brood a year. The moths appear through the months of July and August. Their color is a light, warm gray, shaded with brown and umber."

In speaking of their operations, copying from the reports made to him, he says: "In the beginning of the evening its activity is wonderful; moving along from limb to limb swiftly, and selecting at first only the blossom-buds, to one of which having fastened, it does not let go its hold until the entire bud is eaten out, and from this place, so thorough is its work, no latent or adventitious bud will ever again push. From a six year old fruit tree, I have, on a single night, taken seventy-five of these worms, and on the ensuing evening found them well nigh as plenty on the

same tree. When all the blossom buds of a tree are taken, it attacks with equal avidity the leaf-buds. * * * * The instinct of the perfect insect, like that of all insects injurious to vegetation, leads it unerringly to deposit its eggs where they will hatch out by the warmth of the sun, and where the larvæ will be nearest the food necessary for its sustenance, and hence I have never found the eggs on clay or heavy, cold ground."

FIG. 21. WHITE BRISTLY CUT-WORM.

The Bristly White Cut-Worm is often found in the garden, where it feeds mainly on the roots of plants, and especially flowers. It is of a dirty white color, and is covered with stiff, yellow bristles. It is usually seen early in August. The caterpillar, when full grown, is about three-quarters of an inch in length. Early in August it passes into the chrysalis state, from which the perfect moth emerges in about two weeks. The moth is smaller than those of the other species. It is very prettily marked, the fore wings are of a dark gray color, shaded with brown, and variegated by three moss green patches.

There are quite a number of insects that prey upon the cut-worm in its larval state, but they are not sufficient to hold them in check, or even to make any perceptible diminution in the numbers of the foe. Among the parasites which destroy the larva by depositing their eggs in the worm, are the Ichneumon fly, and also a species of the Microgaster bred from the worms, and described by Professors Riley and Thomas. Among the insects that devour the worms bodily are the Spined Soldier Bug and the Fiery Ground Beetle.

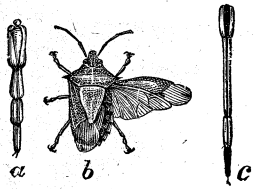


FIG. 22. SPINED SOLDIER BUG.

Figure 22, *b*, represents the first with one wing extended, the other folded under the wing cover; *a* is a highly magnified view of its short, stout beak, with which it impales its victims, soon pumps them dry and leaves them an empty shell. This insect, vulgarly known as the 'Stink Bug," is a friend of the farmer and horticulturist, and should be protected in every way possible.

The Fiery Ground Beetle — *Calosoma calidum*, Fig. 23, is a black beetle about an inch in length, and has three rows of copper colored dots on each wing-case. In its grub or larval state it is especially beneficial in the destruction of injurious insects, and from its boldness in attack, its ferocity, has well earned the name of cut-worm lion. The larva has a flattened form, is black in color and has six legs placed near the head; from the extremity of the abdomen are two arms or projections, giving the appearance of a crescent. The jaws are stout and hook shaped. They follow the cut-worms into their hiding places, and seize them when found, though greatly inferior in size, and will soon conquer and devour them.

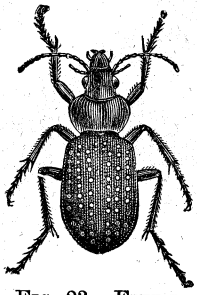

FIG. 23. FIERY GROUND BEETLE.

Of artificial remedies, where the ground planted is stocked with worms, there is nothing of much avail but hunting the worms and killing them. The application of poison may destroy those that attack the plants or trees above ground, but where they cut off the roots or stalks below the surface, no application will reach them, and nothing will prevent their destructive work but a "still hunt" and a personal attack. The climbing worms may be captured by shaking them off from trees or shrubs at night onto sheets spread beneath the trees; or they may be kept from ascending by encircling the trunk of the tree with strips of tin of some width, the lower edge being imbedded in the earth close to the stem of the tree.

Fall plowing has been found very beneficial in destroying the larvæ, and many instances are given where the ground plowed in the fall has escaped the ravages of the worm, while crops on similar land near by and even in the same field, plowed in the spring, were nearly destroyed by them. The later in the season the plowing is done the better, for if the weather is still warm the larva will be able to prepare new winter quarters. Very early fall plowing may also be beneficial, when it destroys all vegetation, by checking the development of the young larva from want of food. Clean culture is also a good preventive remedy for the

same reason, or because the parent moths will shun such fields, knowing that their young progeny will not find there the necessary food. Fall plowing, however, will have but little effect on the worms in sod land, probably owing to the compactness of the sod when turned over, and it is in such land that these worms especially abound. The best way to serve such ground is to plant or seed it to crops that are least affected by the worms, or to summer fallow or plant to crops that will not mature sufficiently to be injured by them before the worms are prepared to assume their chrysalis state. Where the sod ground is covered with dry grass or other rubbish, burning it over late in the spring and then turning it under will destroy many of the worms. Some recommend in planting corn on ground stocked with worms to plant three or four more kernels than are wanted in the hill, but one worm is generally sufficient for a whole hill and often has appetite enough left for the next, and is pretty sure to find it, too, unless he is discovered at his work and crushed.

The number of these and many other of our insect enemies might be greatly reduced by the means of lights put out at night, either an open blaze or a sheltered light so placed that the insect flying against it would drop into water or some sticky fluid. This method is largely used in some portions of the country, and should be resorted to generally, if we would hold our foes in check. Nearly all, if not all of the nocturnal moths are our enemies, and a great majority of our worst foes are either nocturnal or crepuscular in their habits and can easily be lured to their destruction by these decoy lights. The expense attendant upon this practice will not be great, and were it considerable, would be economy, for the numbers of the destroying army will be greatly diminished by the destruction of a few parent moths.

Much might be accomplished in this direction by enlisting the interest of the children in the work. Instruction given in regard to our insect friends and foes would keep them on the watch, and a slight bounty offered for the destruction of the insects now devouring our crops would give a practical direction to their interest, so as to greatly diminish the present numbers of the foe, and would create such an interest in the subject of entomology in the coming generation, that its importance would be better realized,

and lead to general, concerted action, and to the use of more efficient means for the preservation of our crops.

HESSIAN FLY — *Cecidomyia Destructor.* The first serious obstacle to successful wheat culture in this state was the advent of this pest, which made its appearance in sufficient numbers to attract attention, in 1842. So rapidly did it spread, that in 1846 it extended quite generally over the southern portion of the state, and in such numbers as to seriously injure the crop that year. It also made its appearance the following years, and became so destructive as to compel a general abandonment of raising winter wheat for a time. Spring wheat was then quite largely raised — in fact, almost exclusively — until the chinch bug appeared on the field. By giving up the cultivation of winter wheat the Hessian fly was, to all appearances, exterminated, but on the resumption of fall seeding, it soon returned in great numbers, and in occasional seasons did great damage. The loss they have caused has been very great, but their appearance cannot be regarded as an unmitigated evil, for they have driven our farmers to give up exclusive wheat culture, and resort to diversified farming, and if now we can discover when the foe will attack us, and are prepared to rout his forces, positive good will come out of the evil. Their introduction into this country, like that of the chinch bug, is charged to the mercenary allies which England employed to subdue her revolted colonies. The insect was first noticed on Long Island, in the year 1776, and was called Hessian Fly, on account of its supposed origin. Though tiny in form, and "defenseless against the least enemy, crushed by the most delicate touch," it has proved a more serious foe than the troops whose name it bears, and is estimated to yearly occasion more damage to this country than the whole cost of the Revolutionary War. A good example,

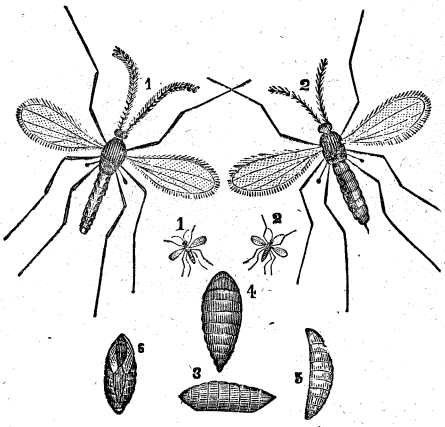


FIG. 24. THE HESSIAN FLY.

as has been remarked, of the evil results that may flow from one bad act.

The following description is taken from Professor Packard's report, as a member of the United States Entomological Commission: "This insect belongs to the Dipteria or two-winged insects, of which the common house fly is the best known type. It belongs to the family *Cecidomyidæ*, a large group of minute flies resembling the crane flies or daddy-long-legs, but of diminutive form. They are nearly all gall-flies, the female laying their eggs by means of the soft extensible end of the body which slides back and forth like the joints of a telescope. The irritation caused by the egg results in the swelling of the stems of the plants, or the formation of tumors or galls on the leaves and buds. The Hessian Fly does not produce true galls in this way, but the presence of the insect in the flaxseed state, between the leaf and the stalk, causes the stem to swell and the leaves to wither and die. The body of the female (Fig. 24 — 2, 2) is rather slender, uniformly dark brown, the head is round but somewhat flattened, the eyes are black, the wings uniformly dull smoky brown, while the legs are paler brown than the rest of the upper side of the body. The body, wings and legs are provided with fine hair-like scales, those on the wings being in many cases quite broad and ribbed, somewhat like the scales on the wings of a butterfly or moth. The brown antennæ are about half as long as the body; the joints, seventeen in number, are very distinct, like a string of beads. The legs are of the same color as the upper side of the body, being a little paler than the back. The abdomen is rather full, with nine well-marked rings or segments, the paler small ovipositor forming the tenth. The length of the fly is about one-tenth of one inch.

"The male (Fig. 24 — 1, 1) is rather smaller than the female, being distinguished by the long, slender abdomen, and the longer and more hairy antennæ, in which there are twenty joints."

The egg is of a pale red color, very minute in size, about a fifteenth of an inch in length. The eggs are usually laid on the upper side of the blade near where it joins the stock or crown of the root. Professor A. J. Cook, of Michigan Agricultural College,

says that "the fly very rarely lays more than three eggs at one time without change of position. She more frequently lays two, and generally but one. In case she lays but one, it takes less than a quarter of a minute, and less than a half a minute to lay three, when they are all laid without a change of position on the part of the fly. After laying she seems to draw in her ovipositor, soon to extend it again, at the same time crowding into it the one, two or three eggs that are next to be laid. She then flies to another leaf, alighting usually, not always, with head towards the end of the leaf. She then appears to wipe the eggs off the jointed ovipositor. She really crowds the egg till the end touches the leaf, when by friction of the leaf and adhesion of the egg, the latter is held fast while the egg-tube is withdrawn. If the second and third are to be laid she repeats the operation, after which she retracts her ovipositor, restocks it, and in a trice is depositing the fatal germs on another leaf. I say usually on the upper surface, for occasionally eggs are laid on the stalk, and sometimes on the under side of a leaf. I have observed that the fly often makes many unsuccessful efforts to cause the egg to adhere on the outer face of the leaf before she succeeds. I have seen a fly work thus for two minutes before success crowned her efforts. The fly may thus learn by experience that it is easier to deposit on the inner or upper face of the blade, and so generally chooses that surface.

"These eggs hatch in from four days to two or three weeks, according to the weather, and the larva or maggot (Fig. 24—3, 5) makes its way down to the base of the sheath, which in the young winter wheat is at the crown of the root. Here it fastens lengthwise and head downwards to the tender stalk, and lives upon the sap. It does not gnaw the stalk, nor does it enter the central cavity thereof, but as it increases in size, it gradually becomes imbedded in the substance of it, causing it to swell and the plant to turn yellow and die. By the end of November, or from thirty to forty days after the wheat is sown, they assume the "flaxseed" (Fig. 24—4 and 6) state, and may, on removing the lower leaves, be found as little brown, oval, cylindrical, smooth bodies, a little smaller than grains of rice. They remain in the wheat until warm weather; in April the larva rapidly transforms into the

pupa within its flaxseed skin, the fly emerging from the flaxseed case about the end of April. The eggs laid by this first or spring brood of flies soon hatch; the second brood of maggots live but a few weeks, the flaxseed state is soon undergone, and the autumn or second brood of flies appears in August. In some cases there may be two autumn broods, the earliest August brood giving rise to a third set of flies in September. The first brood of flies lay their eggs on the leaves of the young wheat from early April till the end of May, the time varying with the latitude and weather; the second brood appearing during August and the early part of September, and laying about thirty eggs on the leaves of the young winter wheat. Thus our crops of winter wheat, as is stated by Dr. Fitch, are liable to two attacks of the Hessian Fly, one generation reared at its roots producing another, which occupies the lower joints of the stalks. Thus the larvæ and pupæ are present in it almost continually from the time the tender young blades appear above the ground in autumn, till the grain ripens and is harvested the next summer. Our spring wheat, on the other hand, can rear but one brood of these insects; they consequently resort to it but little, if at all. Nor can the Hessian fly sustain itself except in districts where winter wheat is cultivated in which for it to nestle during the autumn and winter."

The first evidence of their work is the change in color of the wheat, turning from a bright green to a yellow shade, and this appearance is noticed the earliest on the higher ground, where the soil is dryest and light. This has been supposed to indicate that dry weather, as with the chinch bug, is most favorable for their development, while the reverse is true. This is evident from the fact that the year preceding the years when they have been the most destructive have been noted for their excess of moisture, and that they are seen to propagate much more rapidly in a warm and wet autumn, and even in a cool and moist season than a warm, dry one. Where they have full possession of the field early in the spring and in large numbers, the damage done by them in dry seasons is more marked, for the drouth diminishes the amount of nourishment taken up by the plant, and the larva appropriates so much of what there is, as to leave little or none for the wheat, and

therefore it starves. This will also account for the seeming contradiction, that while moisture is favorable for the development of the fly, the first and seemingly the greatest damage is seen on the dryest ground. Poor soil and land suffering from drouth cannot furnish sustenance sufficient to bear the drain made by the vampires and to mature the wheat, while good, rich soil, land that is in good tilth and has abundant moisture, will furnish enough to maintain a vigorous growth, and for the blood suckers too. Where there is sufficient nourishment to maintain the vitality of the plant it will tiller out, and the rank growth of the parts of the plant not infested will make a rapid growth and cover up the affected stalks so that they will not show. Those varieties of wheat that have a tendency to make a rank growth and have a hard flinty stalk are the least injured by the fly. Some think that vigorous growth throws off the fly, others that being gross feeders they furnish enough for both plant and foe. This would seem to indicate that by the selection of the proper variety, by good culture, liberal fertilizing, underdraining, etc., we may be able to raise fair crops in spite of the fly.

Another method taken to circumvent them is to sow the wheat so late in the season that it will not come up until the cool weather has destroyed the fly. The success of this will depend largely on the character of the season. If the fall be cool and dry, and the conditions yet favorable for germination of the wheat, and the following winter mild, with a good covering of snow, wheat sowed after the middle of September would probably escape injury from the fly and do well; but should the fall be late and the weather warm, even after there had been heavy frosts, flies would probably come out in sufficient force to thoroughly stock up the field, and the result would be more disastrous from the lack of vital power in the very young plants; and if there were no flies, a hard, open winter would make the destruction fully as complete. Some have been successful in sowing a narrow strip around the outside of the field quite early in the season, with a thorough preparation of the whole field; then if the fly appeared they would expend their energies on the early sown wheat, which could be turned under about the middle of

September, and the whole field be seeded under favorable conditions for a good fall growth, weather permitting. If the first brood can be planted in this way, the second brood will "come up" minus. There is one thing certain, where a field of wheat has been sown in the fall, and the flies make their appearance in such numbers as to indicate the destruction of the crop, or so as to materially injury it, which can be easily told by the color of the wheat, or by even a cursory examination, the whole may be turned under in the fall, or early in the spring, burying the foe beyond the power of resurrection. If the wheat be early sown, the seed and labor will not be lost, for the green coat turned under will add to the value of the next crop; and the gratification of having outwitted the enemy, and having sent them to an untimely end, will lighten the labor of putting it in.

Pasturing affected wheat with sheep in early fall is said to be attended with good results; also, when ground is dry, early in the spring. Some of the eggs and larvæ may be destroyed in this way, and the tendency of close cropping is to cause the wheat to tiller, and as the remaining larvæ cannot move from their original stalk, the new shoots would strike out for themselves, and being free from the parasitic burden, would soon draw the vigor of the plant to themselves.

It is a very common practice where the fly has destroyed a crop of wheat, so that it is not worth harvesting, to set fire to the dead and crinkled straw; also, where the crop has been cut from such a field, to burn off the stubble in hopes of thus destroying the destroyer. Those who have made this subject a study claim that this is a very questionable practice. In nearly every instance where the fly has been very destructive in a season, it is followed by one or more seasons where few, if any, are to be seen, and that it is only by degrees that much of a perceptible increase in their numbers is seen. This is largely attributed to parasitic foes. These are mainly two species of ichneumon flies, the most important of which is a four-winged chalcis fly — *semiotellus destructor*— that lays its eggs in the "flaxseed" larva, and the *Platygaster* that devours the eggs of the Hessian Fly. Conditions favorable to the fruitfulness of the Hessian Fly are said to be far more favorable

for these foes, and that their fecundity is so great that the fly is well nigh exterminated for a season. Burning the fields destroys many of the enemy, it is true, but the greater portion of them are said at this time to be carrying from one to twenty of our friends in their bodies, who will not only destroy the foe, but when fully developed will continue the good work.

Rolling of the land after the wheat is up, the application of lime, soot, salt, etc., are recommended, but the methods most effectual are late sowing, thorough culture, recuperating by close cropping and by fertilizers, and turning under and reseeding infested fields.

# TABLE SHOWING THE RAILROAD STATIONS IN WISCONSIN, AND THE DISTANCE OF EACH STATION FROM MILWAUKEE, THE COMMERCIAL METROPOLIS OF THE STATE.

*C., M. & St. Paul R'y—Chicago Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Caledonia | 15 | Russell | 38 |
| Kinickinic | 1 | Franksville | 19 | | |
| Kelly Cut | 4 | W. U. Junct. | 23 | Chicago | 85 |
| Lake | 7 | Somers | 27 | | |
| Oak Wood | 12 | Truesdell | 32 | | |

*C., M. & St. Paul R'y— Prairie du Chien Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Milton | 62 | Spring Green | 132 |
| Wauwatosa | 5 | Milton Junct. | 64 | Lone Rock | 139 |
| Elm Grove | 10 | Edgerton | 71 | Avoca | 145 |
| Brookfield Junct. | 14 | Stoughton | 80 | Muscoda | 151 |
| Forest House | 17 | McFarland | 89 | Blue River | 158 |
| Waukesha | 20 | Madison | 95 | Boscobel | 166 |
| Genesee | 28 | Middleton | 102 | Woodman | 172 |
| North Prairie | 31 | Cross Plains | 110 | Wauzeka | 176 |
| Eagle | 36 | Black Earth | 115 | Wright's Ferry | 183 |
| Palmyra | 42 | Mazomanie | 118 | Bridgeport | 186 |
| Whitewater | 50 | Arena | 124 | Lower Town | 192 |
| Lima | 56 | Helena | 130 | Prairie du Chien | 193 |

*C., M. & St. Paul R'y— Viroqua Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Sparta | 0 | Melvina | 12 | Westby | 27 |
| Leon | 6 | Hazen | 19 | Viroqua | 34 |

*C., M. & St. Paul R'y— La Crosse Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Elba | 60 | Orange | 139 |
| Stock Yards | 2 | Columbus | 64 | Camp Douglass | 141 |
| Gravel Pit | 3 | Fall River | 67 | Oakdale | 147 |
| Spring Meadow | 5 | Doylestown | 73 | Toman | 153 |
| Elm Grove | 9 | East Rio | 77 | Greenfield | 157 |
| Brookfield Junct. | 13 | Rio | 78 | Lafayette | 164 |
| Pewaukee | 19 | Wyocena | 83 | Sparta | 170 |
| Hartland | 24 | Portage City | 92 | Herseyville | 174 |
| Nashotah | 26 | Lewiston | 100 | Rockland | 177 |
| Oconomowoc | 31 | Kilbourn City | 108 | Bangor | 180 |
| Ixonia | 37 | Lyndon | 117 | West Salem | 185 |
| Watertown | 44 | Round Bluff | 122 | Winona Junct. | 192 |
| Watertown Junct. | 45 | Lemonweir | 124 | N. La Crosse | 195 |
| Richwood | 49 | Mauston | 128 | La Crosse | 196 |
| Reeseville | 54 | Lisbon | 135 | | |

*C., M. & St. Paul R'y— Madison Line.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Waterloo | 58 | East Madison | 80 |
| | | Marshall | 61 | Madison | 81 |
| Watertown Junct. | 45 | Deanville | 64 | | |
| Hubbleton | 52 | Sun Prairie | 69 | | |

*C., M. & St. Paul R'y — Northern Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Hartford | 37 | Waupun | 68 |
| Schwartzburg | 9 | Rubicon | 41 | Brandon | 76 |
| Granville | 15 | Woodland | 45 | Ripon | 83 |
| Germantown | 20 | Iron Ridge | 47 | Pickett's | 90 |
| Richfield | 25 | Horicon Junc | 54 | Fisk's | 94 |
| Ackerville Siding | 30 | Burnett Junc | 59 | Fitzgerald | 98 |
| Schleisingerville | 32 | Atwater | 64 | Oshkosh | 103 |

*C., M. & St. Paul R'y — Winneconne Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Ripon | 0 | Waukau | 11 | Winneconne | 20 |
| Rush Lake Junc | 6 | Omro | 15 | | |

*C., M. & St. Paul R'y — Berlin Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Rnsh Lake Junc. | 9 | Berlin | 7 | | |

*C., M. & St. Paul R'y — Portage Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Beaver Dam | 63 | Pardeeville | 89 |
| Horicon Junc | 54 | Fox Lake Junc | 69 | Wis. Cent. Junc | 97 |
| Minnesota Junc | 57 | Randolph | 74 | Portage City | 98 |
| Rolling Prairie | 59 | Cambria | 80 | | |

*C., M. & St. Paul R'y — Southern Wisconsin Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milton | 0 | Hanover | 16 | Juda | 34 |
| Milton Junc | 1 | Orford | 21 | Monroe | 43 |
| Janesville | 9 | Brodhead | 27 | | |

*C., M. & St. Paul R'y — Madison & Portage Div.*

| | | | | | |
|---|---|---|---|---|---|
| Madison | 0 | De Forest | 14 | Hartman | 28 |
| East Madison | 1 | Morrison | 16 | Portage | 39 |
| Sanderson | 7 | Arlington | 21 | | |
| Windsor | 11 | Poynette | 25 | | |

*C., M. & St. Paul R'y — Racine & Southwestern Div.*

| | | | | | |
|---|---|---|---|---|---|
| Racine | 0 | Burlington | 27 | Clinton | 59 |
| Racine Junc | 2 | Lyons | 31 | Porters | 64 |
| W. U. Junc | 8 | Springfield | 34 | Beloit | 69 |
| Windsor | 10 | Elkhorn | 41 | | |
| Union Grove | 15 | Delavan | 46 | Freeport, Ill | 103 |
| Kansasville | 18 | Darien | 50 | Rock Island | 197 |
| Dover | 21 | Allen's Grove | 54 | | |

*C., M. & St. Paul R'y — Eagle Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Elkhorn | 0 | Mayhews | 8 | Eagle | 17 |
| Fayette | 6 | Troy Center | 11 | | |

*Chicago, St. Paul & Minneapolis R'y.*

| | | |
|---|---|---|
| Elroy ..... 0 | Humbird ..... 70 | Woodville ..... 152 |
| Tun. Siding ..... 6 | Fairchild ..... 77 | Baldwin ..... 157 |
| Camp Douglass ..... 13 | Augusta ..... 86 | Hammond ..... 160 |
| Stowell ..... 19 | Fall Creek ..... 96 | Roberts ..... 166 |
| Wis. Val. Junc ..... 25 | Midway ..... 102 | North Wis. Junc .. 174 |
| Lowery's ..... 29 | Eau Claire ..... 108 | Hudson ..... 177 |
| Warren's ..... 32 | West Eau Claire .. 110 | MINNESOTA — |
| Rudd's ..... 36 | Elk Mound ..... 119 | Stillwater Junc... 182 |
| Millston ..... 40 | Rusk ..... 127 | Lake Elmo ..... 185 |
| Sheppard's ..... 47 | Menomonee ..... 132 | Oak Dale ..... 189 |
| Black River Falls... 52 | Knapp ..... 141 | Post's ..... 194 |
| Wright's ..... 61 | Wilson ..... 145 | S. P. & P. Junc... 196 |
| Merrillan ..... 64 | Hersey ..... 148 | St. Paul ..... 198 |

*Chicago & Tomah R'y.*

| | | |
|---|---|---|
| Woodman ..... | Dankliff Junc ..... | Lancaster ..... |
| Worley ..... | Stitzer ..... | ..... |
| Fennimore ..... | Liberty Ridge ..... | ..... |

*Green Bay & Minnesota R'y.*

| | | |
|---|---|---|
| Green Bay ..... 0 | Amherst Junc .... 70 | Hixon ..... 158 |
| Duck Creek ..... 6 | Plover ..... 81 | Taylor ..... 165 |
| Oneida ..... 10 | Meehan ..... 86 | Blair ..... 171 |
| Seymour ..... 17 | Grand Rapids ..... 95 | Whitehall ..... 178 |
| Black Creek ..... 23 | Elm Lake ..... 104 | Independence ..... 184 |
| Shiocton ..... 30 | Dexterville ..... 110 | Arcadia ..... 192 |
| New London ..... 39 | Scranton ..... 119 | Dodge ..... 204 |
| Northport ..... 42 | City Point ..... 121 | Marshland ..... 210 |
| Royalton ..... 46 | Tremont ..... 130 | Bluff Spring ..... 212 |
| Manawa ..... 50 | Hatfield ..... 142 | ..... ..... |
| Ogdensburg ..... 55 | Merrillan ..... 148 | Winona, Minn ..... 214 |
| Scandinavia ..... 61 | Alma Centre ..... 152 | ..... |

*G. B. & M. R'y — La Crosse Division.*

| | | |
|---|---|---|
| La Crosse ..... 0 | Lytle's ..... 15 | Marshland ..... 29 |
| Onalaska ..... 6 | Trempealeau ..... 21 | ..... ..... |
| Midway ..... 10 | Pine Creek ..... 28 | Green Bay ..... 239 |

*Chicago & Northwestern R'y — Madison Division.*

| | | |
|---|---|---|
| Chicago ..... 0 | Lodi ..... 67 | Norwalk ..... 142 |
| Beloit ..... 91 | Merrimac ..... 73 | Summit ..... 145 |
| ..... | Kirkland ..... 80 | Sparta ..... 155 |
| Beloit ..... 0 | Cliff House ..... 81 | Bangor ..... 165 |
| Afton ..... 7 | Baraboo ..... 84 | West Salem ..... 169 |
| Hanover ..... 13 | Kirkwood ..... 88 | Winona Junc ..... 176 |
| Footville ..... 16 | North Freedom ... 90 | Onalaska ..... 178 |
| Magnolia ..... 20 | Ableman's ..... 94 | Midway ..... 182 |
| Evansville ..... 25 | Reedsburg ..... 100 | Lytle's ..... 187 |
| Brooklyn ..... 31 | Lavalle ..... 108 | Trempealeau ..... 193 |
| Oregon ..... 37 | Wonewoc ..... 115 | Pine Creek ..... 200 |
| Syene ..... 42 | Union Centre ..... 118 | Marshland ..... 202 |
| Madison ..... 47 | Elroy ..... 121 | Bluff Spring ..... 204 |
| Mendota ..... 52 | Glendale ..... 126 | ..... |
| Waunakee ..... 57 | Kendall's ..... 128 | Winona, Minn ..... 206 |
| Dane ..... 62 | Wilton ..... 137 | St. Paul, Minn ..... |

*C. & N. W. R'y — Wisconsin Div.*

| | | | | | |
|---|---|---|---|---|---|
| Chicago | 0 | Watertown | 130 | State Hospital | 198 |
| Harvard Junc., Ill. | 63 | Clyman | 138 | Snell's | 202 |
| | | Juneau | 145 | Menasha | 207 |
| Sharon | 71 | Minnesota Junc | 148 | Neenah | 207 |
| Clinton Junc | 78 | Burnett Junction | 152 | West Menasha | 208 |
| Shopiere | 82 | Chester | 160 | M., L. S. & W. Junc | 212 |
| Janesville | 91 | Oak Centre | 165 | Appleton | 213 |
| Milton Junc | 99 | Oak Field | 168 | Little Chute | 218 |
| Koshkonong | 104 | N. W. Union Junc. | 176 | Kaukauna | 220 |
| Ft. Atkinson | 111 | Fond du Lac | 177 | Wrightstown | 226 |
| Jefferson | 116 | S. & F. Junc | 178 | Little Kaukauna | 230 |
| Johnson's Creek | 122 | Vandyne | 184 | De Pere | 236 |
| Watertown Junc | 129 | Oshkosh | 193 | Ft. Howard | 242 |

*C. & N. W. R'y — Northwestern Union Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Granville | 15 | Kewaskum | 41 |
| L. S. Junc | 3 | Rockfield | 21 | New Cassel | 47 |
| Lindwerm | 6 | Jackson | 27 | Eden | 55 |
| Silver Springs | 8 | West Bend | 34 | Fond du Lac Junc. | 63 |
| St. Catherine | 13 | Barton | 35 | Fond du Lac | 64 |

*C. & N. W. R'y — Milwaukee Div.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | County Line | 14 | Kenosha | 33 |
| St. Francis | 4 | Ives Station | 20 | State Line | 40 |
| Buckhorn | 6 | Racine | 23 | | |
| Oak Creek | 9 | Racine Junc | 24 | Chicago | 85 |

*C. & N. W. R'y — Peninsular Div.*

| | | | | | |
|---|---|---|---|---|---|
| Ft. Howard | 0 | Brookside | 19 | Peshtigo | 42 |
| Duck Creek | 5 | Pensaukee | 23 | Marinette | 49 |
| Big Suamico | 8 | Oconto | 28 | | |
| Little Suamico | 14 | Cavaits | 38 | Menominee, Mich. | 50 |

*C. & N. W. R'y — Kenosha Div.*

| | | | | | |
|---|---|---|---|---|---|
| Kenosha | 0 | Bristol | 12 | Bassetts | 21 |
| Pleasant Prairie | 6 | Salem | 15 | Genoa Junc | 28 |
| Woodworth | 9 | Fox River | 19 | Rockford, Ill | 72 |

*C. & N. W. R'y — Fox River Line.*

| | | | | | |
|---|---|---|---|---|---|
| Chicago | 0 | Genoa Junc | 77 | Geneva Lake | 86 |

*Sheboygan & Fond du Lac R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Sheboygan | 0 | Calvary | 30 | Eldorado | 52 |
| M., L. S. & W. Junc. | 0 | Malone | 32 | Rosendale | 54 |
| Sheboygan Falls | 5 | Summit Switch | 34 | West Rosendale | 57 |
| Town Line | 11 | Peebles | 38 | Ripon Junction | 63 |
| Plymouth | 14 | Fond du Lac | 43 | Ripon | 63 |
| Glenbeulah | 19 | Fond du Lac Junc. | 44 | Green Lake | 69 |
| Hull's Crossing | 22 | Woodhull | 48 | St. Marie | 72 |
| St. Cloud | 26 | Holliday's | 50 | Princeton | 78 |

*Fond du Lac, Amboy & Peoria R'y.*

| | | |
|---|---|---|
| Fond du Lac..... | Brown's Crossing ..... | Iron Mountain ..... |
| Camp-ground..... | Lomira ..... | Iron Ridge..... |
| Byron..... | Mayville... ..... | ..... ..... |

*Galena & Wisconsin R'y.*

| | | |
|---|---|---|
| Galena, Ill..... | St. Rosa ..... | M. P. R. R. Crossing... |
| Bell's Mills, Ill..... | Elmo. ..... | Grand View..... |
| ..... ..... | Philip's Corner ..... | McCormac's... ..... |
| Bunchome ..... | ..... | ..... |
| Benton..... | Platteville..... | ..... |
| Cuba City..... | ..... | ..... ..... |

*Milwaukee, Lake Shore & Western R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee ..... | 0 | Newton ..... | 69 | Appleton Junc.... | 121 |
| Lake Shore Junc.... | 3 | Manitowoc..... | 77 | Greenville..... | 127 |
| Whitefish Bay..... | 5 | Two Rivers Junc.. | 78 | West Greenville ... | 130 |
| Dillman's ..... | 10 | ..... ..... | | Hortonville..... | 133 |
| Mequon.... ..... | 13 | Two Rivers..... | 84 | New London Junc. | 140 |
| Ulao ..... | 20 | ..... | | Sugar Bush..... | 146 |
| Port Washington ... | 25 | Branch..... | 84 | Bear Creek..... | 150 |
| Decker's..... | 30 | Cato. ..... | 88 | Clintonville ... ... | 156 |
| Belgium..... | 33 | Grimm's..... .... | 91 | Marion ..... | 164 |
| Cedar Grove..... | 38 | Reedville..... | 94 | Hunting..... | 169 |
| Oastburg ..... .. | 42 | Brillion ..... | 99 | Split Rock ..... | 172 |
| Wilson ..... ... | 46 | Forrest Junc..... | 104 | Tigerton ..... | 175 |
| Weeden's..... | 48 | Dundas..... | 107 | Whitcomb ..... | 179 |
| Sheboygan. ..... | 52 | Kaukauna ..... | 112 | Wittenberg ..... | 183 |
| Mosel ..... | 58 | Little Chute... ... | 116 | Eland Junc..... | 187 |
| Centreville ..... | 63 | Appleton ..... | 119 | Norrie..... | 190 |

*M., L. S. & W. R'y— Oshkosh Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Hortonville Junc.... | 0 | Wis. Cent. Junc... | 6 | Prattville..... | 14 |
| Medina ..... | 4 | Lee..... | 9 | Oshkosh ..... | 22 |

*Mineral Point R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Warren, Ill..... | 0 | Darlington..... | 16 | ..... | |
| ..... ..... | | Calamine..... | 23 | ..... | |
| Gratiot..... | 7 | Mineral Point .... | 33 | ..... | |

*Mineral Point R'y— Platteville Div.*

| | | | | | |
|---|---|---|---|---|---|
| Mineral Point ..... | 0 | Belmont..... | 20 | ..... ..... | |
| Calamine..... | 10 | Platteville ..... | 28 | .... ..... | |

*North Wisconsin R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Hudson ..... | 0 | Deer Park ..... | 22 | Granite Lake..... | 59 |
| North Wis. Junc.... | 0 | Cedar Lake..... | 30 | Shell Lake ... .... | 70 |
| Burkhardt's..... | 3 | Summit ..... | 31 | Chandler ..... | 80 |
| Boardman ..... | 8 | Clayton..... | 38 | ..... | |
| New Richmond..... | 14 | Cumberland ..... | 54 | ..... | |

*Wisconsin Valley R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Tomah | 0 | Port Edwards | 42 | Mosinee | 75 |
| Valley Junction | 6 | Centralia | 46 | Schofield | 84 |
| Norway | 13 | Wooden | 50 | Wausau | 89 |
| Mather | 15 | Rudolph | 53 | Trap City | 99 |
| Meadow Valley | 20 | Junction City | 60 | Pine River | 103 |
| Mill Grove | 21 | Runkels | 63 | Jenny | 108 |
| Smith's | 23 | Hutchinson | 67 | | |
| Remington | 28 | Knowlton | 70 | | |

*Wisconsin Central R'y.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Appleton | 109 | Colby | 216 |
| Schwartzburg | 9 | | | Dorchester | 222 |
| Good Hope | 12 | West Menasha | 103 | Stetsonville | 227 |
| Brown Deer | 14 | Clayton | 107 | Medford | 232 |
| Theinsville | 18 | Medina | 112 | Whittlesey | 239 |
| Cedarburg | 23 | Dale | 115 | Chelsea | 243 |
| Grafton | 25 | Gill's Landing | 127 | Westboro | 247 |
| Saukville | 29 | Weyauwega | 129 | Ogema | 254 |
| Fredonia | 36 | Waupaca | 136 | Malden | 259 |
| Random Lake | 41 | Sheridan | 143 | Worcester | 265 |
| Sherman | 46 | Amherst | 149 | Philips | 273 |
| Waldo | 50 | Amherst Junction | 151 | Wauboo | 281 |
| Plymouth | 55 | Custer | 157 | Fifield | 287 |
| Elkhart | 62 | Stevens Point | 165 | Gould | 292 |
| Kiel | 68 | Boom Track | 169 | Butternut | 297 |
| New Holstein | 71 | Junction City | 176 | Chippewa | 307 |
| Hayton | 76 | Milladore | 180 | Willis | 317 |
| Chilton | 78 | Auburndale | 188 | Penokee | 324 |
| Hilbert | 86 | Marshfield | 197 | Silver Creek | 332 |
| Sherwood | 91 | Mannville | 200 | Marengo | 338 |
| Lake Park | 96 | Spencer | 205 | White River | 344 |
| Menasha | 102 | Unity | 212 | Ashland | 351 |

*Wisconsin Central R'y — Green Bay Branch.*

| | | | | | |
|---|---|---|---|---|---|
| Milwaukee | 0 | Holland | 94 | De Pere | 108 |
| | | Latham's | 97 | Green Bay | 113 |
| Hilbert | 86 | Greenleaf | 98 | | |
| Forrest Junction | 91 | Ledgeville | 101 | | |

*Wisconsin Central R'y — Southern Div.*

| | | | | | |
|---|---|---|---|---|---|
| Portage | 0 | Hank's | 21 | Plainfield | 49 |
| Corning | 6 | Westfield | 25 | Bancroft | 56 |
| Moundville | 10 | Liberty Bluff | 31 | Buena Vista | 60 |
| Merritt's | 12 | Coloma | 36 | Plover | 66 |
| Packwaukee | 18 | Hancock | 43 | Stevens Point | 71 |

*C. & N. W. R'y — Madison & Montfort Line.*

| | | | | | |
|---|---|---|---|---|---|
| Madison | 0 | Verona | 12 | Riley's | 18 |
| Mt. Horeb | 24 | Blue Mounds | 29 | Barneveld | 33 |
| Ridgeway | 39 | Dodgeville | 48 | Edmund | 55 |
| Cobb | 59 | Montfort | 64 | | |